AN HISTORICAL MISCELLANY OF THE CURIOSITIES AND RARITIES IN NATURE AND ART.

COMPRISING

NEW AND ENTERTAINING DESCRIPTIONS

OF THE MOST SURPRISING

VOLCANOS, CAVERNS, CATARACTS, WHIRLPOOLS, WATER-FALLS, EARTHQUAKES, THUNDER, LIGHTNING,

AND OTHER WONDERFUL AND STUPENDOUS

PHENOMENA OF NATURE.

FORMING A RICH AND COMPREHENSIVE VIEW OF ALL THAT IS INTERESTING AND CURIOUS

IN EVERY PART OF THE HABITABLE WORLD.

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PREFACE.

FEW Subjects which present themselves to our view, as fit objects for human enquiry and amusement, are so desirable or instructive as the CURIOSITIES of NATURE and ART. The exertion of the national spirit upon any particular Art, promotes activity and success in the discovery of others, whereby knowledge and prosperity go hand in hand, and the mind receives a spring which is vigorously exerted in every new pursuit. Thus it is that one artist catches fire from another, and he who makes a figure in one department, rouses emulation in all.

But the most important step towards perfection in the polite and imitative Arts, as well as to direct our Taste and Judgment therein, is a comprehensive knowledge of the *Beauties of Nature*. These were the first and earliest studies of those celebrated characters who now only live, but who will for ever live, in the beauty and perfection of those Arts in which they excelled. Thus beauty was studied in objects of sight; and men of taste attached themselves to the fine Arts, which multiplied their enjoyments, and increased their benevolence. From this source Sculpture and Painting made an early figure in Greece, which afford such a variety of beautiful originals to modern artists. Statuary, a more simple imitation than painting, was much sooner brought to perfection; the Statue of Jupiter by Phidias, and of Juno by Polycletes, though the admiration of all the world, were executed long before the art and effect of light

and ſhade were known. It was a ſtrict adherence to the moſt perfect models of nature, that made the artiſts of Greece and Rome excel their cotemporaries; and to theſe alone we muſt look up for the ſublimity and grandeur of the beſt-finiſhed works and moſt ſtriking productions of men.

The Sublime and Beautiful in Nature, which are more or leſs to be found in all countries, climates, and ſeaſons, conſiſt of thoſe qualities in the Works of Providence, which are calculated to excite pleaſing ſenſations in the minds of thoſe who attentively obſerve them. Mountains, hills, valleys, and all the inequalities of the earth, though ſome think they take away much from its beauty, are ſo far from producing ſuch an effect, that on the contrary they afford a more pleaſing aſpect, and confer great advantages to the intentions of nature. For thus the terreſtrial ſuperficies is larger; different kinds of plants thrive better, and are more eaſily watered; and the rain-waters run in continual ſtreams into the ſea; not to mention many other uſes in relation to winds, heat, cold, &c. The Alps, which are the higheſt mountains, and reach to the ſecond region of the air, where trees cannot grow erect, add much to the ſplendour and magnificence of pictureſque beauty, which conſtitutes the portrait of Nature, clothed in her original variety, and attired in all her irregular grandeur; a view of which we always find among the ingredients of landſcape, trees, and rocks, broken grounds, woods, rivers, lakes, plains, valleys, and foaming caſcades,---a retroſpect, that at once rouſes

and

and enlightens the imagination of the poet, and fires the genius of the artiſt, by a means which no human ſtudy can confer, ſince it is alone the gift of heaven.

But the taſte for natural beauty is ſubſervient to higher purpoſes than theſe; and the cultivation of it not only refines and humaniſes, but dignifies and exalts the affections of mankind. It elevates them to the admiration and love of that Being who is the author of all that is fair, ſublime, and good, in the creation. Scepticiſm and irreligion are hardly compatible with the ſenſibility of heart which ariſes from a juſt and lively reliſh of the wiſdom, harmony, and order, ſubſiſting in the world around us; and emotions of piety muſt ſpring up ſpontaneouſly in the boſom that is fraught with a lively ſenſe of the gifts and bleſſings of all-bountiful nature.

On the whole, the advantages reſulting from a taſte for the Beauties of Nature, are great and important. It is equally certain, that as it is uſeful, ſo it is a continual ſource of real enjoyment; for a more rational pleaſure cannot poſſibly occupy the attention, or captivate the affections of mankind, than that which ariſes from a due conſideration of the works of creation. Pleaſure, we know, is a neceſſary ingredient in human life, in order to counterbalance the pains, the evils, and liſtleſſneſſes, which are at times unavoidable. It is the part then of the moraliſt, and it has been frequently his buſineſs, to point out and recommend ſuch pleaſures as are highly gratifying, and yet are perfectly innocent. Of this kind are the pleaſures afforded by contemplating the Curioſities of Nature

and Art; and they cannot but be highly agreeable to every taſte uncorrupted by vicious indulgence. Rural ſcenes of almoſt every kind are delightful to the mind of man; ſince they unqueſtionably produce an inexhauſtible fund of innocent amuſement, highly gratifying to the ſenſes. The verdant lawn, the ſhady grove, the variegated landſcape, the boundleſs ocean, and the ſtarry firmament, are contemplated with pleaſure by every attentive beholder. But the emotions of different ſpectators, though ſimilar in kind, differ widely in degree. There are ſome men indeed, who appear to be hurried on in the career of life with too great rapidity to give attention to that which ſolicits no paſſion. To ſuch, the darkeſt habitations in the dirtieſt ſtreets of the metropolis, where money can be accumulated, has greater charms than the Leaſowes, or groves of Hagley. To reliſh with full delight, the enchanting ſcenes of Nature, the mind muſt be untinctured with ſenſuality, indolence, and avarice; quick in her ſenſibilities; elevated in her ſentiments, and elegant in her choice of objects and ſpeculations. Such ardent enthuſiaſm after the Works of NATURE and ART, may perhaps be thought incompatible with the neceſſary toils and active offices which Providence has aſſigned to the generality of men. But there are none to whom ſome portion of it may not prove advantageous; and if it were cheriſhed by each individual, in that degree which is conſiſtent with the indiſpenſible duties of his ſtation, the felicity and dignity of the human character would be conſiderably enriched by it.

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DIRECTIONS TO THE BINDER.

The Copper-plate View of the Cascade of Velino, is to face the Title, by way of Frontispiece to the Volume.

HISTORY

HISTORY

OF THE

CURIOSITIES AND RARITIES

IN NATURE AND ART.

OF THE INTELLECTUAL FACULTY OF BRUTES.

THAT brute-animals poſſeſs reflection and ſentiment, and are ſuſceptible of the kindly as well as the irraſcible paſſions, independently of ſexual attachment and natural affection; and that they have a great ſhare of fidelity, of pride, and even a ſenſe of glory; may be demonſtrated from the elephant, the horſe, and the dog. Elephants, even in a ſavage ſtate, are peaceable and gentle creatures, and never uſe their weapons but in defence of themſelves or companions. When tamed, the elephant is the moſt friendly and obedient of all animals; and ſeems entirely devoted to the perſon who feeds and takes care of him. In a ſhort time he underſtands ſigns, and the ſound of his maſter's voice. He diſtinguiſhes the language of paſſion, of command, of ſatisfaction; and acts accordingly. He receives his orders with attention, and executes them with prudence and alacrity, but without precipitation. He eaſily learns to bow his knees and lower his body, for the convenience of thoſe who mount him. He careſſes his friends, and lifts burdens with his trunk, and aſſiſts thoſe who are loading him in laying them on his back; but above all he delights in ſhining harneſs and trappings, and in being thus led on to the war.

The intrepidity and ſagacity of the horſe has been regarded with admiration by all ranks of men, and in all ages of the world. Even in a domeſtic ſtate he is bold and fiery; and, equally undaunted as his maſter, faces danger and death with ardour and magnanimity. He delights in the noiſe and tumult of arms, and ſeems to feel the glory of victory; he exults in the chace; his eyes ſparkle with emulation in the courſe. But, though bold and intrepid, he is docile and tractable: he knows how to govern and check the natural vivacity and fire of his temper. He not only yields to the hand, but ſeems to

 consult

consult the inclination, of his rider. Constantly obedient to the impressions he receives, his motions are entirely regulated by the will of his master. He in some measure resigns his very existence to the pleasure of man. He delivers up his whole powers, he reserves nothing; he will rather die than disobey. Who could endure to see a character so noble abused? who could be guilty of such gross barbarity? none but wretches most relentless and unfeeling! We need go no farther than the horse to prove how strongly nature has endowed brute-animals with memory; for, whatever roads, pastures, inns, or stables, a horse has been accustomed to, though removed for years to a distant part of the country, he never forgets them; but, if ever he returns or passes by them again, he gives evident tokens that he has been accustomed to the place. The celebrated equestrians, Hughes and Astley, could, we doubt not, furnish a thousand curious anecdotes to illustrate this fact, and to shew that nothing is wanting but the gift of speech to make them reasonable creatures.

But, to shew more obviously the reasoning faculty of brutes, and to distinguish the operations of intellect from those of instinct, we need only contemplate the actions and disposition of the dog. In a savage state, it must be allowed, that he is fierce, cruel, and voracious; but, when civilized and accustomed to live with men, he is possessed of every amiable quality. He seems to have no other desire than to please and protect his master. He is gentle, obedient, submissive, and faithful. These dispositions, joined to his almost unbounded sagacity, justly claim the esteem of mankind. Accordingly, no animal is so much caressed or respected: he is so ductile, and so much formed to please, that he assumes the very air and temper of the family in which he resides. An animal endowed with such uncommon qualities must answer many useful purposes. His fidelity and vigilance are daily employed to protect our persons, our flocks, and our goods. The acuteness of his smell gains him employment in hunting; he is frequently employed as a turnspit; at Brussels and in Holland he is trained to draw little carts to the herb-market; and in the northern regions draws a sledge with his master in it, or else loaded with provisions. The instances of sagacity, fidelity, and attention, and even of foresight, which these faithful animals have evinced towards their masters, must have fallen under the observation of every reader: we shall therefore only recite the following instance, which is of unquestionable authenticity.—At the seat of the late Earl of Litchfield, three miles from Blenheim, there is a portrait in the dining-room of Sir Henry Lee, by Johnstone, with that of a mastiff-dog which saved his life. It seems a servant had formed the design of assassinating his master and robbing the house; but, the night he had fixed on, the dog, which had never been much noticed by Sir Henry, for the first time followed him up stairs, got under his bed, and could not be got from thence by either master or man; in the dead of night, the same servant entered the room to execute his horrid design, but was instantly seized by the dog, and, being secured, confessed his intentions. There are ten quaint lines in one corner of the picture, which conclude thus:

But in my dog, whereof I made no store,
I find more love than those I trusted more.

Upon what hypothesis can we account for a degree of foresight and penetration such as this? Or will it be suggested, as a solution of the difficulty, that a dog may possibly become capable in a great measure of understanding human discourse, and of reasoning and acting accordingly; and that, in the present instance, the villain had either uttered his design in soliloquy, or imparted it to an accomplice, in the hearing of the animal?

Yet it is much disputed whether the brutes have any language whereby they can express their minds to each other; or whether all the noise they make consists only of cries inarticulate, and unintelligible even to themselves. We may indeed, from analogy, conclude, with great reason, that some of the cries of beasts are really expressions of their sentiments; but whether one beast is capable of forming a design, and communicating that design by any kind of language to others, is what I shall leave to the judgment of the reader, after submitting to his consideration the following instance. A sparrow, finding a nest, that a martin had just built, standing very conveniently for him, possessed himself of it. The martin, seeing the usurper in her house, called for help to expel him. A thousand martins came full speed, and attacked the sparrow; but the latter being covered on every side, and presenting only his large beak at the entrance of the nest, was invulnerable, and made the boldest of them who durst approach him repent of their temerity. After a quarter of an hour's combat all the martins disappeared. The sparrow thought he had got the better, and the spectators judged that the martins had abandoned their undertaking. Not in the least. Immediately they returned to the charge; and, each of them having procured a little of that tempered earth with which they make their nests, they all at once fell upon the sparrow, and inclosed him in the nest to perish there, though they could not drive him thence. Can it be imagined that the martins could have been able to hatch and concert this design all of them together, without speaking to each other, or without some medium of communication equivalent to language?

From these and other extraordinary endowments manifested by brute-animals of different countries and kinds, some philosophers have maintained that brutes are endowed with a soul, though essentially inferior to that of men; and to this soul they have allowed immortality. Father Bougeant, a Jesuit, has lately published a treatise expressly on this subject, entitled, *A Philosophical Amusement on the Language of Brutes*, in which he affirms that they are animated by evil spirits, or devils. The strangeness of this doctrine has induced me to give the outline of his arguments, since they cannot fail to prove entertaining to the reader:—"Reason (says he) naturally inclines us to believe that beasts have a spiritual soul; and the only thing that opposes this sentiment is, the consequences that might be inferred from it. If brutes have a soul, that soul must be either matter or spirit; it must be one of the two, and yet you dare affirm neither. You dare not say it is matter, because then you must necessarily suppose matter to be capable of thinking: nor will you say that it is spirit, this opinion bringing with it consequences contrary to the principles of religion; and this, among others, that man would differ from beasts only by the degrees of *plus* and *minus*, which would demolish the very foundation of all religion. Therefore, if I can elude all these consequences; if I can assign to beasts a spiritual soul, without strik-

ing at the doctrines of religion: it is evident, that my ſyſtem, being moreover the moſt agreeable to reaſon, is the only warrantable hypotheſis. Now I ſhall and can do it, with the greateſt eaſe imaginable. I even have means, by the ſame method, to explain many very obſcure paſſages in the Holy Scripture, and to reſolve ſome very great difficulties which are not well confuted. This we ſhall unfold in a more particular manner. Religion teaches us, that the devils, from the very moment they had ſinned, were reprobate, and that they were doomed to burn for ever in hell; but the church has not yet determined whether they do actually endure the torments to which they are condemned. It may then be thought that they do not yet ſuffer them, and that the execution of the verdict brought againſt them is reſerved for the day of final judgment.—Now what I pretend to infer from hence is, that, till doomſday comes, God, in order not to ſuffer ſo many legions of reprobate ſpirits to be of no uſe, has diſtributed them through the ſeveral ſpaces of the world, to ſerve the deſigns of his Providence, and make his omnipotence to appear. Some, continuing in their natural ſtate, buſy themſelves in tempting men, in ſeducing and tormenting them; either immediately, as Job's devil, and thoſe that lay hold of human bodies; or by the miniſtry of ſorcerers or phantoms. Theſe wicked ſpirits are thoſe whom the ſcripture calls the power of darkneſs, or the powers of the air. God, with the others, makes millions of beaſts of all kinds, which ſerve for the uſes of men, and cauſe the omnipotence of the Creator to be admired. By that means I can eaſily conceive, on the one hand, how the devils can tempt us; and on the other, how beaſts can think, know, have ſentiments, and a ſpiritual ſoul, without any way ſtriking at the doctrines of religion. I am no longer ſurpriſed to ſee them have forecaſt, memory, and judgment. I ſhould rather have occaſion to wonder at their having no more, ſince their ſoul very likely is more perfect than ours. But I diſcover the reaſon of this: it is becauſe, in beaſts as well as in ourſelves, the operations of the mind are dependent on the material organs of the machine to which it is united; and, thoſe organs being groſſer and leſs perfect than in us, it follows, that the knowledge, the thoughts, and the other ſpiritual operations, of the beaſts, muſt of courſe be leſs perfect than ours: and, if theſe proud ſpirits know their own diſmal ſtate, what an humiliation muſt it be to them thus to ſee themſelves reduced to the condition of beaſts! But, whether they know it or not, ſo ſhameful a degradation is ſtill, with regard to them, the primary effect of the divine vengeance I juſt mentioned; it is an anticipated hell."—Having mentioned the prejudices againſt this hypotheſis, ſuch particularly as the pleaſure which people of ſenſe and religion take in beaſts and birds, eſpecially all ſorts of domeſtic animals; he proceeds, "Do we love beaſts for their own ſakes? No. As they are altogether ſtrangers to human ſociety, they can have no other appointment but that of being uſeful and amuſing. And what care we whether it be a devil or any other creature that amuſes us? The thought of it, far from ſhocking, pleaſes me mightily. I with gratitude admire the goodneſs of the Creator, who gave me ſo many little devils to ſerve and amuſe me. If I am told that theſe poor devils are doomed to ſuffer eternal tortures, I admire God's decrees, but I have no manner of ſhare in that dreadful ſentence; I leave the execution of it

it to the ſovereign Judge; and, notwithſtanding this, I live with my little devils as I do with a multitude of people, of whom religion informs me that a great number ſhall be damned. But the cure of a prejudice is not to be effected in a moment; it is done by time and reflection; give me leave then lightly to touch upon this difficulty, in order to obſerve a very important thing. Perſuaded as we are that beaſts have intelligence, have we not all of us a thouſand times pitied them for the exceſſive evils which the majority of them are conſtantly expoſed to, and in reality ſuffer? How unhappy is the condition of horſes! we are apt to ſay upon ſeeing a horſe whom an unmerciful carman is murdering with blows. How miſerable is a dog whom they are breaking for hunting! How diſmal is the fate of beaſts living in woods! they are perpetually expoſed to the injuries of the weather; always ſeized with apprehenſions of becoming the prey of hunters, or ſome wilder animals; for ever obliged, after long fatigue, to look out for ſome poor inſipid food; often ſuffering cruel hunger; and ſubject, moreover, to illneſs and death! If men are ſubject to a multitude of miſeries that overwhelm them, religion acquaints us with the reaſon of it; viz. the being born ſinners. But what crime can beaſts have committed by birth to be ſubject to evils ſo very cruel? What are we, then, to think of the horrible exceſſes of miſeries undergone by beaſts? miſeries, indeed, far greater than thoſe endured by men. This is, in any other ſyſtem, an incomprehenſible myſtery; whereas nothing is more eaſy to be conceived from the ſyſtem I propoſe. The rebellious ſpirits deſerve a puniſhment ſtill more rigorous, and happy is it for them that their puniſhment is deferred. In a word, God's goodneſs is vindicated, man himſelf is juſtified: for what right can we have, without neceſſity, and often in the way of mere diverſion, to take away the life of millions of beaſts, if God had not authoriſed us ſo to do? And, beaſts being as ſenſible as ourſelves of pain and death, how could a juſt and merciful God have given man that privilege, if they were not ſo many guilty victims of the divine vengeance?

"But hear ſtill ſomething more convincing, and of greater conſequence; beaſts, by nature are extremely vicious. We know well that they never ſin, becauſe they are not free; but this is the only condition wanting to make them ſinners. The voracious birds and beaſts of prey are cruel. Many inſects of one and the ſame ſpecies devour one another. Cats are perfidious and ungrateful; monkeys are miſchievous; and dogs envious. All beaſts in general are jealous and revengeful to exceſs; not to mention many other vices we obſerve in them: and at the ſame time that they are by nature ſo very vicious, they have, ſay we, neither the liberty nor any helps to reſiſt the bias that hurries them into ſo many bad actions. They are, according to the ſchools, neceſſitated to do evil, to diſconcert the general order, to commit whatever is moſt contrary to the notion we have of natural juſtice, and to the principles of virtue. What monſters are theſe in a world originally created for order and juſtice to reign in! This is, in good part, what formerly perſuaded the Manicheans, that there were of neceſſity two orders of things, one good, and the other bad; and that the beaſts were not the work of the good principle: a monſtrous error! But how then ſhall we believe that beaſts came out of the hands of their Creator with qualities ſo very ſtrange! If man is ſo very wicked and corrupt, it is becauſe he has himſelf through ſin perverted

verted the happy nature God had given him at his creation. Of two things, then, we must say one: either that God has taken delight in making beasts so vicious as they are, and of giving us in them models of what is most shameful in the world; or that they have, like man, original sin, which has perverted their primitive nature.—The first of these propositions finds very difficult access to the mind, and is an express contradiction to the Holy Scriptures; which say, that whatever came out of God's hands, at the time of the creation of the world, was *good*, yea *very good*. What good can there be in a monkey's being so very mischievous, a dog so full of envy, a cat so malicious? But then many authors have pretended, that beasts, before man's fall, were different from what they are now: and that it was in order to punish man that they became so wicked. But this opinion is a mere supposition, of which there is not the least footstep in Holy Scripture. It is a pitiful subterfuge to elude a real difficulty: this at most might be said of the beasts with whom man has a sort of correspondence; but not at all of the birds, fishes, and insects, which have no manner of relation to him. We must then have recourse to the second proposition, that the nature of beasts has, like that of man, been corrupted by some original sin: another hypothesis, void of foundation, and equally inconsistent with reason and religion, in all the systems which have been hitherto espoused concerning the souls of beasts. What party are we take? Why, admit of my system, and all is explained. The souls of beasts are refractory spirits which have made themselves guilty towards God. The sin in beasts is no original sin; it is a personal crime, which has corrupted and perverted their nature in its whole substance; hence all the vices and corruption we observe in them, though they can be no longer criminal, because God, by irrecoverably reprobating them, has at the same time divested them of their liberty."

These quotations contain the strength of Father Bougeant's hypothesis, which also hath had its followers; but the reply to it is obvious. Beasts, though remarkably mischievous, are not completely so; they are in many instances capable of gratitude and love, which devils cannot possibly be. The very same passions that are in the brutes exist in the human nature; and, if we chose to argue from the existence of those passions, and the ascendency they have over mankind at some times we might say with as great justice that the souls of men are devils, as that the souls of brutes are. All that can be reasonably inferred from the greater prevalency of the malignant passions among the brutes than among men, is, that the former have less rationality than men: and accordingly it is found, that among savages, who exercise their reason less than other men, every species of barbarity is practised, without being deemed a crime.—Upon the whole, it is impossible to deduce this variety of action, in animals, from a general and uniform instinct only. For they accommodate their operations to times and circumstances. They combine; they choose the favourable moment; they avail themselves of the occasion, and seem to receive instruction by experience. Many of their operations announce reflection: the bird repairs a shattered nest, instead of constructing instinctively a new one: the hen who has been robbed of her eggs, changes her place in order to lay the remainder with more security: the cat discovers both care and artifice in concealing her kittens. Again, it is evident, that, on many occasions, animals know their

their faults and mistakes, and correct them; they sometimes contrive the most ingenious methods of obtaining their ends, and, when one method fails, have recourse to another; and they have, without doubt, a kind of language for the mutual communication of their ideas. How is all this to be accounted for, unless we suppose them endowed with the powers of perceiving, thinking, remembering, comparing, and judging? They certainly have these powers, in a degree inferior to the human species, and form classes below them in the graduated scale of intelligent beings; but their actions, not being directed to moral ends, are consequently not accountable and proper subjects for reward or punishment in a future world.

CURIOUS ACCOUNT OF A CROCODILE DISSECTED AT SIAM.

A VERY large Crocodile has been lately dissected at Siam, an account of which was sent to the Royal Society. It measured eighteen feet and a half long, of which the tail was no less than five feet and a half, and the head and neck above two and a half. He was four feet and nine inches in circumference where thickest.

The hinder legs, including the thigh and the paw, were two feet and two inches long; the paws, from the joint to the extremity of the longest claws, were above nine inches. They were divided into four toes; of which three were armed with large claws, the longest of which was an inch and a half, and seven lines and a half broad at the root. The fourth toe was without a nail, and of a conical figure; but was covered with a thick skin like shagreen leather. These toes were united with membranes like those of ducks, but much thicker.

The fore-legs had the same parts and conformation as the arms of a man, both within and without; but they were somewhat shorter than those behind. The hands had five fingers, the two last of which had no nails, and were of a conical figure, like the fourth toe on the hind paws. The head was long, and had a little rising at the top; but the rest was flat, and especially towards the extremity of the jaws. It was covered with a skin, which adhered firmly to the skull and to the jaws. The skull was rough and unequal in several places; and about the middle of the forehead there were two bony crests about two inches high. They were not quite parallel, but separated from each other in proportion as they amounted upwards.

The eye was very small in proportion to the rest of the body; and was so placed within its orbit, that the outward part, when shut, was only a little above an inch in length, and ran parallel to the opening of the jaws.

The nose was placed in the middle of the upper jaw, near an inch from its extremity, and was perfectly round and flat, being two inches in diameter, of a black, soft, spongy, substance, not unlike the nose of a dog. The nostrils were in the form of a Greek capital Σ; and there were two caruncles which filled and closed them very exactly, and which opened as often as he breathed through the nose. The jaws seemed to shut one within another by means of several apophyses, which proceeded from above downwards, and from below upwards, there being cavities in the opposite jaw to receive them. They had twenty-seven dog-teeth in the upper jaw and fifteen in the lower, with several void spaces between them. They were thick at the bottom,

bottom, and ſharp at the point; being all of different ſizes, except ten large hooked ones, ſix of which were in the lower jaw, and four in the upper. The mouth was fifteen inches in length, and eight and a half in breadth where broadeſt; and the diſtance of the two jaws, when opened as wide as they could be, was fifteen inches and a half. The ſkull, between the two creſts, was proof againſt a muſket-ball, for it only rendered the part a little white that it ſtruck againſt.

The colour of the body was of a dark brown on the upper part, and of a whitiſh citron below, with large ſpots of both colours on the ſides. From the ſhoulders to the extremity of the tail he was covered with large ſcales of a ſquare form, diſpoſed like parallel girdles, and were fifty-two in number; but thoſe near the tail were not ſo thick as the reſt. In the middle of each girdle there were four protuberances, which became higher as they approached the end of the tail, and compoſed four rows; of which the two in the middle were lower than the remaining two, forming three channels, which grew deeper the nearer they came to the tail, and were confounded with each other about two feet from its extremity.

The ſkin was defended with a ſort of armour which, however, was not proof againſt a muſket-ball, contrary to what has been commonly ſaid. However, it muſt be acknowledged, that the attitude in which it was placed might contribute not a little thereto; for probably, if the ball had ſtruck obliquely againſt the ſhell, it would have flown off. Thoſe parts of the girdles underneath the belly were of a whitiſh colour, and were made up of ſcales of divers ſhapes. They were about one ſixth of an inch in thickneſs, and were not ſo hard as thoſe on the back.

This creature is, however, ſaid to grow to a ſtill larger ſize than that above-mentioned, ſome having been known to meaſure twenty-five feet in length.—They have no tongue; but in place of that organ there is a ſort of membrane attached by its edges to the two ſides of the under jaw.

The crocodile lays eggs, which ſhe covers over with ſand, and leaves to be hatched by the heat of the ſun. They are to be met with in the rivers Nile, Niger, and Ganges, beſides moſt other large rivers in the ſouthern parts of Aſia, Africa, and America.

A beautiful ſnake, called the Amphiſbœne Viper, alſo depoſits her eggs in the ſand; in doing which ſhe ſeeks for and often finds thoſe of the crocodile, which ſhe opens and ſucks; but, inſtant death is ſure to be her fate, if detected by the parent crocodile.

Mr. Haſſelquiſt informs us, that the crocodile ſwallows ſtones to aſſiſt digeſtion, after the manner of ſeed-eating birds, which commit to the ſtomach the work of maſtication as well as concoction, being deſtitute of the inſtruments adapted to that purpoſe. The Egyptians ſay, that his excrements do not paſs by the anus: this ſeems to be confirmed by the ſtructure of the gut, which is near the pylorus; for it cannot eaſily be conceived that excrements ſhould paſs through ſuch a narrow paſſage, ſeemingly deſtined for the conveyance of the chyle only; but the ſtructure of the parts, and the gut being ſo near the pylorus, ſeem to indicate that the excrements paſs through it into the ventricle, and are vomited up. The inhabitants above Cairo ſay they ſee this daily; and obſerve, that the crocodile is obliged to come on-ſhore as often as he has occaſion to eaſe himſelf.

There

There is a folliculus, of the bignefs of a hazel-nut, under the fhoulders of the old crocodiles, which contains a thick matter fmelling like mufk. The Egyptians are very anxious to get this when they kill a crocodile; it being a perfume much efteemed by the grandees. When the male copulates with female, he turns her with his fnout on her back. The Egyptians ufe the fat againft the rheumatifm and ftiffnefs of the tendons, efteeming it a powerful remedy outwardly applied. They fay the gall is good for the eyes; they make ufe of it as a certain remedy for barrennefs in women, taking about fix grains internally, and outwardly they apply a peffus made of cotton and the gall of a crocodile. The eyes of the crocodile are the beft aphrodifiacs of any known by the Arabs; who prefer them to all confections, dea-fatyrii, hyacinthi, &c. and even to ambergris.

The crocodile is a very dangerous and terrible animal in fome countries. It does a great deal of mifchief among the common people of Upper Egypt, often killing and devouring women who come to the river to fetch water, and children playing on the fhore or fwimming in the river. In the ftomach of one diffected before Mr. Barton the Englifh conful, they found the bones of the legs and arms of a woman, with the rings which they wear in Egypt as ornaments. Thefe animals are feen in fome places lying for whole hours, and even days, ftretched in the fun and motionlefs; fo that one not ufed to them might miftake them for trunks of trees covered with a rough and dry bark: but the miftake would foon be fatal; for the feemingly torpid animal, at the near approach of any living creature, inftantly darts upon it, and carries it to the bottom. In the times of an inundation they fometimes enter the cottages of the natives, where they feize the firft animal they meet with. There have been feveral examples of their taking a man out of a canoe in the fight of his companions, without their being able to lend him any affiftance. The crocodile, however, except when preffed with hunger, or with a view of depofiting its eggs, feldom leaves the water. Its ufual method is to float along upon the furface, and feize whatever animals come within its reach; but, when this method fails, it then goes clofer to the bank. There it waits in patient expectation of fome land animal that comes to drink; the dog, the bull, the tiger, or man himfelf. Nothing is to be feen as the animal approaches, nor is its retreat difcovered till it is too late for fafety. It feizes the victim with a fpring, and goes at a bound much fafter than fuch an unwieldy animal could be fuppofed to do; then, having fecured the creature both with teeth and claws, it drags it into the water, inftantly finks with it to the bottom, and in this manner quickly drowns it. Sometimes it happens, that the creature wounded by the crocodile makes its efcape; in which cafe, the latter purfues with great celerity, and often takes it a fecond time. In thefe depredations, however, this terrible animal often feizes on another as formidable as itfelf, and meets with a defperate refiftance. We are told of frequent combats between the crocodile and the tiger. All creatures of the tiger kind are continually oppreffed by a parching thirft, that keeps them in the vicinity of great rivers, whither they defcend to drink very frequently. On thefe occafions they are feized by the crocodile; upon whom they inftantly turn with the greateft agility, and force their claws into his eyes, while he plunges with his fierce antagonift into the river. There they continue to ftruggle for fome time, till at laft

the tiger is drowned. Notwithſtanding all this, however, we are aſſured by Labat, that a negro, with no other weapon than a knife in his right hand, and his left arm wrapped round with a cow-hide, ventures boldly to attack this animal in its own element. As ſoon as he approaches the crocodile, he preſents his left arm, which the animal ſwallows moſt greedily: but as it ſticks in his throat, the negro has time to give it ſeveral ſtabs below the chin, where it is eaſily vulnerable; and the water alſo getting in at the mouth, which is held involuntarily open, the creature is ſoon bloated up as big as a tun, and expires.

The natives of Siam ſeem particularly fond of the capture of all the great animals with which their country abounds. The crocodiles are taken by throwing three or four ſtrong nets acroſs a river, at proper diſtances from each other; ſo that if the animal breaks through the firſt, it may be caught by one of the reſt. When it is firſt taken, it employs the tail, which is the grand inſtrument of ſtrength, with great force; but, after many unſucceſsful ſtruggles, the animal's ſtrength is at laſt exhauſted. Then the natives approach their priſoner in boats, and pierce him in the moſt tender parts till he is weakened by loſs of blood. When he has done ſtirring, they begin by tying up his mouth, and with the ſame cord tie his head to his tail, which laſt they bend back like a bow. However, they are not yet perfectly ſecure from his fury; but for their greater ſafety they tie his fore-feet, as well as thoſe behind, to the top of his back. Theſe precautions are not uſeleſs; for, if they were to omit them, the crocodile would ſoon recover ſtrength enough to do a great deal of miſchief. When thus brought into ſubjection, or when taken young and tamed, this formidable animal is uſed to divert and entertain the great men of the eaſt. It is often managed like an horſe; a curb is put into its mouth, and the rider directs it as he thinks proper. Though aukwardly formed, it does not fail to proceed with ſome degree of ſwiftneſs; and is thought to move as faſt as ſome of the moſt unwieldy of our own animals, the hog or the cow. Some indeed aſſert, that no animal could eſcape it but for its ſlowneſs in turning; which, however, ſeems very improbable, as its back-bone is full of articulations, and ſeemingly as flexible as that of other large animals.

All crocodiles breed near freſh-waters; and though they are ſometimes found in the ſea, yet that may be conſidered rather as a place of excurſion than abode. They produce their young by eggs, as was ſaid before; and for this purpoſe, the female, when ſhe comes to lay, chooſes a place by the ſide of a river, or ſome freſh-water lake, to depoſit her brood in. She always pitches upon an extenſive ſandy ſhore, where ſhe may dig a hole without danger of detection from the ground being freſh turned up. The ſhore muſt alſo be gentle and ſhelving to the water, for the greater convenience of the animal's going and returning; and a convenient place muſt be found near the edge of the ſtream, that the young may have a ſhorter way to go. When all theſe requiſites are adjuſted, the animal is ſeen cautiouſly ſtealing up on-ſhore to depoſit her burden. The preſence of a man, a beaſt, or even a bird, is ſufficient to deter her at that time; and if ſhe perceives any creature looking on, ſhe infallibly returns. If, however, nothing appears, ſhe then goes to work, ſcratching up the ſand with her fore-paws, and making a hole pretty deep in the ſhore.

There

There ſhe depoſits from eighty to one hundred eggs, of the ſize of a tennis-ball, and of the ſame figure, covered with a tough white ſkin like parchment. She takes above an hour to perform this taſk; and then covering up the place ſo artfully that it can ſcarcely be perceived, ſhe goes back to return again the next day. Upon her return, with the ſame precaution as before, ſhe lays about the ſame number of eggs; and the day following alſo a like number. Thus having depoſited her whole quantity, and having covered them cloſe up in the ſand, they are ſoon vivified by the heat of the ſun; and at the end of thirty days the young ones begin to break open the ſhell. At this time the female is inſtinctively taught that her young ones want relief; and ſhe goes upon land to ſcratch away the ſand and ſet them free. Her brood quickly avail themſelves of their liberty; a part run unguided to the water; another part aſcend the back of the female, and are carried thither in greater ſafety. But the moment they arrive at the water, all natural connection is at an end; when the female has introduced her young to their natural element, not only ſhe, but the male, become amongſt the number of their moſt formidable enemies, and devour as many of them as they can. The whole brood ſcatters into different parts at the bottom; by far the greateſt number are deſtroyed, and the reſt find ſafety in their agility or minuteneſs.

But it is not the parent alone that is thus found to thin their numbers; the eggs of this animal are not only a delicious feaſt to the ſavage, but are eagerly ſought after by every beaſt and bird of prey. The ichneumon was erected into a deity among the ancients for its ſucceſs in deſtroying the eggs of theſe monſters: at preſent that ſpecies of the vulture called the *gallinazo* is their moſt prevailing enemy. All along the banks of great rivers, for thouſands of miles, the crocodile is ſeen to propagate in numbers that would ſoon overrun the earth, but for the vulture, that ſeems appointed by Providence to abridge its fecundity. Theſe birds are ever found in great numbers where the crocodile is moſt numerous; and hiding themſelves within the thick branches of the trees that ſhade the banks of the river, they watch the female in ſilence, and permit her to lay all her eggs without interruption. When ſhe has retired, they encourage each other with cries to the ſpoil; and flocking all together upon the hidden treaſure, tear up the eggs, and devour them in a much ſhorter time than they were depoſited. Nor are they leſs diligent in attending the female while ſhe is carrying her young to the water; for, if any one of them happens to drop by the way, it is ſure to receive no mercy.

Such is the extraordinary account given us by late travellers of the propagation of this animal; an account adopted by Linnæus and the moſt learned naturaliſts of the age. Yet if one might argue from the general analogy of nature, the crocodile's devouring her own young when ſhe gets to the water ſeems doubtful. This may be a ſtory raiſed from the general idea of this animal's rapacious cruelty; when in fact the crocodile only ſeems more cruel than other animals, becauſe it has more power to do miſchief.

DESCRIPTION OF THE BEDOUINS.

THE Bedouins are the wild Arabs of Asia and Africa, they inhabit the vast desarts which extend from the confines of Persia to Morocco; the term *Bedaoui* signifying, "Inhabitant of the Desart."

The wandering life of these people arises from the very nature of their desarts. To paint to himself these desarts, the reader must imagine a sky almost perpetually inflamed, and without clouds, immense and boundless plains, without houses, trees, rivulets, or hills, where the eye frequently meets nothing but an extensive and uniform horizon like the sea, though in some places the ground is uneven and stony. Almost invariably naked on every side, the earth presents nothing but a few wild plants thinly scattered, and thickets, whose solitude is rarely disturbed but by antelopes, hares, locusts, and rats. Such is the nature of nearly the whole country, which extends six hundred leagues in length and three hundred in breadth, and stretches from Aleppo to the Arabian sea, and from Egypt to the Persian gulph. It must not, however, be imagined that the soil in so great an extent is every where the same; it varies considerably in different places. On the frontiers of Syria, for example, the earth is in general fat and cultivable, nay even fruitful. It is the same also on the banks of the Euphrates: but in the internal parts of the country, and towards the south, it becomes white and chalky, as in the parallel of Damascus; rocky, as in the Tih and the Hedjaz; and a pure sand, as to the eastward of the Yemen. This variety in the qualities of the soil is productive of some minute differences in the condition of the Bedouins. For instance, in the more sterile countries, that is, those which produce but few plants, the tribes are feeble and very distant; which is the case in the desart of Suez, that of the Red Sea, and the interior of the great desart called the Najd. When the soil is more fruitful, as between Damascus and the Euphrates, the tribes are more numerous and less remote from each other; and, lastly, in the cultivable districts, such as the Pachalics of Aleppo, the Hauran, and the neighbourhood of Gaza, the camps are frequent and contiguous. In the former instances, the Bedouins are purely pasturers, and subsist only on the produce of their herds, and on flesh meat, and a few dates which they eat either fresh or dried in the sun and reduced to a powder. In the latter, they sow some land, and add cheese, barley, and even rice, to their flesh and milk-meats.

In general, the Bedouins are small, meagre, and tawny; more so, however, in the heart of the desart than on the frontiers of the cultivated country: but they are always of a darker hue than the neighbouring peasants. They also differ among themselves in the same camp; and M. Volney remarked, that the shaiks, that is the rich, and their attendants, were always taller and more corpulent than the common class. He has seen some of them above five feet five and six inches high; though in general they do not (he says) exceed five feet two inches. This difference can only be attributed to their food, with which the former are supplied more abundantly than the latter. And the effects of this are equally evident in the Arabian and Turkmen camels; for these latter, dwelling in countries rich in forage, are become a species more robust and fleshy than the former. It may likewise be affirmed, that the lower class of

of Bedouins live in a ſtate of habitual wretchedneſs and famine. It will appear almoſt incredible to us, but it is an undoubted fact, that the quantity of food uſually conſumed by the greateſt part of them does not exceed ſix ounces a day. This abſtinence is moſt remarkable among the tribes of the Najd and the Hedjaz. Six or ſeven dates ſoaked in melted butter, a little ſweet milk or curds, ſerve a man a whole day; and he eſteems himſelf happy when he can add a ſmall quantity of coarſe flour or a little ball of rice. Meat is reſerved for the greateſt feſtivals; and they never kill a kid but for a marriage or a funeral. A few wealthy and generous ſhaiks alone can kill young camels, and eat baked rice with their victuals. In times of dearth, the vulgar, always half famiſhed, do not diſdain the moſt wretched kinds of food; and eat locuſts, rats, lizards, and ſerpents, broiled on briars. Hence are they ſuch plunderers of the cultivated land and robbers on the high roads: hence alſo their delicate conſtitution and their diminutive and meagre bodies, which are rather active than vigorous. It may be worth while to remark, that their evacuations of every kind, even perſpiration, are extremely ſmall; their blood is ſo deſtitute of ferocity, that nothing but the greateſt heat can preſerve its fluidity. This, however, does not prevent them from being tolerably healthy in other reſpects; for maladies are leſs frequent among them than among the inhabitants of the cultivated country.

From theſe facts we are by no means juſtified in concluding that the frugality of the Bedouins is a virtue purely of choice, or even of climate. The extreme heat in which they live unqueſtionably facilitates their abſtinence, by deſtroying that activity which cold gives to the ſtomach. Their being habituated alſo to ſo ſparing a diet, by hindering the dilatation of the ſtomach, becomes doubtleſs a means of their ſupporting ſuch abſtemiouſneſs; but the chief and primary motive of this habit is with them, as with the reſt of mankind, the neceſſity of the circumſtances in which they are placed.

It has been already remarked, that the Bedouin Arabs are divided into tribes, which conſtitute ſo many diſtinct nations. Each of theſe tribes appropriates to itſelf a tract of land forming its domain; in this they do not differ from cultivating nations except that their territory requires a greater extent, in order to furniſh ſubſiſtence for their herds throughout the year. Each tribe is collected in one or more camps, which are diſperſed through the country, and which make a ſucceſſive progreſs over the whole, in proportion as it is exhauſted by the cattle; hence it is, that within a great extent a few ſpots only are inhabited, which vary from one day to another; but as the entire ſpace is neceſſary for the annual ſubſiſtence of the tribe, whoever encroaches on it is deemed a violater of property; this is with them the law of nations. If, therefore, a tribe, or any of its ſubjects, enter upon a foreign territory, they are treated as enemies and robbers, and a war breaks out. Now, as all the tribes have affinities with each other by alliances of blood or conventions, leagues are formed, which render theſe wars more or leſs general. The manner of proceeding on ſuch occaſions is very ſimple. The offence made known, they mount their horſes, and ſeek the enemy; when they meet they enter into a parley, and the matter is frequently made up; if not, they attack either in ſmall bodies, or man to man. They encounter each other at full ſpeed with fixed lances, which they ſome times

ſometimes dart, notwithſtanding their length, at the flying enemy: the victory is rarely conteſted; it is decided by the firſt ſhock, and the vanquiſhed take to flight full gallop over the naked plain of the deſart. Night generally favours their eſcape from the conqueror. The tribe which has loſt the battle ſtrikes its tents, removes to a diſtance by forced marches, and ſeeks an aſylum among its allies. The enemy, ſatisfied with their ſucceſs, drive their herds farther on, and the fugitives ſoon after return to their former ſituation. But the ſlaughter made in theſe engagements frequently ſows the ſeeds of hatreds which perpetuate theſe diſſentions. The intereſt of the common ſafety has for ages eſtabliſhed a law among them, which decrees that the blood of every man who is ſlain muſt be avenged by that of his murderer. This vengeance is called *Tar*, or retaliation; and the right of exacting it devolves on the neareſt of kin to the deceaſed. So nice are the Arabs on this point of honour, that if any one neglects to ſeek his retaliation he is diſgraced for ever. He therefore watches every opportunity of revenge: if his enemy periſhes from any other cauſe, ſtill he is not ſatisfied, and his vengeance is directed againſt the neareſt relation. Theſe animoſities are tranſmitted as an inheritance from father to children, and never ceaſe but by the extinction of one of the families, unleſs they agree to ſacrifice the criminal, or *purchaſe the blood* for a ſtated price in money or in flocks. Without this ſatisfaction, there is neither peace, nor truce, nor alliances, between them, nor ſometimes even between whole tribes: *There is blood between us*, ſay they on every occaſion; and this expreſſion is an inſurmountable barrier. Such accidents being neceſſarily numerous in a long courſe of time, the greater part of the tribes have ancient quarrels, and live in an habitual ſtate of war; which added to their way of life, renders the Bedouins a military people, though they have made no great progreſs in war as an art.

Such is the external ſituation of the Arabs. It is ſubject to great viciſſitudes, according to the good or bad conduct of their chiefs. Sometimes a feeble tribe raiſes and aggrandizes itſelf, whilſt another, which was powerful, falls into decay, or perhaps is entirely annihilated; not that all its members periſh, but they incorporate themſelves with ſome other; and this is the conſequence of the internal conſtitution of the tribes. Each tribe is compoſed of one or more principal families, the members of which bear the title of ſhaiks, *i. e.* chiefs or lords. Theſe families have a great reſemblance to the patricians of Rome and the nobles of modern Europe. One of the ſhaiks has the ſupreme command over the others. He is the general of their little army; and ſometimes aſſumes the title of *emir*, which ſignifies commander and prince. The more relations, children, and allies, he has, the greater are his ſtrength and power. To theſe he adds particular adherents, whom he ſtudiouſly attaches to him, by ſupplying their wants. But beſides this, a number of ſmall families, who, not being ſtrong enough to live independent, ſtand in need of protection and alliances, range themſelves under the banners of this chief. Such an union is called *kabila*, or tribe. Thus the government of theſe tribes is at once republican, ariſtocratical, and even deſpotic, without exactly correſponding with any of theſe forms. It is republican, inaſmuch as the people have a great influence in all affairs, and as nothing can be tranſacted without the conſent of a majority. It is ariſtocratical, becauſe the familes of the ſhaiks poſſeſs ſome of the prerogatives which every where accompany power; and, laſtly, it

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is despotic, because the principal shaik has an indefinite and almost absolute authority, which, when he happens to be a man of credit and influence, he may even abuse; but the state of these tribes confines even this abuse to very narrow limits; for if a chief should commit an act of injustice; if, for example, he should kill an Arab, it would be almost impossible for him to escape punishment; the resentment of the offended party would pay no respect to his dignity; the law of retaliation would be put in force; and, should he not pay the blood, he would be infallibly assassinated, which, from the simple and private life the shaiks lead in their camps, would be no difficult thing to effect. If he harrasses his subjects by severity, they abandon him and go over to another tribe. His own relations take advantage of his misconduct to depose him, and advance themselves to his station. He can have no resource in foreign troops; his subjects communicate too easily with each other to render it possible for him to divide their interests and form a faction in his favour. Besides, how is he to pay them, since he receives no kind of taxes from the tribe; the wealth of the greater part of his subjects being limited to absolute necessaries, and his own confined to very moderate possessions, and those too loaded with great expences?

The principal shaik in every tribe, in fact, defrays the charges of all who arrive at or leave the camp. He receives the visits of the allies, and of every person who has business with them. Adjoining to his tent is a large pavillion for the reception of all strangers and passengers. There are held frequent assemblies of the shaiks and principal men, to determine on encampments and removals; on peace and war; on the differences with the Turkish governors and the villages; and the litigations and quarrels of individuals. To this crowd, which enters successively, he must give coffee, bread baked on the ashes, rice, and sometimes roasted kid or camel; in a word, he must keep open table; and it is the more important to him to be generous, as this generosity is closely connected with matters of the greatest consequence. On the exercise of this depend his credit and his power. The famished Arab ranks the liberality which feeds him before every virtue: nor is this prejudice without foundation; for experience has proved that covetous chiefs never were men of enlarged views: hence the proverb, as just as it is brief, *A close fist a narrow heart.* To provide for these expences, the shaik has nothing but his herds, a few spots of cultivated ground, the profits of his plunder, and the tribute he levies on the high-roads; the total of which is very inconsiderable. We must not therefore, when we speak of the Bedouins, affix to the words *Prince* and *Lord* the ideas they usually convey; we should come nearer the truth by comparing them to substantial gentlemen farmers, in mountainous countries, whose simplicity they resemble in their dress as well as in their domestic life and manners. A shaik who has the command of five hundred horse does not disdain to saddle and bridle his own, nor to give him barley and chopped straw. In his tent, his wife makes the coffee, kneads the dough, and superintends the dressing of the victuals. His daughters and kinswomen wash the linen, and go with pitchers on their heads and veils over their faces to draw water from the fountain. These manners agree precisely with the descriptions in Homer, and the history of Abraham in Genesis.

Thus confined to the moſt abſolute neceſſities of life, the Arabs have as little induſtry as their wants are few; all their arts conſiſt in weaving the clumſy tents and in making mats and butter. Their whole commerce only extends to the exchanging camels, kids, ſtallions, and milk, for arms, clothing, a little rice or corn, and money, which they bury. They are totally ignorant of all ſcience; and have not even any idea of aſtronomy, geometry, or medicine. They have not a ſingle book; and nothing is ſo uncommon among the ſhaiks as to know how to read. All their literature conſiſts in reciting tales and hiſtories in the manner of the Arabian Nights Entertainments. They have a peculiar paſſion for ſuch ſtories, and employ in them almoſt all their leiſure, of which they have a great deal.

The Bedouins have likewiſe their love-ſongs, which have more ſentiment and nature in them than thoſe of the Turks and inhabitants of the towns; doubtleſs, becauſe the former whoſe manners are chaſte, know what love is: while the latter, abandoned to debauchery, are acquainted only with enjoyment.

The Bedouins have often been reproached with a ſpirit of rapine; but, without wiſhing to defend it, we may obſerve that one circumſtance has not been ſufficiently attended to, which is, that it only takes place towards reputed enemies, and is conſequently founded on the acknowledged laws of almoſt all nations. Amongſt themſelves they are remarkable for a good faith, a diſintereſtedneſs, a generoſity, which would do honour to the moſt civilized people. A ſtranger, nay even an enemy, touches the tent of the Bedouin, and from that inſtant his perſon becomes inviolable. Has the Bedouin conſented to eat bread and ſalt with his gueſt, nothing in the world can induce him to betray him. The power of the ſultan himſelf would not be able to force a refugee from the protection of a tribe, but by its total extermination. The Bedouin, ſo rapacious without his camp, has no ſooner ſet his foot within it, than he becomes liberal and generous. What little he poſſeſſes he is ever ready to divide. He affects to ſeat himſelf at the door of his tent, in order to invite the paſſengers; his generoſity is ſo ſincere, that he does not look upon it as a merit, but merely as a duty. To obſerve the manner in which the Arabs conduct themſelves towards each other, one would imagine that they poſſeſſed all their goods in common. Nevertheleſs they are no ſtrangers to property. Deprived of a multitude of enjoyments which nature has laviſhed upon other countries, they are leſs expoſed to temptations which might corrupt and debaſe them. Each individual, capable of ſupplying all his wants, is better able to preſerve his character and independence; and private property becomes at once the foundation and bulwark of public liberty.

We obſerve a difference between the Arabs of the towns and thoſe of the deſart; ſince, while the former crouch under the double yoke of political and religious deſpotiſm, the latter live in a ſtate of perfect freedom from both: it is true, that on the frontiers of the Turks, the Bedouins, from policy, preſerve the appearance of Mahometaniſm; but ſo relaxed is their obſervance of its ceremonies, and ſo little fervour has their devotion, that they are generally conſidered as infidels, who have neither laws nor prophets. They even make no difficulty in ſaying that the religion of Mahomet was not made for them: "For (add they) how ſhall we make ablutions who have no water? How can we beſtow alms who are not rich? Why ſhould we faſt

fast in the Ramadan, since the whole year with us is one continual fast? and what necessity is there for us to make the pilgrimage to Mecca, if God be present every where?" In short, every man acts and thinks as he pleases; and the most perfect toleration is established among them.

ACCOUNT OF THE MINES IN CORNWALL.

CORNWALL abounds in mines of different metals and semi-metals; but the principal produce is tin. The Phenicians early visited these coasts for this article, some think 400 or 450 years before Christ; and the mines continued to be wrought with various success at different periods. In the time of King John they appear to have yielded no great emolument; the right of working them being wholly in the king as Earl of Cornwall, and the mines farmed by the Jews for one hundred marks; and according to this proportion the tenth of it, six pounds thirteen shillings and four pence, is at this day paid by the crown to the Bishop of Exeter. In the time of Richard king of the Romans and earl of Cornwall, the tin-mines were very rich; the Jews being farmed out to him by his brother Henry III. what interest they had was at his disposal. The Spanish tin-mines being stopped by the Moors, and none discovered in Germany, the Malabar coast, or the Spanish West Indies, Cornwall and its earls had all the trade of Europe for it. The Jews being banished the kingdom, 18 Edw. I. they were again neglected till the gentlemen of Blackmore, lords of seven tythings best stored at that time with tin, obtained of Edmund earl of Cornwall, son of Richard king of the Romans, a charter under his own seal, with more explicit grants of privileges, courts, pleas, parliaments, and the toll-tin or one fifteenth of all the tin raised. At this time too the right of bounding or dividing tin-grounds into separate partitions for the encouragement of searching for it seems to have been first appointed, or at least adjusted. This charter was confirmed 33 Edward I. and the Cornish separated from the Devonshire tinners. Their laws, particularly recited in Plowden's Commentaries, p. 237, were further explained 50 Edw. III. confirmed and enlarged by parliament, 8 Rich. II. 3 Ed. IV. 1 Ed. VI. 1 and 2 Ph. and M. and 2 Eliz. and the whole society divided into four parts under one general warden to do justice in law and equity, from whose sentence lies an appeal to the Duke of Cornwall, in council, or for want of a Duke of Cornwall to the crown. The lord-warden appoints a vice-warden, to determine all stannary disputes every month: he also constitutes four stewards, one for each of the precincts before-mentioned, who hold their courts every three weeks, and decide by juries of six persons, with an appeal reserved to the vice-warden, lord-warden, and lord of the prince's council. In difficult cases the lord-warden, by commission, issues his precept to the four principal towns in the stannary districts, who each choose six members, and these twenty-four stannators constitute the parliament of tinners. Each stannator chooses an assistant, making a kind of standing council in a different apartment, to give information to the prince. Whatever is enacted by the body of tinners must be signed by the stannators, the lord-warden, or his deputy, and by the duke or the king, and thenceforward has with regard to tin affairs all the

authority of an act of the whole legislature. Five towns are appointed in the most convenient parts of the county for the tinners to bring their tin to every quarter of a year. These are Leskard, Leistwithiel, Truro, Helston, and Penzance; the last added by Charles II. for the conveniency of the western tinners. In the time of Henry VIII. there were but two coinages, at Midsummer and Michaelmas: two more at Christmas and Lady-day were added, for which the tinners pay an acknowledgement called *Post groats*, or 4d. for every hundred of white tin then coined. The officers appointed by the duke assay it; and if well purified stamp it by a hammer with the duchy seal, the arms of Richard earl of Cornwall, a lion rampant G. crowned O. within a bordure of bezants S; and this is a permission to the coiner to sell, and is called *coining the tin*. Every hundred of white tin so coined pays to the duke 4s. The tin of the whole county, which, in Carew's time, in the last century, amounted to 30 or 40,000l. yearly, has for twenty-four years last past amounted one year with another to 180,000 or 190,000l. sterling. Of this the Duke of Cornwall receives for his 4s. duty on every hundred of white tin above 10,000l. yearly: the bounders or proprietors of the soil about one sixth at a medium clear, or about 30,000l. yearly; the rest goes to the adventurers in the mine, who are at all the charge of working. Tin is found collected and fixed in lodes and floors, or in grains and bunches in the natural rock, or loose and detached in single separate stones called *shodes* or *streams*, or in a continued course of such stones called the *beuheyl* or *living stream*, or in an arenacious pulverized state. It is most easily discovered by tracing the lodes by the scattered fragments of them called *shodes*, by leave of the lord of the soil or the bounder. The tin, being divided among the lords and adventurers, is stamped and worked at the mill; and being thus dressed is carried under the name of *black tin* to the melting-house, where it is melted by Welsh pit-coal, and poured into blocks of 320lb. weight, and carried to the coinage town. Mundic, a scarce metal or mineral ore, of a white, brassy, or brown, colour, is found in large quantities, intermixed with tin, copper, and lead, and sometimes by itself. Iron ore is found in Cornwall, but the working it does not answer. There is no richer copper, nor a greater variety, any where than in this county. Silver, if really found here in the reigns of Edward I. and II. has been rarely found since, nor do the lead-mines answer. Very late discoveries have proved that Cornwall has more gold than was formerly imagined. What is called the *Cornish diamond* is a figured crystal generally hexagonal and pyramidical or columnar, or both, of a fine clear water, and of all our bastard diamonds in this nation esteemed the best, and some of different colours, black, yellow, &c. The clearer these are, the better they will bear engraving for seals.

ARTIFICIAL METHOD OF HATCHING EGGS.

THE art of hatching chickens by means of ovens has long been practised in Egypt; but it is there only known to the inhabitants of a single village named Berme, and to those that live at a small distance from it. Towards the beginning of autumn they scatter themselves all over the country; where each person among them is ready to undertake the management of an oven, each of which is of a dif-

a different size; but, in general, they are capable of containing from forty to fourscore thousand eggs. The number of these ovens placed up and down the country is about 386, and they usually keep them working for about six months: as, therefore, each brood takes up in an oven, as under a hen, only twenty-one days, it is easy in every one of them to hatch eight different broods of chickens. Every Bermean is under the obligation of delivering to the person who intrusts him with an oven only two-thirds of as many chickens as there have been eggs put under his care; and he is a gainer by this bargain, as more than two-thirds of the eggs usually produce chickens. In order to make a calculation of the number of chickens yearly so hatched in Egypt, it has been supposed that only two-thirds of the eggs are hatched, and that each brood consists of at least 30,000 chickens; and thus it would appear that the ovens of Egypt give life yearly to at least 92,640,000 of these animals.

This useful and advantageous method of hatching of eggs has been lately discovered in France by the ingenious Mr. Reaumur; who, by a number of experiments, has reduced the art to certain principles. He found by experience, that the heat necessary for this purpose is nearly the same with that marked 32 on his thermometer, or that marked 96 on Fahrenheit's. This degree of heat is nearly that of the skin of the hen, and, what is remarkable, of the skin of all other domestic fowls, and probably of all other kinds of birds. The degree of heat which brings about the developement of the cygnet, the gosling, and the turkey-pout, is the same as that which fits for hatching the canary-songster, and, in all probability, the smallest humming-bird: the difference is only in the time during which this heat ought to be communicated to the eggs of different birds; it will bring the canary-bird to perfection in eleven or twelve days, while the turkey-pout will require twenty-seven or twenty-eight.

After many experiments, Mr. Reaumur found, that stoves heated by means of a baker's oven succeeded better than those made hot by layers of dung: and the furnaces of glass-houses and those of the melters of metals, by means of pipes to convey heat into a room, might, no doubt, be made to answer the same purpose. As to the form of the stoves, no great nicety is required. A chamber over an oven will do very well. Nothing more will be necessary but to ascertain the degree of heat; which may be done by melting a lump of butter of the size of a walnut with half as much tallow, and putting it into a phial. This will serve to indicate the heat with sufficient exactness: for, when it is too great, this mixture will become as liquid as oil; and, when the heat is too small, it will remain fixed in a lump; but it will flow like a thick syrup, upon inclining the bottle, if the stove be of a right temper. Great attention therefore should be given to keep the heat always at this degree, by letting in fresh air if it be too great, or shutting the stove more close if it be too small: and, that all the eggs in the stove may equally share the irregularities of the heat, it will be necessary to shift them from the sides to the centre; and thus to imitate the hens, who are frequently seen to make use of their bills, to push to the outer parts those eggs that were nearest to the middle of their nests, and to bring into the middle such as lay nearest the sides.

Mr. Reaumur has invented a sort of low boxes, without bottoms, and lined with furs. These, which he calls artificial parents, not

only ſhelter the chickens from the injuries of the air, but afford a kindly warmth, ſo that they preſently take the benefit of their ſhelter as readily as they would have done under the wings of a hen. After hatching, it will be neceſſary to keep the chickens, for ſome time, in a room artfully heated and furniſhed with theſe boxes; but afterwards they may be ſafely expoſed to the air in the court-yard, in which it may not be amiſs to place one of theſe artificial parents to ſhelter them if there ſhould be occaſion for it.

As to the manner of feeding the young brood, they are generally a whole day after being hatched before they take any food at all; and then a few crumbs of bread may be given them for a day or two, after which they will begin to pick up inſects and graſs for themſelves.

But, to ſave the trouble of attending them, capons may be taught to watch them in the ſame manner as hens do. Mr. Reaumur aſſures, that he has ſeen above two hundred chickens at once, all led about and defended only by three or four ſuch capons. Nay, cocks may be taught to perform the ſame office; which they, as well as the capons, will continue to do all their lives after.

HISTORY OF THE GIANTS.

THE romances of all ages have furniſhed us with ſo many extravagant accounts of giants of incredible bulk and ſtrength, that the exiſtence of ſuch people is now generally diſbelieved. It is commonly thought, that the ſtature of man hath been, at leaſt very nearly, the ſame in all ages; and ſome have even pretended to demonſtrate the impoſſibility of the exiſtence of giants mathematically. Of theſe our countryman M'Laurin hath been the moſt explicit. "In general (ſays he) it will eaſily appear, that the efforts tending to deſtroy the coheſion of beams ariſing from their own gravity only, increaſe in the quadruplicate ratio of their lengths; but that the oppoſite efforts, tending to preſerve their coheſion, increaſe only in the triplicate proportion of the ſame lengths. From which it follows, that the greater beams muſt be in greater danger of breaking than the ſmaller ſimilar ones; and, that though a ſmaller beam might be firm and ſecure, yet a greater ſimilar one may be made ſo long, that it will neceſſarily break by its own weight. Hence Galleo juſtly concludes, that what appears very firm, and ſucceeds very well, in models, may be very weak and infirm, or even fall to pieces by its own weight, when it comes to be executed in large dimenſions according to the model. From the ſame principle he argues, that there are neceſſary limits in the operations of nature and art, which they cannot ſurpaſs in magnitude. Were trees of a very enormous ſize, their branches would fall by their own weight. Large animals have not ſtrength in proportion to their ſize; and, if there were any land-animals much larger than thoſe we know, they could hardly move, and would be perpetually ſubject to the moſt dangerous accidents. As to the animals of the ſea, indeed, the caſe is different; for the gravity of the water in a great meaſure ſuſtains thoſe animals; and in fact theſe are known ſometimes to be vaſtly larger than the greateſt land-animals. Nor does it avail againſt this doctrine to tell us, that bones have ſometimes been found which were ſuppoſed to have belonged to giants of immenſe ſize; ſuch as the ſkeletons mentioned by Strabo and Pliny, the former of which was ſixty cubits high, and the latter forty-ſix; for

for naturalists have concluded, on just grounds, that in some cases these bones had belonged to elephants; and that the larger ones were bones of whales, which had been brought to the places where they were found, by the revolutions of nature that have happened in past times. Though it must be owned, that there appears no reason why there may not have been men who have exceeded by some feet in height the tallest we have seen."

It will easily be seen, that arguments of this kind can never be conclusive; because, along with an increase of stature in any animal, we must always suppose a proportional increase in the cohesion of the parts of its body. Large works sometimes fail when constructed on the plan of models, because the cohesion of the materials whereof the model is made, and of the large work, are the same; but a difference in this respect will produce a very remarkable difference in the ultimate result. Thus, suppose a model is made of fir-wood the model may be firm and strong enough; but a large work made also of fir, when executed according to the plan of the model, may be so weak that it will fall to pieces with its own weight. If, however, we make use of iron for the large work instead of fir, the whole will be sufficiently strong, even though made exactly according to the plan of the model. The like may be said with regard to large and small animals. If we could find an animal whose bones exceeded in hardness and strength the bones of other animals as much as iron exceeds fir, such an animal might be of a monstrous size, and yet be exceedingly strong. In like manner, if we suppose the flesh and bones of a giant to be greatly superior in hardness and strength to the bones of other men, the great size of his body will be no objection at all to his strength. The whole of the matter therefore concerning the existence of giants must rest on the credibility of the accounts we have from those who pretend to have seen them, and not on any arguments drawn *à priori*.

In the scripture we are told of giants, who were produced from the marriages of the sons of God with the daughters of men. This passage indeed has been differently interpreted, so as to render it doubtful whether the word translated giants does there imply any extraordinary stature. In other parts of scripture, however, giants, with their dimensions, are mentioned in such a manner that we cannot possibly doubt; as in the case of Og king of Bashan, and Goliath. In a memoir read before the academy of sciences at Rouen, M. Le Cat gives the following account of giants that are said to have existed in different ages:

"Profane historians have given seven feet of height to Hercules, their first hero; and in our days we have seen men eight feet high. The giant who was shewn in Rouen in 1735, measured eight feet some inches. The emperor Maximin was of that size; Shenkius and Platerus, physicians of the last century, saw several of that stature; and Goropius saw a girl who was ten feet high.—The body of Orestes, according to the Greeks, was eleven feet and a half; the giant Galbara, brought from Arabia to Rome under Claudius Cæsar, was near ten feet; and the bones of Secundilla and Pusia, keepers of the gardens of Sallust, were but six inches shorter. Funnam, a Scotsman, who lived in the time of Eugene II. king of Scotland, measured eleven feet and a half: and Jacob le Maire, in his voyage to the Straits of Magellan, reports, that on the 17th of December 1615,

they found at Port Desire several graves covered with stones; and, having the curiosity to remove the stones, they discovered human skeletons of ten and eleven feet long. The Chevalier Scory, in his Voyage to the Peak of Teneriff, says, that they found in one of the sepulchre caverns of that mountain the head of a Guanche which had eighty teeth, and that the body was not less than fifteen feet long. The giant Ferragus, slain by Orlando nephew of Charlemagne, was eighteen feet high. Rioland, a celebrated anatomist, who wrote in 1614, says, that some years before there was to be seen in the suburbs of St. Germain the tomb of the giant Iforet, who was twenty feet high. In Rouen, in 1509, in digging in the ditches near the Dominicans, they found a stone-tomb containing a skeleton whose skull held a bushel of corn, and whose shin-bone reached up to the girdle of the tallest man there, being about four feet long, and consequently the body must have been seventeen or eighteen feet high. Upon the tomb was a plate of copper, whereon was engraved, "In this tomb lies the noble and puissant lord, the chevalier Ricon de Vallemont, and his bones." Platerus, a famous physician, declares, that he saw at Lucern the true human bones of a subject which must have been at least nineteen feet high. Valence in Dauphiné boasts of possessing the bones of the giant Bucart, tyrant of the Vivarais, who was slain by an arrow by the Count de Cabillon his vassal. The Dominicans had a part of the shin-bone, with the articulation of the knee, and his figure painted in fresco, with an inscription, shewing that this giant was twenty-two feet and a half high, and that his bones were found in 1705 near the banks of the Morderi, a little river at the foot of the mountain of Crussol, upon which (tradition says) that giant dwelt.

"January 11, 1613, some masons digging near the ruins of a castle in Dauphiné, in a field which (by tradition) had long been called the giant's field, at the depth of eighteen feet discovered a brick-tomb thirty feet long, twelve feet wide, and eight feet high; on which was a grey stone, with the words *Teutobochus Rex*, cut thereon. When the tomb was opened, they found a human skeleton entire, twenty-five feet and a half long, ten feet wide across the shoulders, and five feet deep from the breast-bone to the back. His teeth were about the size each of an ox's foot, and his shin-bone measured four feet. —Near Mazarino, in Sicily, in 1516, was found a giant thirty feet high; his head was the size of an hogshead, and each of his teeth weighed five ounces. Near Palermo, in the valley of Mazara, in Sicily, a skeleton of a giant thirty feet long was found, in the year 1548; and another of thirty-three feet high, in 1550; and many curious persons have preserved several of these gigantic bones.

"The Athenians found near their city two famous skeletons, one of thirty-four and the other of thirty-six feet high.

"At Totu, in Bohemia, in 758, was found a skeleton, the head of which could scarcely be encompassed by the arms of two men together, and whose legs, which they still keep in the castle of that city, were twenty-six feet long. The skull of the giant found in Macedonia, September 1691, held two hundred and ten pounds of corn.

"The celebrated Sir Hans Sloane, who treated this matter very learnedly, does not doubt these facts; but thinks the bones were those of elephants, whales, or other enormous animals.

"Elephants

"Elephants bones may be shewn for those of giants; but they can never impose on connoisseurs. Whales, which, by their immense bulk, are more proper to be substituted for the largest giants, have neither arms nor legs; and the head of that animal hath not the least resemblance of that of a man. If it be true, therefore, that a great number of the gigantic bones which we have mentioned have been seen by anatomists, and by them have been reputed real human bones, the existence of giants is proved."

With regard to the credibility of all or any of these accounts, it is difficult to determine any thing. If, in any castle of Bohemia, the bones of a man's leg twenty-six feet in length are preserved, we have indeed a decisive proof of the existence of a gaint, in comparison of whom most others would be but pigmies. Nor indeed could these bones be supposed to belong to an elephant; for an elephant itself would be but a dwarf in comparison of such an enormous monster. But, if these bones were really kept in any part of Bohemia, it seems strange that they have not been frequently visited, and particular descriptions of them given by the learned who have travelled into that country. It is certain, however, that there have been nations of men considerably exceeding the common stature. Thus all the Roman historians inform us, that the Gauls and Germans exceeded the Italians in size; and it appears that the Italians in those days were of much the same stature with the people of the present age. Among these northern nations, it is also probable, that there would be as great differences in stature as there are among the present race of men. If that can be allowed, we may easily believe that some of these barbarians might be called giants, without any great impropriety. Of this superiority of size, indeed, the historian Florus gives a notable instance in Teutobochus, before-mentioned, king of the Tuetones: who, being defeated and taken prisoner by Marius, was carried in triumph before him at Rome, when his head reached above the trophies that were carried in the same procession.

But, whether these accounts are credited or not, we are very certain, that the stature of the human body is by no means absolutely fixed. We are ourselves a kind of giants in comparison of the Laplanders; nor are these the most diminutive people to be found upon the earth. The Abbé la Chappe, in his journey into Siberia in order to observe the last transit of Venus passed through a village inhabited by people called Wotiacks, neither the men nor women of which were above four feet high. The accounts of the Patagonians also, which cannot be easily discredited, rendered it very probable, that somewhere in South America there is a race of people very considerably exceeding the common size of mankind; and consequently that we cannot altogether discredit the relations of giants handed down to us by ancient authors; though what degree of credit we ought to give them, is not easy to be determined.

DESCRIPTION OF THE GIANT'S CAUSEWAY IN IRELAND.

THE Giant's Causeway is a vast collection of Basaltic pillars in the county of Antrim in Ireland.—The principal or grand causeway (for there are several less considerable and scattered fragments of similar workmanship) consists of a most irregular arrangement

ment of many hundred thousands of columns of a black kind of rock hard as marble: almost all of them are of a pentagonal figure; but so closely and compactly situated on their sides, though perfectly distinct from top to bottom, that scarcely any thing can be introduced between them. The columns are of an unequal height and breadth; some of the highest, visible above the surface of the strand, and at the foot of the impending angular precipice, may be about twenty feet; they do not exceed this height, at least none of the principal arrangement. How deep they are fixed in the strand was never yet discovered. This grand arrangement extends nearly two hundred yards, visible at low water; how far beyond is uncertain; from its declining appearance, however, at low water, it is probable it does not extend under water to a distance any thing equal to what is seen above. The breadth of the principal causeway, which runs out in one continued range of columns, is, in general, from twenty to thirty feet; at one place or two it may be nearly forty for a few yards. In this account are excluded the broken and scattered pieces of the same kind of construction, that are detached from the sides of the grand causeway, as they do not appear to have ever been contiguous to the principal arrangement, though they have frequently been taken into the width; which has been the cause of such wild and dissimilar representations of this causeway, which different accounts have exhibited. The highest part of this causeway is the narrowest, at the very foot of the impending cliff from whence the whole projects, where, for four or five yards, it is not above ten or fifteen feet wide. The columns of this narrow part incline from a perpendicular a little to the westward, and form a slope on their tops, by the very unequal height of the columns on the two sides, by which an ascent is made at the foot of the cliff, from the head of one column to the next above, gradatim, to the top of the great causeway, which, at the distance of half a dozen yards from the cliff, obtains a perpendicular position, and, lowering in its general height, widens to about twenty or between twenty and thirty feet, and for one hundred yards nearly is always above water. The tops of the columns for this length being nearly of an equal height, they form a grand and singular parade, that may be easily walked on, rather inclining to the water's edge. But from high-water mark, as it is perpetually washed by the beating surges on every return of the tide; the platform lowers considerably, and becomes more and more uneven, so as not to be walked on but with the greatest care. At the distance of one hundred and fifty yards from the cliff, it turns a little to the east for twenty or thirty yards, and then sinks into the sea. The figure of these columns is almost unexceptionably pentagonal, or composed of five sides; there are but very few of any other figure introduced: some few there are of three, four, and six, sides, but the generality of them are five-sided, and the spectator must look very nicely to find any of a different construction: yet what is very extraordinary, and particularly curious, there are not two columns in ten thousand to be found, that either have their sides equal among themselves, or whose figures are alike. Nor is the composition of these columns or pillars less deserving the attention of the curious spectator. They are not of one solid stone in an upright position; but composed of several short lengths, curiously joined, not with flat surfaces, but articulated into each other like ball and socket, or like the joints in the vertebræ

of

of some of the larger kind of fish, the one end at the joint having a cavity, into which the convex end of the opposite is exactly fitted. This is not visible, but by disjoining the two stones. The depth of the concavity or convexity is generally about three or four inches. And what is still farther remarkable of the joint, the convexity, and the correspondent concavity, is not conformed to the external angular figure of the column, but exactly round, and as large as the size or diameter of the column will admit; and consequently as the angles of these columns are in general extremely unequal, the circular edges of the joint are seldom coincident with more than two or three sides of the pentagonal, and from the edge of the circular part of the joint to the exterior sides and angles they are quite plain. It is still farther very remarkable, likewise, that the articulations of these joints are frequently inverted; in some the concavity is upwards, in others the reverse. This occasions that variety and mixture of concavities and convexities on the tops of the columns, which is observable throughout the platform of this causeway, yet without any discoverable design or regularity with respect to the number of either. The length also of these particular stones, from joint to joint, is various: in general, they are from eighteen to twenty-four inches long; and, for the most part, longer toward the bottom of the columns than nearer the top, and the articulation of the joints something deeper. The size or diameter likewise of the columns is as different as their length and figure; in general, they are from fifteen to twenty inches in diameter. There are really no traces of uniformity or design discovered throughout the whole combination, except in the form of the joint, which is invariably by an articulation of the convex into the concave of the piece next above or below it; nor are there any traces of a finishing in any part, either in height, length, or breadth, of this curious causeway. If there is here and there a smooth top to any of the columns above water, there are others just by, of equal height, that are more or less convex or concave, which shew them to have been joined to pieces that have been washed or by other means taken off. And undoubtedly those parts that were always above water have, from time to time, been made as even as might be; and the remaining surfaces of the joints must naturally have been worn smoother by the constant friction of weather and walking, than where the sea, at every tide, is beating upon it, and continually removing some of the upper stones and exposing fresh joints. And farther, as these columns preserve their diameters from top to bottom, in all the exterior ones, which have two or three sides exposed to view, the same may with reason be inferred of the interior columns whose tops only are visible. Yet what is very extraordinary, and equally curious, in this phenomenon, is, that notwithstanding the universal dissimilitude of the columns, both as to their figure and diameter, and though perfectly distinct from top to bottom, yet is the whole arrangement so closely combined at all points, that hardly a knife can be introduced between them either on the sides or angles. And it is really a most curious piece of entertainment to examine the close contexture and nice insertion of such an infinite variety of angular figures as are exhibited on the surface of this grand parade. From the infinite dissimilarity of the figure of these columns, this will appear a most surprising circumstance to the curious spectator; and would incline him to believe it a work of human art, were it not, on the other

hand, inconceivable that the wit or invention of man ſhould conſtruct and combine ſuch an infinite number of columns, which ſhould have a general apparent likeneſs, and yet be ſo univerſally diſſimilar in their figure, as that, from the minuteſt examination, not two in ten or twenty thouſand ſhould be found, whoſe angles and ſides are equal among themſelves, or of the one column to thoſe of the other. That it is the work of nature, there can be no doubt to an attentive ſpectator, who carefully ſurveys the general form and ſituation, with the infinitely various figurations, of the ſeveral parts of this cauſeway. There are no traces of regularity or deſign in the outlines of this curious phenomenon; which, including the broken and detached pieces of the ſame kind of workmanſhip, are extremely ſcattered and confuſed, and, whatever they might originally, do not at preſent appear to have any connection with the grand or principal cauſeway, as to any ſuppoſable deſign or uſe in its firſt conſtruction, and as little deſign can be inferred from the figure or ſituation of the ſeveral conſtituent parts. The whole exhibition is, indeed, extremely confuſed, diſuniform, and deſtitute of every appearance of uſe or deſign in its original conſtruction. But what, beyond diſpute, determines its original to have been from nature, is, that the very cliffs, at a great diſtance from the cauſeway, eſpecially in the bay to the eaſtward, exhibit at many places the ſame kind of columns, figured and jointed in all reſpects like thoſe of the grand cauſeway: ſome of them are ſeen near to the top of the cliff, which in general, in theſe bays to the eaſt and weſt of the cauſeway, is near three hundred feet in height; others again are ſeen about midway, and at different elevations from the ſtrand. A very conſiderable expoſure of them is ſeen in the very bottom of the bay to the eaſtward, near a hundred roods from the cauſeway, where the earth has evidently fallen away from them upon the ſtrand, and exhibits a moſt curious arrangement of many of theſe pentagonal columns, in a perpendicular poſition, ſupporting, in appearance a cliff of different ſtrata of earth, clay, rock, &c. to the height of one hundred and fifty feet or more, above. Some of theſe columns are between thirty and forty feet high, from the top of the ſloping bank below them; and, being longeſt in the middle of the arrangement, ſhortening on either hand in view, they have obtained the appellation of *organs*, for a rude likeneſs in this particular to the exterior or frontal tubes of that inſtrument; and, as there are few broken pieces on the ſtrand near it, it is probable that the outſide range of columns that now appears is really the original exterior line, to the ſeaward, of this collection. But how far they extend internally into the bowels of the incumbent cliff, is unknown. The very ſubſtance, indeed, of this part of the cliff which projects to a point, between the two bays on the eaſt and weſt of the cauſeway, ſeems compoſed of this kind of materials; for beſides the many pieces that are ſeen on the ſides of the cliff that circulate to the bottom of the bays, particularly on the eaſtern ſide, there is, at the very point of the cliff, and juſt above the narrow and higheſt part of the cauſeway, a long collection of them ſeen, whoſe heads or tops, juſt appearing without the ſloping bank, plainly ſhew them to be an oblique poſition, and about half-way between the perpendicular and horizontal. The heads of theſe, likewiſe, are of mixed ſurfaces, convex and concave, and the columns evidently appear to have been removed, from their original upright to their preſent inclining or oblique poſition, by the ſinking or falling of the cliff.

PHENOMENA

PHENOMENA OF BURNING SPRINGS.

OF these there are many in different parts of the world; particularly one in Dauphiny near Grenoble; another near Hermanstadt in Transylvania; a third at Chermay, a village near Switzerland; a fourth in the canton of Friburg; and a fifth not far from the city of Cracow in Poland. There also is, or was, a famous spring of the same kind at Wigan in Lancashire, which, upon the approach of a lighted candle, would take fire and burn like spirits of wine for a whole day. But the most remarkable one of this kind, or at least that of which we have the most particular description, was discovered in 1711 at Brosely in Shropshire. The following account of this remarkable spring was given by the Rev. Mr. Mason, Woodwarden professor at Cambridge, dated February 18th, 1746. "The well for four or five feet deep is six or seven feet wide; within that is another less hole of like depth dug in the clay, in the bottom whereof is placed a cylindric earthen vessel, of about four or five inches diameter in the mouth, having the bottom taken off, and the sides well fixed in the clay rammed close about it. Within the pot is brown water, thick as puddle, continually forced up with a violent motion beyond that of boiling water, and a rumbling hollow noise, rising or falling by fits five or six inches; but there was no appearance of any vapour rising, which perhaps might have been visible had not the sun shone so bright. Upon putting a candle down at the end of a stick, at about a quarter of a yard distance, it took fire, darting and flashing after a very violent manner for about half a yard high, much in the manner of spirits in a lamp, but with great agitation. It was said, that a tea-kettle had been made to boil in about nine minutes time, and that it had been left burning for forty-eight hours without any sensible diminution. It was extinguished by putting a wet mop upon it; which must be kept there for a little time, otherwise it would not go out. Upon the removal of the mop there arises a sulphureous smoke lasting about a minute, and yet the water is cold to the touch." In 1755, this well totally disappeared by the sinking of a coal-pit in its neighbourhood.

The cause of the inflammable property of such waters is with great probability supposed to be their mixture with petroleum, which is one of the most inflammable substances in nature, and has the property of burning on the surface of water.

There are burning fountains in Iceland, of a most extraordinary nature forming at times *jets d'eaux* of scalding water ninety-four feet high and thirty in diameter, creating the most magnificent gerbes that can be imagined, especially when backed by the setting sun. They arise out of cylindrical tubes of unknown depths: near the surface they expand into apertures of a funnel shape, and the mouths spread into large extent of stalactical matter, formed of successive scaly concentric undulations. The playing of these stupendous spouts is foretold by noises roaring like the cataract of Niagara. The cylinder begins to fill: it rises gradually to the surface, and gradually increases its height, smoking amazingly, and flinging up great stones. After attaining its greatest height, it gradually sinks till it totally disappears. Boiling *jets d'eaux* and boiling springs are frequent in most parts of

the island. In many parts they are applied to the culinary uses of the natives. The most capital is that which is called *Geyer* or *Geyser*, in a plain rising into small hills, and in the midst of an amphitheatre, bounded by the most magnificent and various-shaped icy mountains; amongst which the three-headed Hecla soars pre-eminent.—These are not confined to the land only; they rise in the very sea, and form scalding fountains amidst the waves. Their distance from the land is unknown; but the new volcanic isle, twelve miles off the point of Reickenes, emitting fire and smoke, proves that the subterraneous fires and waters extend to that space; for those awful effects arise from the united fury of the two elements.

ART OF ACQUIRING PERSONAL ELEGANCE.

ELEGANCE of person most wonderfully elevates the human character; it is the undoubted offspring and visible image of fine taste; and the moment it appears, it is universally admired. Men disagree about the other constituent parts of beauty, but they all unite without hesitation to acknowledge the power of elegance.

The general opinion is, that this most conspicuous part of beauty, which is perceived and acknowledged by every body, is yet utterly inexplicable, and retires from our search when we would discover what it is. Where shall I find the secret retreat of the graces, to explain to me the elegance they dictate, and to paint in visible colours the fugitive and variable enchantment that hovers round a graceful person, yet leaves us for ever in agreeable suspence and confusion? I need not seek for them; the graces are but emblems of the human mind in its loveliest appearances; and, while we contemplate their effect, it is impossible not to feel their influence.

Personal elegance, for that is the object of our present enquiry, may be defined the image and reflection of the grandeur and beauty of the invisible soul. Grandeur and beauty in the soul itself are not objects of sense; colours cannot paint them, but they are united to sentiments that appear visible; they bestow a noble meaning and importance of attitude, and diffuse inexpressible loveliness over the whole person.

When two or more passions or sentiments unite, they are not so readily distinguished as if they had appeared separate; however, it is easy to observe, that the complacency and admiration we feel in the presence of elegant persons is made up of respect and affection; and we are disappointed when we see such persons act a base or indecent part. These symptoms plainly shew, that personal elegance appears to us to be the image and reflection of an elevated and beautiful mind. In some characters, the grandeur of soul is predominant; in whom beauty is majestic and awful. In other characters, a soft and attracting grace is more conspicuous; this latter kind is more pleasing, for an obvious reason. But elegance cannot exist in either alone, without a mixture of the other; for majesty without the beautiful would be haughty and disgusting; and easy accessible beauty would lose the idea of elegance, and become an object of contempt.

The grandeur and beauty of the soul charm us universally, who have all of us implanted in our bosoms, even in the midst of misery, passions of high descent, immense ambition, and romantic hopes.

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You may conceive an imprisoned bird, whose wild notes, prompted by the approach of spring, give her a confused notion of joy, although she has no distinct idea of airy flights and summer groves; so when man emerging from wretchedness assumes a noble character, and the elevation of the human genius appears openly, we view, with secret joy and amazement, the sure evidence and pledge of our dignity: the mind catches fire by a train that lies within inself, and expands with conscious pride and merit, like a generous youth over the images of his country's heroes. Of the softened and engaging part of elegance we shall have occasion to speak at large hereafter.

Personal elegance or grace is the fugitive lustre, that never settles in any part of the body; you see it glance and disappear in the features and motions of a graceful person; it strikes your view; it shines like an exhalation: but the moment you follow it, the wandering flame vanishes, and immediately lights up something else: you may as well think of fixing the pleasing delusion of your dreams, or the colours of a dissolving rainbow.

You have arisen early at times, in the summer season, to take the advantage of the cool of the morning, to ride abroad. Let us suppose you have mistaken an hour or two, and just got out a few minutes before the rising of the sun. You see the fields and woods, that lay the night before in obscurity, attiring themselves in beauty and verdure; you see a profusion of brilliants shine in the dew; you see the stream gradually admitting the light into its pure bosom; and you hear the birds, which are awakened by a rapture that comes upon them from the morning. If the eastern sky be clear, you see it glow with the promise of a flame that has not appeared; and, if it be overcast with clouds, you see those clouds stained by a bright red, bordered with gold or silver, that by the changes appear volatile, and ready to vanish. How various and beautiful are those appearances, which are not the sun, but the distant effects of it over different objects. In like manner the soul flings inexpressible charms over the human person and actions; but then the cause is less known, because the soul for ever shines behind a cloud, and is always retired from our senses.

You conceive why elegance is of a fugitive nature, and exists chiefly in motion: as it is communicated by the principle of action that governs the whole person, it is found over the whole body, and is fixed no where. The curious eye with eagerness pursues the wandering beauty which it sees with surprise at every turn, but is never able to overtake. It is a waving flame, that, like the reflection of the sun from water, never settles; it glances on you in every motion and disposition of the body; its different powers through attitude and motion seem to be collected in dancing, wherein it plays over the arms, the legs, the breast, the neck, and in short the whole frame; but, if grace has any fixed throne, it is in the face, the residence of the soul, where you think a thousand times it is just issuing into view.

Elegance assumes to itself an empire equal to that of the soul; it rules and inspires every part of the body, and makes use of all the human powers; but it particularly takes the passions under its charge and direction, and turns them into a kind of artillery, with which it does infinite execution.

The passions that are favourites with the graces are modesty, good-nature, particularly when it is heightened into *sweetness*, and that fine langour

langour which seems to be formed of a mixture of still joy and hope. Surprise, shame, and even grief and anger, have appeared pleasing under proper restrictions; for it must be observed, that all excess is shocking and disagreeable, and that even the most pleasing passions appear to most advantage when the tincture they cast over the countenance is enfeebled and gentle. The passions that are enemies to the graces are, impudence, affectation, strong and harsh degrees of pride, malice, and austerity.

There is an union of the fine passions, but so delicate that you cannot conceive any one of them, separate from the rest, called *sensibility*, which is requisite in an elegant deportment; it chiefly resides in the eye, which indeed is the seat of the passions.

I have spoken of the passions only as they are subservient to grace, which is the object of our present attention. The face is the mother-country, if I may call it so, or the habitation, of grace; and it visits the other parts of the body only as distant provinces, with some little partiality to the neck, and the fine basis that supports it; but the countenance is the very palace in which it takes up its residence; it is there it revels through its various apartments: you see it wrapped in clouded majesty upon the brow; you discover it about the lips hardly rising to a smile, and vanishing in a moment, when it is rather perceived than seen; and then, by the most engaging vicissitudes, it enlivens, flames, and dissolves, in the eye.

You have, I suppose, all along observed, that I am not treating of beauty, which depends on different principles, but of that elegance which is the effect of an awakened taste, and in every kind of form is the enchantment that attracts and pleases universally, even without the assistance of ony other charm; whereas without it no degree of beauty is charming. You have undoubtedly seen women lovely without much beauty, and handsome without being lovely; it is gracefulness causes this variation, and throws a lustre over disagreeable features, as the sun paints a showery cloud with the colours of the rainbow.

I before remarked, that the grace of every elegant person is varied agreeably to the character and disposition of the person it beautifies; I am sensible you readily conceive the reason. Elegance is the natural habit and image of the soul beaming forth in action; it must therefore be expressed by the peculiar features, air, and disposition, of the person; it must arise from nature, and flow with ease and a propriety that distinguishes it. The imitation of any particular person, however graceful, is dangerous, lest the affectation appear; but the unstudied elegance of nature is acquired by the example and conversation of several elegant persons of different characters, which people adapt to the import of their own gestures, without knowing how.

It is also because elegance is the reflection of the soul appearing in action, that good statues, and pictures drawn from life, are laid before the eye in motion. If you look at the old Gothic churches built in barbarous ages, you will see the statues reared up dead and inanimate against the walls.

It may be said, that the beauty of dress results from mode or fashion, and it certainly does so in a great measure, but we must limit that assertion by the following observation, that there is also a real beauty in attire that does not depend on the mode: those robes which leave the whole person at liberty in its motions, and that give

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to the imagination the natural proportions and symmetry of the body, are always more becoming than such as restrain any part of the body, or in which it is lost or disfigured. You may easily imagine how a pair of stays laced tightly round an elegant woman would oppress the sublime beauty of her comportment and figure. Since persons of rank cannot choose their own dress, but must run along with the reigning fashion, the secret of dressing gracefully must consist in the slender variations that cannot be observed to desert the fashion, and yet approach nigher to the complexion and import of the countenance, and that at the same time allow to the whole body the greatest possible freedom, ease, and imagery: by imagery I mean, that, as a good painter will shew the effect of the muscles that do not appear to the eye, so a person skilful in dress will display the elegance of the form, though it be covered and out of view. As the taste of dress approaches to perfection, all art disappears, and it seems the effect of negligence and instinctive inattention; for this reason its beauties arise from the manner and general air rather than from the richness, which last, when it becomes too gross and oppressive, destroys the elegance. A brilliancy and parade in dress is therefore the infallible sign of bad taste, that in this contraband manner endeavours to make amends for the want of true elegance, and bears a relation to the heaps of ornament that encumbered the Gothic buildings. Appelles observing an Helen, painted by one of his scholars, that was overcharged with a rich dress, "I find, young man," said he, "not being able to paint her beautiful, you have made her fine."

Harsh and violent motions are always unbecoming. Milton attributes the same kind of motion to his angels that the heathens did to their deities, *soft sliding without step*. It is impossible to preserve the attractions in a country dance that attend on a minuet; as the step quickens, the most delicate of the graces retire. The rule holds universally through all actions, whether quick or slow; it should always partake of the same polished and softened motion, particularly in the transitions of the countenance, where the genius of the person seems to hover and reside.

The degrees run very high upon the scale of elegance, and probably few have arrived near the highest pitch; but it is certain, that the idea of surprising beauty, that was familiar in Greece, has been hardly conceived by the moderns: many of their statues remain the objects of our admiration, but wholly superior to imitation; their pictures, that have sunk in the wreck of time, appear in the descriptions made of them to have equal imaginations with the statues; and their poetry abounds with the same celestial imagery. But what puts this matter out of doubt is, that their celebrated beauties were the models of their artists; and it is known, that the elegancies of Thais and Phryne were copied by the famous painters of Greece, and consigned to canvass and marble to astonish and charm distant ages.

Personal elegance, in which taste assumes the most conspicuous and noble appearance, confuses us in our enquiries after it, by the quickness and variety of its changes, as well as by a complication that is not easily unravelled. I defined it to be the image and reflection of a great and beautiful soul: let us separate the distinct parts of this variety; when they appear asunder you will find them perfectly familiar and intelligible.

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The first, and most respectable part that enters into the composition of elegance, is the lofty consciousness of worth or virtue, which sustains an habitual decency, and becoming pride.

The second, and most pleasing part, is a display of good-nature approaching to affection, of gentle affability, and, in general, of the pleasing passions. It seems difficult to reconcile these two parts, and in fact it is so; but, when they unite, then they appear like a reserved and virgin kindness, that is at once noble and soft, that may be won, but must be courted with delicacy.

The third part of elegance is the appearance of a polished and tranquil habit of mind, that softens the actions and emotions, and gives a covert prospect of innocence and undisturbed repose. We will treat of these separate; and first of dignity of soul.

We observed, near the beginning of this discourse, that the mind has always a taste for truth, for gratitude, for generosity, and greatness of soul: these, which are peculiarly called sentiments, stamp upon the human spirit a dignity and worth not to be found in any other animated being. However great and surprising the most glorious objects in nature be, the heaving ocean, the moon that guides it, and casts a softened lustre over the night, the starry firmament, or the sun itself; yet their beauty and grandeur instantly appear of an inferior kind, beyond all comparison, to this of the soul of man. These sentiments are united under the general name of virtue: and such are the embellishments they diffuse over the mind, that Plato, a very polite philosopher, says finely, "If virtue was to appear in a visible shape, all men would be enamoured of her."

Virtue and truth are inseparable, and take their flight together. A mind devoid of truth is a frightful wreck; it is like a great city in ruins whose mouldering towers just bring to the imagination the mirth and life that were once there, and are now no more. Truth is the genius of taste, and enters into the essence of simple beauty, in wit, in writing, and throughout the fine arts.

Generosity covers almost all other defects, and raises a blaze around them in which they disappear and are lost: like sovereign beauty, it makes a short cut to our affections; wins our hearts without resistance, and unites all the world to favour its designs.

Grandeur of soul, fortitude, and a resolution that haughtily struggles with despair, and will neither yield to, nor make terms with, misfortunes; which, through every situation, reposes a noble confidence in itself, and has an immovable view to future glory and honour, astonishes the world with admiration and delight. We, as it were, lean forward with surprise and trembling joy to behold the human soul collecting its strength, and asserting a right to superior fates. When you leave man out of your account, and view the whole visible creation beside, you indeed see several traces of grandeur and unspeakable power, and the intermixture of a rich scenery of beauty; yet still the whole appears to be but a solemn absurdity, and to have a littleness and insignificancy. But when you restore man to prospect, and put him at the head of it, endued with genius and an immortal soul; when you give him a passion for truth, boundless views that spread along through eternity, and a fortitude that struggles with fate, and yields not to misfortunes; then the skies, the ocean, and the earth, take the stamp of worth and dignity from the noble inhabitant whose purposes they serve.

A mind fraught with the virtues is the natural foil of elegance. Unaffected truth, generofity, and grandeur of foul, for ever pleafe and charm: even when they break from the common forms, and appear wild and unmethodifed by education, they are ftill beautiful. On the contrary, as foon as we difcover that outward elegance, which is formed by the mode, to want truth, generofity, or grandeur of foul, it inftantly finks in our efteem like counterfeit coin, and we are fenfible of a reluctant difappointment, like that of the lover in the epigram, who became enamoured with the lady's voice and the foftnefs of her hand in the dark, but was cured of his paffion as foon as he had light to view her.

Let us now pafs on to the moft pleafing part of elegance, an habitual difplay of the kind and gentle paffions.

We are naturally inclined to love thofe who bear an affection to us; and we are charmed with the homage that is paid to our merit; by thefe weaknefles politenefs attacks us. The well-bred gentleman always in his behaviour infinuates a regard to others tempered with refpect. His attention to pleafe confeffes plainly his kindnefs to you, and the high efteem he holds you in. The affiduous prevention of our wifhes, and that yielding fweetnefs complaifance puts on for our fake, are irrefiftible; and, although we know this kind flattery to be proftitute and habitual, yet it is not indifferent to us; we receive it in a manner that fhews how much it gratifies us.

The defire of being agreeable finds out the art of being fo without ftudy or labour. Ruftics who fall in love grow unufually polite and engaging. This new charm, that has altered their natures and fuddenly endued them with the powers of pleafing, is nothing more than an enlivened attention to pleafe, that has taken poffeffion of their minds and tinctured their actions. We ought not to wonder that love is thus enchanting: its tender affiduity is but the natural addrefs of the paffion; politenefs borrows the flattering form of affection, and becomes agreeable by the appearance of kindnefs.

What pleafes us generally appears beautiful. Complaifance, that is fo engaging, gives an agreeablenefs to the whole perfon, and creates a beauty that nature gave not to the features; it fubmits, it promifes, it applauds in the countenance; the heart lays itfelf in fmiles at your feet, and a voice that is indulgent and tender is always heard with pleafure.

The laft conftituent part of elegance is the picture of a tranquil foul, that appears in foftening the actions and emotions, and exhibits a retired profpect of happinefs and innocence.

A calm of mind that is feen in graceful eafy action, and in the enfeeblement of our paffions, gives us an idea of the golden age, when human nature, adorned with innocence, and the peace that attends it, repofed in the arms of content. This ferene profpect of human nature muft always pleafe us, and the content, whofe image it is, be vifionary in this world, and though we cannot arrive at it, yet it is the point in imagination we have finally in view, in all the purfuits of life, and the native home for which we do not ceafe to languifh.

The fentiment of tranquillity particularly beautifies paftoral poetry. The images of calm and happy quiet that appear in fhaded groves, in filent vales, and flumbers by falling ftreams, invite the poet to indulge his genius in rural fcenes. The mufic that lulls and

compoſes the mind at the ſame time enchants it. The hue of this beauteous eaſe, caſt over the human actions and emotions, forms a very delightful part of elegance, and gives the other conſtituent parts an appearance of nature and truth: for in a tranquil ſtate of mind, undiſturbed by wants or fears, the views of men are generous and elevated. From the combination of theſe fine parts, grandeur of ſoul, complacency, and eaſe, ariſe the enchantments of elegance; but the appearance of the two laſt are oftener found together, and then they form politeneſs.

When we take a view of the ſeparate parts that conſtitute perſonal elegance, we immediately know the ſeeds that are proper to be cheriſhed in the infant mind, to bring forth the beauteous production. The virtues ſhould be cultivated early with ſacred care. Good-nature, modeſty, affability, and a kind concern for others, ſhould be carefully inculcated; and an eaſy unconſtrained dominion acquired by habit over the paſſions. A mind thus finely prepared is capable of the higheſt luſtre of elegance; which is afterwards attained with as little labour as our firſt language, by only aſſociating with graceful people of different characters, from whom an habitual gracefulneſs will be acquired, that will bear the natural unaffected ſtamp of our own minds; in ſhort, it will be our own character and genius, ſtripped of their native rudeneſs, and enriched with beauty and attraction.

Nature, that beſtows her favours without reſpect of perſons, often denies to the great the capacity of diſtinguiſhed elegance, and flings it away in obſcure villages. You ſometimes ſee it at a country fair ſpread an amiableneſs over a ſun-burnt girl, like the light of the moon through a miſt; but ſuch is the neceſſity of habitual elegance acquired by education and converſe, that, without it, the fineſt woman could be no more than the favourite damſel at the May-pole, and the object of the hope and jealouſy of a few ruſtics.

People are rendered totally incapable of elegance by the want of good-nature and the other gentle paſſions; by the want of modeſty and ſenſibility; and by a want of that noble pride that ariſes from a conſciouſneſs of lofty and generous ſentiments. The abſence of theſe native charms is generally ſupplied by a briſk ſtupidity, an impudence unconſcious of defect, a caſt of malice, and an uncommon tendency to ridicule; as if nature had given theſe her ſtep-children an inſtinctive intelligence, that they can riſe out of contempt only by the depreſſion of others. For the ſame reaſon it is, that perſons of true and finiſhed taſte ſeldom affect ridicule, becauſe they are conſcious of their own ſuperior merit. Pride is the cauſe of ridicule in the one, as it is of candour in the other; but the effects differ, as the ſtudied parade of poverty does from the negligent grandeur of riches. You will ſee nothing more common in the world, than for people, who by ſtupidity and inſenſibility are incapable of the graces, to commence wits on the ſtrength of the *petite* talents of mimicry, and the briſk tartneſs that ill-nature never fails to ſupply.

From what I have ſaid it appears, that a ſenſe of elegance is a ſenſe of dignity, of virtue, and innocence, united. Is it not natural then to expect, that, in the courſe of a liberal education, men ſhould cultivate the generous qualities they approve and aſſume? But, inſtead of them, men only aim at the appearances, which require no ſelf-denial; and thus, without acquiring the virtues, they ſacrifice their

honeſty

honesty and sincerity: whence it comes to pass, that there is often the least virtue where there is the greatest appearance of it; and that the polished part of mankind only arrive at the subtile corruption of uniting vice with the dress and complexion of virtue.

I have dwelt on personal elegance, because the ideas and principles in this part of good taste should become familiar. We may then take them for a foundation in our future observations, since the same principles of easy grace and simple grandeur will animate our ideas with an unstudied propriety, and enlighten our judgments in beauty, in literature, in sculpture, painting, and the other departments of fine taste.

NATURE AND PROPERTIES OF HAIL.

NATURAL historians furnish us with various accounts of surprising showers of hail, in which the hailstones were of extraordinary magnitude. Mezeray, speaking of the war of Louis XII. in Italy, in the year 1510, relates, that there was for some time an horrible darkness, thicker than that of night; after which the clouds broke into thunder and lightning, and there fell a shower of hailstones, or rather (as he calls them) pebble-stones, which destroyed all the fish, birds, and beasts, of the country.—It was attended with a strong smell of sulphur; and the stones were of a bluish colour; some of them weighed an hundred pounds.

At Lisle in Flanders, in 1686, fell hailstones of a very large size; some of which contained in the middle a dark-brown matter, which, thrown on the fire, gave a very great report.

Dr. Halley and others also relate, that in Cheshire, Lancashire, &c. April 29, 1697, a thick black cloud, coming from Carnarvonshire, disposed the vapours to congeal in such a manner, that for about the breadth of two miles, which was the limit of the cloud, in its progress for the space of sixty miles, it did inconceivable damage; not only killing all sorts of fowls and other small animals, but splitting trees, knocking down horses and men, and even plowing up the earth; so that the hailstones buried themselves under ground an inch or an inch and a half deep. The hailstones, many of which weighed five ounces, and some half a pound, and being five or six inches about, were of various figures; some round, others half round; some smooth, others embossed and crenated: the icy substance of them was very transparent and hard, but there was a snowy kernel in the middle of them.

In Hertfordshire, May 4, the same year, after a severe storm of thunder and lightning, a shower of hail succeeded, which far exceeded the former: some persons were killed by it, their bodies beat all black and blue; vast oaks were split, and fields of rye cut down as with a scythe. The stones measured from ten to thirteen or fourteen inches about. There figures were various, some oval, others pointed, some flat.

It is remarkable, that, so far as we know, hail is a meteor which never produces any beneficial effect. The rain and dew invigorate and give life to the whole vegetable tribe; the frost, by expanding the water contained in the earth, pulverises and renders the soil fertile; snow covers and preserves the tender vegetables from being destroyed by too severe a frost. But hail does none of all these. In

winter, it lies not sufficiently close to cover vegetables from the nipping frost; and in spring and summer it not only has a chilling and blasting effect from its coldness, but often does great damage to the more tender plants by the weight of the stones; and in great hailstorms the damage done in this manner is prodigious.

Hail is one of the natural phenomena for which it is almost impossible to account in any satisfactory manner. It is certain, that on the tops of mountains hailstones, as well as drops of rain, are very small, and continually increase in bulk till they reach the lower grounds. It would seem, therefore, that, during their passage through the air, they attract the congealed vapour which increases them in size. But here we are at a loss how they come to be solid hard bodies, and not always soft, and composed of many small stars like snow. The flakes of snow, no doubt, increase in size as they descend, as well as the drops of rain or hailstones; but why should the one be in soft crystals, and the other in large hard lumps, seeing both are produced from congealed vapour? Some modern philosophers ascribe the formation of hail to electricity. Signior Beccaria supposes hail to be formed in the higher regions of the air, where the cold is intense, and where the electric matter is very copious. In these circumstances, a great number of particles of water are brought near together, where they are frozen, and in their descent collect other particles, so that the density of the substance of the hailstones grows less and less from the centre; this being formed first in the higher regions, and the surface being collected in the lower. Agreeable to this, it is observed, that, in mountains, hailstones, as well as drops of rain, are very small, there being but little space through which they can fall and increase their bulk. Drops of rain and hail also agree in this, that, the more intense the electricity that forms them, the larger they are. Motion is known to promote freezing, and so the rapid motion of the electrified clouds may produce that effect. A more intense electricity also, he thinks, unites the particles of hail more closely than the more moderate electricity does those of snow. In like manner we see thunder-clouds more dense than those that merely bring rain; and the drops of rain are larger in proportion, though they fall not from so great a height.

INSTANCES OF EXTRAORDINARY GROWTH.

IN the year 1729, the Academy of Sciences examined a boy brought to them as a curiosity, who was then only seven years old, and who measured four feet eight inches and four lines high without his shoes. His mother observed the signs of puberty on him at two years old, which continued to increase very quick, and soon arrived at the usual standard. At four years old he was able to lift and toss the common bundles of hay in stables into the horses racks; and at six years old could lift as much as a sturdy fellow of twenty. But, though he thus increased in bodily strength, his understanding was no greater than is usual with children of his age, and their playthings were also his favourite amusements.

Another boy, a native of the hamlet of Bouzanquet, in the diocese of Alais, though of a strong constitution, appeared to be knit and stiff in his joints till he was about four years and a half old. During this time nothing farther was remarkable of him than an extraordinary

nary appetite, which was satisfied no otherwise than by giving him plenty of the common aliments of the inhabitants of the country, consisting of rye-bread, chesnuts, bacon, and water; but his limbs soon becoming supple and pliable, and his body beginning to expand itself, he grew up in so extraordinary a manner, that at the age of five years he measured four feet three inches; some months after, he was four feet eleven inches; and at six, five feet, and bulky in proportion. His growth was so rapid, that one might fancy he saw him grow: every month his clothes required to be made longer and wider; and, what was still very extraordinary in his growth, it was not preceded by any sickness, nor accompanied with any pain in the groin or elsewhere. At the age of five years his voice changed, his beard began to appear, and at six he had as much as a man of thirty; in short, all the unquestionable marks of puberty were visible in him. It was not doubted in the country but this child was, at five years old, or five and a half, in a condition of begetting other children; which induced the rector of the parish to recommend to his mother that she would keep him from too familiar a conversation with children of the other sex. Though his wit was riper than is commonly observable at the age of five or six years, yet its progress was not in proportion to that of his body. His air and manner still retained something childish, though by his bulk and stature he resembled a complete man, which at first sight produced a very singular contrast. His voice was strong and manly, and his great strength rendered him already fit for the labours of the country. At the age of five years, he could carry to a good distance three measures of rye, weighing eighty-four pounds; when turned of six, he could lift up easily on his shoulders and carry loads of one hundred and fifty pounds weight a good way off; and these exercises were exhibited by him as often as the curious engaged him thereto by some liberality. Such beginnings made people think that he would soon shoot up into a giant. A mountebank was already soliciting his parents for him, flattering them with hopes of putting him in a way of making a great fortune. But all these hopes suddenly vanished: his legs became crooked, his body shrunk, his strength diminished, his voice grew sensibly weaker, and he at last sunk into a total imbecillity.

In the Paris Memoirs also there is an account of a girl who had her courses at three years of age. When four years old, she was four feet six inches in height, and had her limbs well proportioned to that height, her breasts large, and the parts of generation like those of a girl of eighteen; so that there is no doubt but that she was marriageable at that time, and capable of being a mother of children. These things are more singular and marvellous in the northern than in the southern climates, where the females come sooner to maturity. In some places of the East Indies, the girls have children at nine years of age.

Many other instances of extraordinary growth might be brought, but the particulars are not remarkably different from those already related.—It is at first sight astonishing that children of such early and prodigious growth do not become giants: but when we consider, that the signs of puberty appear so much sooner than they ought, it seems evident that the whole is only a more than usually rapid expansion of the parts, as in hot climates; and accordingly it is observed, that such children, instead of becoming giants, always decay and die apparently of old age long before the natural term of human life.

HISTORY

HISTORY OF ICELAND.

ICELAND is a large island lying in the northern part of the Atlantic Ocean, between 63 and 68 degrees of north latitude, and between 10 and 26 degrees of west longitude, its greatest length being about seven hundred miles, and its breadth three hundred.

This country lying partly within the frigid zone, and being liable to be surrounded with vast quantities of ice which come from the polar seas, is on account the coldness of its climate very inhospitable; but much more so for other reasons. It is exceedingly subject to earthquakes; and so full of volcanoes, that the little part of it which appears fit for the habitation of man seems almost totally laid waste by them. The best account that hath yet appeared of the island of Iceland is in a late publication intitled, "Letters on Iceland, &c. written by Uno Von Troil, D. D. first chaplain to his Swedish majesty." This gentleman sailed from London on the 12th of July 1772, in company with Mr. Banks, Dr. Solander, and Dr. James Lind of Edinburgh, in a ship for which 100l. sterling was paid every month. After visiting the western isles of Scotland, they arrived on the 28th of August at Iceland, where they cast anchor at Bessestedr or Bessastadr, lying in about 64° 6′ N. lat. in the western part of the island. The country had to them the most dismal appearance that can be conceived. Imagine to yourself (says Dr. Troil) a country, which from one end to the other presents to your view only barren mountains, whose summits are covered with eternal snow, and between them fields divided by vitrified cliffs, whose high and sharp points seem to vie with each other to deprive you of the sight of a little grass which scantily springs up among them. These same dreary rocks likewise conceal the few scattered habitations of the natives, and no where a single tree appears which might afford shelter to friendship and innocence. The prospect before us, though not pleasing, was uncommon and surprising. Whatever presented itself to our view bore the marks of devastation; and our eyes, accustomed to behold the pleasing coasts of England, now saw nothing but the vestiges of *the operation of a fire, Heaven knows how ancient!*

The climate of Iceland however is not unwholesome, or naturally subject to excessive cold, notwithstanding its northwardly situation. There have been instances indeed of Fahrenheit's thermometer sinking to 24° below the freezing point in winter, and rising to 104° in summer. Since the year 1749, observations have been made on the weather; and the result of these observations hath been unfavourable, as the coldness of the climate is thought to be on the increase, and of consequence the country is in danger of becoming unfit for the habitation of the human race. Wood, which formerly grew in great quantities all over the island, cannot now be raised. Even the hardy firs of Norway cannot be reared in this island. They seemed indeed to thrive till they were about two feet high; but then their tops withered, and they ceased to grow. This is owing chiefly to the storms and hurricanes which frequently happen in the months of May and June, and which are very unfavourable to vegetation of every kind. In 1772, Governor Thodal sowed a little barley, which grew very briskly; but, a short time before it was to be reaped, a violent storm

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so effectually destroyed it, that only a few grains were found scattered about. Besides these violent winds, this island lies under another disadvantage, owing to the floating ice, with which the coasts are often beset. This ice comes on by degrees, always with an easterly wind, and frequently in such quantities as to fill up all the gulphs on the north-west side of the island, and even covers the sea as far as the eye can reach; it also sometimes drives to other shores. It generally comes in January, and goes away in March. Sometimes it only reaches the land in April; and, remaining there for a long time, does an incredible deal of mischief. It consists partly of mountains of ice, said to be sometimes sixty fathoms in height; and partly of field-ice, which is neither so thick nor so much dreaded. Sometimes these enormous masses are grounded in shoal water; and in these cases they remain for many months, nay years, undissolved, chilling the atmosphere for a great way round. When many such bulky and lofty ice-masses are floating together, the wood, which is often found drifting between them, is so much chafed, and pressed with such violence together, that it sometimes takes fire; which circumstance has occasioned fabulous accounts of the ice being in flames.

In 1753 and 1754, this ice occasioned such a violent cold, that horses and sheep dropped down dead by reason of it, as well as for want of food; horses were observed to feed upon dead cattle, and the sheep ate of each other's wool. In 1755, towards the end of the month of May, the waters were frozen over in one night to the thickness of an inch and five lines. In 1756, on the 26th of June, snow fell to the depth of a yard, and continued falling through the months of July and August. In the year following it froze very hard towards the end of May and beginning of June, in the south part of the island, which occasioned a great scarcity of grass. These frosts are generally followed by a famine, many examples of which are to be found in the Icelandic chronicles. Besides these calamities a number of bears annually arrive with the ice, which commit great ravages among the sheep. The Icelanders attempt to destroy these intruders as soon as they get sight of them. Sometimes they assemble together, and drive them back to the ice, with which they often float off again. For want of fire-arms, they are obliged to use spears on these occasions. The government also encourages the destruction of these animals, by paying a premium of ten dollars for every bear that is killed, and purchasing the skin of him who killed it.

Notwithstanding this dismal winter picture, taken from Von Troil's letters, some tracts of ground, in high cultivation, are mentioned as being covered by the great eruption of lava in 1783.

Thunder and lightning are seldom heard in Iceland, except in the neighbourhood of volcanoes. Aurora borealis is very frequent and strong. It most commonly appears in dry weather, though there are not wanting instances of its being seen before or after rain, or even during the time of it. The lunar halo, which prognosticates bad weather, is likewise very frequent here; as are also parhelions, which appear from one to nine in number at a time. These parhelions are observed chiefly at the approach of the Greenland ice, when an intense degree of frost is produced, and the frozen vapours fill the air. Fire-balls, sometimes round and sometimes oval, are observed, and a kind of *ignis fatuus* which attaches itself to men and beasts; and comets are also frequently mentioned in their chronicles. This last circumstance deserves the attention of astronomers.

Iceland,

Iceland, besides all the inconveniences already mentioned, has two very terrible ones, called by the natives *skrida* and *sniofloda*: the name of the first imports large pieces of a mountain tumbling down and destroying the lands and houses which lie at the foot of it: this happened in 1554, when a whole farm was ruined, and thirteen people buried alive. The other word signifies the effects of a prodigious quantity of snow which covers the tops of the mountains, rolling down in immense masses, and doing a great deal of damage: of this there was an instance in 1699, during the night, when two farms were buried, with all their inhabitants and cattle. This last accident Iceland has in common with all very mountainous countries, particularly Switzerland.

Iceland abounds with hot and boiling springs, some of which spout up into the air to a surprising height. All the jets d'eau which have been contrived with so much art, and at such an enormous expence, cannot by any means be compared with these wonders of nature in Iceland. The water-works at Herenhausen throw up a single column of water of half a quarter of a yard in circumference to a height of about seventy feet; those at the Winterkasten at Cassel throw it up, but in a much thinner column, one hundred and thirty feet; and the jet d'eau at St. Cloud, which is thought the greatest of all the French water-works, casts up a thin column eighty feet into the air: but some springs in Iceland pour forth columns of water several feet in thickness to the height of many fathoms, and some affirm of several hundred feet.

These springs are unequal in their degrees of heat, but we have observed none under 188 degrees of Fahrenheit's thermometer; in some it is 192, 193, 212, and in one small vein in water 213, degrees. From some the water flows gently, and the spring is then called laug, "a bath;" from others it spouts with a great noise, and is then called huer, or kittel. It is very common for some of these spouting springs to close up, and others to appear in their stead. All these hot waters have an incrusting quality; so that we very commonly find the exterior surface from whence it bursts forth covered with a kind of rind, which almost resembles chased work, and which we at first took for lime, but which was afterwards found by Mr. Bergman to be of a siliceous or flinty nature. In some places the water tastes of sulphur, in others not; but, when drunk as soon as it is cold, tastes like common boiled water. The inhabitants use it at particular times for dyeing; and, were they to adopt proper regulations, it might be of still greater use. Victuals may also be boiled in it; and milk held over its steam becomes sweet, owing most probably to the excessive heat of the water, as the same effect is produced by boiling it a long time over the fire. They have begun to make salt by boiling sea-water over it, which, when it is refined, is very pure and good. The cows which drink this hot water yield a great deal of milk. Egbert Olafsen relates, that the water does not become turbid when alkali is thrown into it, nor does it change the colour of syrup of violets. Horrebow asserts, that, if you fill a bottle at one of the spouting springs, the water will boil over two or three times while the spring throws forth its water; and, if corked too soon, the bottle will burst.

Among the many hot springs to be met with in Iceland, several bear the name of geyser: the following is a description of the most remarkable of that name, and in the whole island. It is about two

days journey from Hecla, near a farm called Haukadul. Here a poet would have an opportunity of painting whatever nature has of beautiful and terrible, united in one picture, by delineating this surprising phenomenon. Represent to yourself a large field, where you see on one side, at a great distance, high mountains covered with ice, whose summits are generally wrapped in clouds, so that their sharp and unequal points become invisible. This loss, however, is compensated by a certain wind, which causes the clouds to sink, and covers the mountain itself, when its summit appears as it were to rest on the clouds. On the other side Hecla is seen, with its three points covered with ice, rising above the clouds, and, with the smoke which ascends from it, forming other clouds at some distance from the real ones: and on another side is a ridge of high rocks, at the foot of which boiling water from time to time issues forth; and further on extends a marsh of about three English miles in circumference, where are forty or fifty boiling springs, from which a vapour ascends to a prodigious height.—In the midst of those is the greatest spring, Geyser, which deserves a more exact and particular account. In travelling to the place about an English mile and a half from the huer, from which the ridge of rocks still divided us, we heard a loud roaring noise, like the rushing of a torrent precipitating itself from stupendous rocks. We asked our guide what it meant; he answered, it was Geyser roaring; and we soon saw with our naked eyes what before seemed almost incredible.

The depth of the opening or pipe from which the water gushes cannot well be determined; for sometimes the water sunk down several fathoms, and some seconds passed before a stone which was thrown into the aperture reached the surface of the water. The opening itself was perfectly round, and nineteen feet in diameter, and terminated in a bason fifty-nine feet in diameter. Both the pipe and the bason were covered with a rough stalactic rind, which had been formed by the force of the water: the outermost border of the bason is nine feet and an inch higher than the pipe itself. The water here spouted several times a-day, but always by starts, and after certain intervals. The people who lived in the neighbourhood told us, that they rose higher in cold and bad weather than at other times; and Egbert Olafsen and several others affirm, that it has spouted to the height of sixty fathoms.

At thirty-five minutes after twelve we heard as it were three discharges of a gun under ground, which made it shake: the water flowed over immediately, but instantly sunk again. At eight minutes after two the water flowed over the border of the bason. At fifteen minutes after three we again heard several subterranean noises, though not so strong as before. At forty-three minutes after four the water flowed over very strongly during the space of a minute. In six minutes after we heard many loud subterraneous discharges, not only near the spring, but also from the neighbouring ridge of rocks where the water spouted. At fifty-one minutes after six the fountain spouted up to the height of ninety-two feet, and continued to do so for four minutes. After this great effort it sunk down very low into the pipe, and was entirely quiet during several minutes; but soon began to bubble again: it was not, however, thrown up into the air, but only to the top of the pipe.

The force of the vapours which throw up these waters is excessive; it not only prevents the stones which are thrown into the opening from sinking, but even throws them up to a very great height, together with the water. When the bason was full, we placed ourselves before the sun in such a manner that we could see our shadows in the water; when every one observed round the shadow of his own head (though not round that of others) a circle of almost the same colours which compose the rainbow, and round this another bright circle. This most probably proceeded from the vapours exhaling from the water.

Not far from this place, another spring, at the foot of the neighbouring ridge of rocks, spouted water to the height of one or two yards each time. The opening through which this water issued was not so wide as the other: we imagined it possible to stop up the hole entirely by throwing large stones into it, and even flattered ourselves that our attempts had succeeded; but, to our astonishment, the water gushed forth in a very violent manner. We hastened to the pipe, and found all the stones thrown aside, and the water playing freely through its former channel. In these large springs the waters were hot in the highest degree, and tasted a little of sulphur; but in other respects it was pure and clear. In the smaller springs of the neighbourhood the water was tainted: in some, it was as muddy as that of a clay-pit; in others as white as milk; and in some few as red as blood.

Iceland abounds with pillars of basaltes, which the lower sort of people imagine have been piled upon each other by the giants, who made no use of supernatural force to effect it. They have generally from three to seven sides; and are from four to six feet in thickness, and from twelve to sixteen yards in length, without any horizontal divisions. But sometimes they are only from six inches to one foot in height, and they are then very regular, insomuch that they are sometimes made use of for windows and door-posts. In some places they only peep out here and there among the lava, or more frequently among the tufa; in other places they are quite overthrown, and pieces of broken pillars only make their appearance. Sometimes they extend without interruption for two or three miles in length. In one mountain they have a singular appearance: on the top the pillars lie horizontally; in the middle they are sloping; the lowest are perfectly perpendicular; and in some parts they are bent into a semicircular figure. The matter of the Iceland basaltes seems to be the same with that of Staffa; though in some it is more porous, and inclines to a grey. Some we observed which were of a blackish grey, and composed of several joints. Another time we observed a kind of porous glassy stone, consequently a lava, which was so distinctly divided, that we were for some time at a loss to determine whether it was basaltes or not, though at last we all agreed that it was.

Iron ore is found in some parts of the island, and that beautiful copper ore called malachites. Horrebow speaks of native silver. A stratum of sulphur is found near Myvatu from nine inches to two feet in thickness; partly of a brown colour, and partly of a deep orange. Immediateley over the sulphur is a blue earth; above that a vitriolic and aluminous one; and beneath the sulphur a reddish bole.

At

At what time the island of Iceland was first peopled is uncertain. An English colony indeed is said to have been settled there in the beginning of the fifth century; but of this there are not sufficient proofs. There is, however, reason to suppose that the English and Irish were acquainted with this country, under another name, long before the arrival of the Norwegians; for the celebrated Bede gives a pretty accurate description of the island. But of these original inhabitants we cannot pretend to say any thing, as the Iceland chronicles go no farther back than the arrival of the Norwegians. What they relate is to the following purpose.

Naddodr, a famous pirate, was driven on the coast of Iceland in 861, and named the country *Snio-land*, "Snow-land," on account of the great quantities of snow with which he perceived the mountains covered. He did not remain there long; but on his return extolled the country to such a degree, that one Garder Suafarson, an enterprising Swede, was encouraged by his account to go in search of it in 864. He sailed quite round the island, and gave it the name of *Gardalsholmur*, or Garder's-Island. Having remained in Iceland during the winter, he returned in the spring to Norway, where he described the new-discovered island as a pleasant well-wooded country. This excited a desire in Floke, another Swede, reputed the greatest navigator of his time, to undertake a voyage thither. As the compass was then unknown, he took three ravens on-board to employ them on the discovery. By the way he visited his friends at Ferro; and, having sailed farther to the northward, he let fly one of his ravens, which returned to Ferro. Some time after, he dismissed the second, which returned to the ship again, as he could find no land. The last trial proved more successful; the third raven took his flight to Iceland, where the ship arrived a few days after. Floke staid here the whole winter with his company; and, because he found a great deal of floating ice on the north side, he gave the country the name of Iceland, which name it has ever since retained.

When they returned to Norway in the following spring, Floke, and those that had been with him, gave a very different description of the country. Floke described it as a wretched place; while one of his companions, named Thorulfr, praised it so highly, that he affirmed butter dropped from every plant; which extravagant commendation procured him the name of Thorulfr-smior, or Butter-Thorulfr.

From this time there are no accounts of any voyages to Iceland, till Ingolfr and his friend Leifr undertook one in 874. They spent the winter on the island, and determined to settle there for the future. Ingolfr returned to Norway to provide whatever might be necessary for the comfortable establishment of a colony, and Leifr in the mean time went to assist in the war in England. After an interval of four years, they again met in Iceland, the one bringing with him a considerable number of people, with the necessary tools and instruments for making the country habitable; and the other imported his acquired treasures. After this period many people went there to settle; and, in the space of sixty years, the whole island was inhabited. The tyranny of Harold king of Norway contributed not a little to the population of Iceland; and so great was the emigration of his subjects, that he was at last obliged to issue an order, that no

one ſhould ſail from Norway to Iceland without paying four ounces of fine ſilver to the king.

Beſides the Norwegians, new colonies arrived from different nations, between whom wars ſoon commenced; and the Icelandic hiſtories are full of the accounts of their battles. To prevent theſe conflicts for the future, a kind of chief was choſen in 928, upon whom great powers were conferred. This man was the ſpeaker in all their public deliberations; pronounced ſentence in difficult and intricate caſes; decided all diſputes; and publiſhed new laws, after they had been received and approved of by the people at large; but he had no power to make laws without the approbation and conſent of the reſt. He therefore aſſembled the chiefs, whenever the circumſtances ſeemed to require it; and, after they had deliberated among themſelves, he repreſented the opinion of the majority to the people, whoſe aſſent was neceſſary before it could be conſidered as a law. His authority among the chiefs and leaders, however, was inconſiderable, as he was choſen by them, and retained his place no longer than while he preſerved their confidence.

This inſtitution did not prove ſufficient to reſtrain the turbulent ſpirit of the Icelanders. They openly waged war with each other; and, by their inteſtine conflicts, ſo weakened all parties, that the whole became at laſt a prey to a few arbitrary and enterpriſing men; who, as is too generally the caſe, wantonly abuſed their power, to the oppreſſion of their countrymen and the diſgrace of humanity. Notwithſtanding theſe troubles, however, the Icelanders remained free from a foreign yoke till 1251; when the greateſt part of them put themſelves under the protection of Hakans king of Norway, promiſing to pay him tribute upon certain conditions agreed on between them; and the reſt followed their example in 1264. Afterwards, Iceland, together with Norway, became ſubject to Denmark. For a long time the care of the iſland was committed to a governor, who commonly went there once a-year; though, according to his inſtructions, he ought to have reſided in Iceland. As the country ſuffered incredibly through the abſence of its governors, it was reſolved a few years ago that they ſhould reſide there, and have their ſeat at Beſſeſſtedr, one of the old royal domains. He has under him a bailiff, two laymen, a ſheriff, and twenty-one ſyſſelmen, or magiſtrates, who ſuperintend ſmall diſtricts; and almoſt every thing is decided according to the laws of Denmark.

At the firſt ſettlement of the Norwegians in Iceland, they lived in the ſame manner as they had done in their own country, namely, by war and piracy. Their ſituation with regard to the kings of Norway, however, ſoon obliged them to apply to other ſtates, in order to learn as much of the knowledge of government and politics as was neceſſary to preſerve their colony from ſubjugation to a foreign yoke. For this purpoſe they often ſailed to Norway, Denmark, Sweden, England, and Scotland. The travellers, at their return, were obliged to give an account to their chiefs of the ſtate of thoſe kingdoms through which they paſſed. For this reaſon, hiſtory, and what related to ſcience, was held in high repute as long as the republican form of government laſted: and the great number of hiſtories to be met with in the country ſhew at leaſt the deſire of the Icelanders to be inſtructed. To ſecure themſelves, therefore, againſt their powerful neighbours, they were obliged to enlarge their hiſtorical knowledge.

knowledge. They likewise took great pains in studying perfectly their own laws, for the maintenance and protection of this internal security. Thus Iceland, at a time when ignorance and obscurity overwhelmed the rest of Europe, was enabled to produce a considerable number of poets and historians. When the Christian religion was introduced about the end of the tenth century, more were found conversant in the law than could have been expected, considering the extent of the country and the number of its inhabitants. Fishing was followed among them; but they devoted their attention considerably more to agriculture, which has since entirely ceased.

Two things have principally contributed towards producing a great change both in their character and way of life, viz. the progress of the Christian religion, and their subjection first to Norway and afterwards to Denmark. For, if religion on one side commanded them to desist from their ravages and warlike expeditions, the secular power on the other deprived them of the necessary forces for the execution of them; and, since this time, we find no farther traces of their heroic deeds, except those which are preserved in their histories.

The modern Icelanders apply themselves to fishing and breeding of cattle. They are middle-sized and well-made, though not very strong; and the women are in general ill-featured. Vices are much less common among them than in other parts where luxury and riches have corrupted the morals of the people. Though their poverty disables them from imitating the hospitality of their ancestors in all respects, yet they continue to shew their inclination to it; they cheerfully give away the little they have to spare, and express the utmost joy and satisfaction if you are pleased with their gift. They are uncommonly obliging and faithful, and extremely attached to government. They are very zealous in their religion: an Icelander never passes a river or any other dangerous place, without previously taking off his hat and imploring the divine protection; and he is always thankful for the protection of the Deity when he has passed the danger in safety. They have an inexpressible attachment to their native country, and are no where so happy. An Icelander therefore rarely settles in Copenhagen, though ever such advantageous terms should be offered him. On the other hand, we cannot ascribe any great industry or ingenuity to these people: they work on in the way to which they have all along been accustomed, without thinking of improvements. They are not cheerful in conversation, but simple and credulous; and have no aversion against a bottle, if they can find an opportunity. When they meet together, their chief pastime consists in reading their history. The master of the house makes the beginning, and the rest continue in their turns when he is tired. Some of them know these stories by heart; others have them in print, and others in writing. Besides this, they are great players at chess and cards, but only for their amusement, as they never play for money; which, however, seems to have been formerly in use among them; since, by one of their old laws, a fine is imposed upon those who play for money.

The modern Icelanders have made very little alteration in their dress from what was formerly in use. The men all wear a linen shirt next to the skin, with a short jacket, and a pair of wide breeches over it. When they travel, another short coat is put over all. The whole

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is made of coarse black cloth, called wadmal; but some wear clothes of a white colour. On their head they wear large three-cornered hats, and on their feet Iceland shoes and worsted stockings. Some of them indeed have shoes from Copenhagen; but, as they are rather too dear for them, they generally make their own shoes, sometimes of the hides of oxen, but more frequently of sheep's leather. They make them by cutting a square piece of leather, rather wider than the length of the foot; this they sew up at the toes and behind at the heel, and tie it on with leather thongs. These shoes are convenient enough where the country is level; but it would be very difficult for us who are not accustomed to walk with them amongst the rocks and stones, though the Icelanders do it with great ease.

The women are likewise dressed in black wadmal. They wear a boddice over their shifts, which are sewed up at the bosom; and above this a jacket laced before, with long narrow sleeves reaching down to the wrists. In the opening on the side of the sleeve, they have buttons of chased silver, with a plate fixed to each button; on which the lover, when he buys them in order to present them to his mistress, takes care to have his name engraved along with hers. At the top of the jacket a little black collar is fixed, of about three inches broad, of velvet or silk, and frequently trimmed with gold cord. The petticoat is likewise of wadmal, and reaches down to the ancles. Round the top of it is a girdle of silver or some other metal, to which they fasten the apron, which is also of wadmal, and ornamented at top with buttons of chased silver. Over all this they wear an upper dress nearly resembling that of the Swedish peasants; with this difference, that it is wider at bottom: this is close at the neck and wrists, and a hand's breadth shorter than the petticoat. It is adorned with a facing down to the bottom, which looks like cut velvet, and is generally wove by the Icelandic women. On their fingers they wear gold, silver, or brass, rings. Their head-dress consists of several cloths wrapped round the head almost as high again as the face. It is tied fast with a handkerchief, and serves more for warmth than ornament. Girls are not allowed to wear this head-dress till they are marriageable. At their weddings they are adorned in a very particular manner: the bride wears, close to the face, round her head-dress, a crown of silver gilt. She has two chains round her neck, one of which hangs down very low before, and the other rests on her shoulders. Besides these, she wears a smaller chain, from whence generally hangs a little heart, which may be opened to put some kind of perfume in it. This dress is worn by all the Icelandic women without exception: only with this difference, that the poorer sort have it of coarse wadmal, with ornaments of brass; and those that are in easier circumstances have it of broad cloth, with silver ornaments gilt.

The houses of the Icelanders are very indifferent, but the worst are said to be on the south side of the island. In some parts they are built of drift-wood, in others of lava, almost in the same manner as the stone-walls we make for inclosures, with moss stuffed between the pieces of lava. In some houses the walls are wainscotted on the inside. The roof is covered with sods, laid over rafting, or sometimes over the ribs of whales; the walls are about three yards high, and the entrance somewhat lower. Instead of glass, the windows are made of the chorion and amnios of sheep, or the membranes which surround

surround the womb of the ewe. These are stretched on a hoop, and laid over a hole in the roof. In the poorer sort of houses they employ for the windows the inner membrane of the stomach of animals, which is less transparent than the others.

As the island of Iceland produces no kind of grain, the inhabitants of consequence have no bread but what is imported; and which, being too dear for common use, is reserved for weddings and other entertainments.

The Icelanders in general eat three meals a day, at seven in the morning, two in the afternoon, and nine at night. In the morning and evening they commonly eat curds mixed with new milk, and sometimes with juniper or crow berries. In some parts, they also have pottage made of rock-grass, which is very palatable, or curdled milk boiled till it becomes of a red colour, or new milk boiled a long time. At dinner, their food consists of dried fish, with plenty of sour butter; they also sometimes eat fresh fish, and, when possible, a little bread and cheese with them. It is reported by some, that they do not eat any fish till it is quite rotten; this report perhaps proceeds from their being fond of it when a little tainted: they however frequently eat fish which is quite fresh, though, in the same manner as the rest of their food, often without salt.

Their common beverage is milk, either warm from the cow or cold, and sometimes boiled: they likewise use butter-milk with or without water. On the coasts they generally drink blanda and sour milk; which is sold after it is skimmed at two-fifths of a rix-dollar per cask; some likewise send for beer from Copenhagen, and some brew their own. A few of the principal inhabitants also have claret and coffee. The common people sometimes drink a kind of tea, which they make from the leaves of the dryas octopetala, and the veronica officinalis.

On the coasts the men employ themselves in fishing, both summer and winter. On their return home, when they have drawn and cleaned their fish, they give them to their wives, whose care it is to dry them. In the winter, when the inclemency of the weather prevents them from fishing, they are obliged to take care of their cattle, and spin wool. In summer, they mow the grass, dig turf, provide fuel, go in search of sheep and goats that were gone astray, and kill cattle. They prepare leather with the spiraea ulmaria instead of bark. Some few work in gold and silver; and others are instructed in mechanics, in which they are tolerable proficients. The women prepare the fish, take care of the cattle, manage the milk and wool, sew, spin, and gather eggs and down. When they work in the evening, they use, instead of an hour-glass, a lamp with a wick made of epilobium dipt in train oil, which is contrived to burn four, six, or eight, hours.

Among the common people of Iceland, time is not reckoned by the course of the sun, but by the work they have done, and which is prescribed by law. According to this prescription, a man is to mow as much hay in one day as grows on thirty fathoms of manured soil, or forty fathoms of land which has not been manured; or he is to dig seven hundred pieces of turf eight feet long and three broad. If as much snow falls as reaches to the horses bellies, a man is required daily to clear a piece of ground sufficient for a hundred sheep.

A woman

A woman is to rake together as much hay as three men can mow, or to weave three yards of wadmal a-day.

The wages of a man are fixed at four dollars and twelve yards of wadmal; and those of a woman at two dollars and five yards of wadmal. When men are sent to fishing out of the country, there is allowed to each man, by law, from the 25th of September to the 14th of May, six pounds of butter and eighteen pounds of dried fish every week. This may seem to be too great an allowance; but it must be remembered that they have nothing else to live upon. When they are at home, and can get milk, &c. every man receives only five pounds of dried fish and three quarters of a pound of butter a-week.

The food and manner of life of the Icelanders by no means contribute to their longevity. It is very rare indeed to see an inhabitant of Iceland exceed the age of fifty or sixty; and the greater part are attacked by grievous diseases before middle age. Of these the scurvy and elephantiasis or leprosy are the worst. They are also subject to the gout in their hands, owing to their frequent employment in fishing, and handling the wet fishing-tackle in cold weather. St. Anthony's fire, the jaundice, pleurisy, and lowness of spirits, are frequent complaints in this country. The small-pox also is exceedingly fatal, and not long ago destroyed sixteen thousand persons. By these diseases, and the frequent famines with which the country has been afflicted, the inhabitants are reduced to a much smaller number than they formerly were, insomuch that it is computed they do not in all exceed sixty thousand.

The exports of Iceland consist of dried fish, salted mutton and lamb, beef, butter, tallow, train-oil, coarse woollen cloth, stockings, gloves, raw wool, sheep-skins, lamb-skins, fox-furs of various colours, eider-down, feathers, and formerly sulphur; but there is no longer a demand for this mineral. On the other hand the Icelanders import timber, fishing lines and hooks, tobacco, bread, horse-shoes, brandy, wine, salt, linen, a little silk, and a few other necessaries, as well as superfluities for the better sort. The whole trade of Iceland is engrossed by a monopoly of Danes, indulged with an exclusive charter. This company maintains factories at all the harbours of Iceland, where they exchange their foreign goods for the merchandize of the country; and, as the balance is in favour of the Icelanders, pay the overplus in Danish money, which is the only current coin in this island. All their accounts and payments are adjusted according to the number of fish: two pounds of fish are worth two shillings in specie, and forty-eight fish amount to one rix-dollar. A Danish crown is computed at thirty fish: what falls under the value of twelve fish cannot be paid in money; but must be bartered either for fish or roll-tobacco, an ell of which is equal to one fish. The weights and measures of the Icelanders are nearly the same with those used in Denmark. The Icelanders being neither numerous nor warlike, and altogether unprovided with arms, ammunition, garrisons, or fleets, are in no condition to defend themselves from invasion, but depend entirely on the protection of his Danish majesty, to whom they are subject. The revenues which he draws from this island consist of the income of divers estates, as royal demesne, amounting to about eight thousand dollars per annum; of the money paid by the company for an exclusive trade, to the value of twenty thousand dollars;

and

and of a fixed proportion in the tythes of fish paid in some particular districts.

Iceland is noted for the volcanoes with which it abounds, and which seem to be more furious than any yet discovered in the other parts of the globe. Indeed, from the latest accounts, it would seem that this miserable country were little other than one continued volcano. Mount Hecla has been commonly supposed to be the only burning mountain, or at least the principal one, in the island. It has indeed been more taken notice of than many others of as great extent, partly from its having had more frequent eruptions than any single one, and partly from its situation, which exposes it to the sight of ships sailing to Greenland and North America. But, in a list of eruptions published in the Appendix to Pennant's Arctic Zoology, it appears, that, out of fifty-one remarkable ones, only one third have proceeded from Hecla, the other mountains it seems being no less active in the work of destruction than this celebrated one. These eruptions take place in the mountains covered with ice, which the inhabitants call Jokuls. Some of these, as appears from a large map of Iceland made by order of his Danish majesty in 1734, have been swallowed up. Probably the great lakes met with in this country may have been occasioned by the sinking of such mountains, as several instances of a similar nature are to be met with in other parts of the world. The great Icelandic lake called Myvatn may probably have been one. Its bottom is entirely formed of lava, divided by deep cracks, which shelter during the winter the great quantity of trouts which inhabit this lake. It is now only thirty feet deep, but originally was much deeper; being nearly filled up in the year 1728 by an eruption of the great mountain Krafle. The fiery stream took its course towards Myvatn, and ran into it with an horrid noise, which continued till the year 1730.

The mountains of Iceland are of two kinds, primitive and posterior. The former consists of strata usually regular, but sometimes confused. They are formed of different sorts of stone without the least appearance of fire. Some are composed of sand and free-stone, petrosilex or chirt, slaty or fissile stone, and various kinds of earth or bole, and steatitæ; different sorts of breccia or conglutinated stones; jaspers of different kinds; Iceland crystal; the common rhomboid spathum, chalcedonies stratified, and botryoid; zeolites of the most elegant kinds; crystals, and various other substances that have no relation to volcanoes. These primitive mountains are those called Jokuls, and are higher than the others. One of them, called Æsian or Rias, is six thousand feet high. It seems to be composed of great and irregular rocks of a dark-grey colour, piled on each other. Another, called Enneberg, is about three thousand feet high; the Snæfield Jokul, two thousand two hundred and eighty-seven yards; the Snæfeldnas or promontory of Snæfield is from three to four hundred fathoms. Hornstrand, or the coast by the north Cape Nord, is very high, from three to four hundred fathoms. The rocks of Drango are seven in number, of a pyramidal figure, rising out of the sea at a small distance from the cliffs, four of which are of a vast height, and have a most magnificent appearance.

Eastward from the Snæfield begins the Eisberge, soaring to a vast height; many parts of which have felt the effects of fire, and in some of the melted rocks are large cavities. Budda-lekkur, a rock at one end of this mountain, is also volcanic, and has in it a great cavern

hung with ſtalactitæ. The name of Solvahamar is given to a tremendous range of volcanic rocks, compoſed entirely of flags, and covered in the ſeaſon with ſea-fowl. It would be endleſs, however, to mention all the places which bear the marks of fire in various forms, either by having been vitrified, changed into a fiery colour, ragged and black, or bear the marks of having run for miles in a ſloping direction towards the ſea.

Theſe volcanoes, though ſo dreaful in their effects, ſeldom begin to throw out fire without giving warning. A ſubterraneous rumbling noiſe heard at a conſiderable diſtance, as in other volcanoes, preceedes the eruption for ſeveral days, with a roaring and cracking in the place from whence the fire is about to burſt forth; many fiery meteors are obſerved, but generally unattended with any violent concuſſion of the earth; though ſometimes earthquakes, of which ſeveral inſtances are recorded, have accompanied theſe dreadful conflagrations. The drying up of ſmall lakes, ſtreams, and rivulets, is alſo conſidered as a ſign of an impending eruption; and it is thought to haſten the eruption when a mountain is ſo covered with ice, that the holes are ſtopped up through which the exhalations formerly found a free paſſage. The immediate ſign is the burſting of the maſs of ice with a dreadful noiſe; flames then iſſue forth from the earth, and lightning and fire-balls from the ſmoke; ſtones, aſhes, &c. are thrown out to vaſt diſtances. Egbert Olafsen relates, that, in an eruption of Kattle-giaa in 1755, a ſtone weighing two hundred and ninety pounds was thrown to the diſtance of twenty-four Engliſh miles. A quantity of white pumice-ſtone is thrown up by the boiling waters; and it is conjectured, with great probability, that the latter proceeds from the ſea, as a quantity of ſalt, ſufficient to load ſeveral horſes, has frequently been found after the mountain has ceaſed to burn.

To enumerate the ravages of ſo many dreadful volcanoes, which from time immemorial have contributed to render this dreary country ſtill leſs habitable than it is from the climate, would greatly exceed our limits. It will be ſufficient to give an account of that which happened in 1783, and which from its violence ſeems to have been unparalleled in hiſtory.

Its firſt ſigns were obſerved on the 1ſt of June by a trembling of the earth in the weſtern part of the province of Shapterfiall. It increaſed gradually to the 11th, and became at laſt ſo great that the inhabitants quitted their houſes, and lay at night in tents on the ground. A continual ſmoke or ſteam was perceived riſing out of the earth in the northern and uninhabited parts of the country. Three fire-ſpouts, as they were called, broke out in different places, one in Ulfarſdal, a little to the eaſt of the river Skapta; the other two were a little to the weſtward of the river called Ilwerfisfliot. The river Skapta takes its riſe in the north-eaſt, and, running firſt weſtward, it turns to the ſouth, and falls into the ſea in a ſouth-eaſt direction. Part of its channel is confined for about twenty-four Engliſh miles in length, and is in ſome places two hundred fathoms deep, in others a hundred or a hundred and fifty, and its breadth in ſome places a hundred, fifty, or forty, fathoms. Along the whole of this part of its courſe the river is very rapid, though there are no conſiderable cataracts or falls. There are ſeveral other ſuch confined channels in the country, but this is the moſt conſiderable.

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The three fire-ſpouts, or ſtreams of lava, which had broke out, united into one, after having riſen a conſiderable height into the air, arriving at laſt at ſuch an amazing altitude as to be ſeen at the diſtance of more than two hundred Engliſh miles; the whole country, for double that diſtance, being covered with a ſmoke or ſteam not to be deſcribed.

On the 8th of June this fire firſt became viſible. Vaſt quantities of ſand, aſhes, and other volcanic matters, were ejected, and ſcattered over the country by the wind, which at that time was very high. The atmoſphere was filled with ſand, brimſtone, and aſhes, in ſuch a manner as to occaſion continual darkneſs; and conſiderable damage was done by the pumice-ſtones which fell, red-hot, in great quantities. Along with theſe a tenacious ſubſtance like pitch fell in vaſt quantities; ſometimes rolled up like balls, at other times like rings or garlands, which proved no leſs deſtructive to vegetation than the other. This ſhower having continued for three days, the fire became very viſible, and at laſt arrived at the amazing height already mentioned. Sometimes it appeared in a continued ſtream, at others in flaſhes or flames ſeen at the diſtance of thirty or forty Daniſh miles (a hundred and eighty or two hundred and forty of ours), with a continual noiſe like thunder, which laſted the whole ſummer.

The ſame day that the fire broke out there fell a vaſt quantity of rain, which running in ſtreams on the hot ground tore it up in large quantities, and brought it down upon the lower lands. This rain-water was much impregnated with acid and other ſalts, ſo as to be highly corroſive, and occaſion a painful ſenſation when it fell on the hands or face. At a greater diſtance from the fire the air was exceſſively cold. Snow lay upon the ground three feet deep in ſome places; and in others there fell great quantities of hail, which did very much damage to the cattle and every thing without doors. Thus the graſs and every kind of vegetation in thoſe places neareſt the fire was deſtroyed, being covered with a thick cruſt of ſulphureous and ſooty matter. Such a quantity of vapour was raiſed by the conteſt of the two adverſe elements, that the ſun was darkened and appeared like blood, the whole face of nature ſeeming to be changed; and this obſcurity ſeems to have reached as far as the iſland of Britain; for, during the whole ſummer of 1783, an obſcurity reigned throughout all parts of this iſland; the atmoſphere appearing to be covered with a continual haze, which prevented the ſun from appearing with his uſual ſplendor.

The dreadful ſcene above deſcribed laſted in Iceland for ſeveral days; the whole country was laid waſte, and the inhabitants fled every where to the remoteſt parts of their miſerable country, to ſeek for ſafety from the fury of this unparalleled tempeſt.

On the firſt breaking out of the fire, the river Skapta was conſiderably augmented, on the eaſt ſide of which one of the fire-ſpouts was ſituated; and a ſimilar overflow of water was obſerved at the ſame time in the great river Piorſa, which runs into the ſea a little to the eaſtward of a town called Orrebakka, and into which another river called Tuna, after having run through a large tract of barren and uncultivated land, empties itſelf. But on the 11th of June the waters of the Skapta were leſſened, and in leſs than twenty-four hours totally dried up. The day following, a prodigious ſtream of liquid and red-hot lava, which the fire-ſpout had diſcharged, ran down the

channel of the river. This burning torrent not only filled up the deep channel above-mentioned, but, overflowing the banks of it, spread itself over the whole valley, covering all the low grounds in its neighbourhood; and, not having any sufficient outlet to empty itself by, it rose to a vast height, so that the whole adjacent country was overflowed, insinuating itself between the hills, and covering some of the lower ones. The hills here are not continued in a long chain or series, but are separated from one another, and detached, and between them run little rivulets or brooks; so that, besides filling up the whole valley in which the river Skapta ran, the fiery stream spread itself for a considerable distance on each side, getting vent between the above-mentioned hills, and laying all the neighbouring country under fire.

The spouts still continuing to supply fresh quantities of inflamed matter, the lava took its course up the channel of the river, overflowing all the grounds above as it had done those below the place whence it issued. The river was dried up before it, until at last it was stopped by the hill whence the Skapta takes its rise. Finding now no proper outlet, it rose to a prodigious height, and overflowed the village of Buland, consuming the houses, church, and every thing that stood it its way; though the high ground on which this village stood seemed to ensure it from any danger of this kind.

The fiery lake, still increasing, spread itself out in length and breadth for about thirty-six English miles; and, having converted all this tract of land into a sea of fire, it stretched itself towards the south, and getting vent again by the river Skapta rushed down its channel with great impetuosity. It was still confined between the narrow banks of that river for about six miles (English); but, coming at last into a more open place, it poured forth in prodigious torrents with amazing velocity and force; spreading itself now towards the south, tearing up the earth, and carrying on its surface flaming woods and whatsoever it met with. In its course it laid waste another large district of land. The ground where it came was cracked, and sent forth great quantities of steam long before the fire reached it; and every thing near the lake was either burnt up or reduced to a fluid state. In this situation matters remained from the 12th of June to the 13th of August; after which the fiery lake no longer spread itself, but nevertheless continued to burn; and, when any part of the surface acquired a crust by cooling, it was quickly broken by the fire from below; and this, tumbling down among the melted substance, was rolled and tossed about with prodigious noise and cracking; and, in many parts of its surface, small spouts or at least ebullitions were formed, which continued for some length of time.

In other directions this dreadful inundation proved no less destructive. Having run through the narrow part of the channel of Skapta as early as the 12th of June, it stretched out itself towards the west and south-west, overflowing all the flat country, and its edge being no less than seventy fathoms high at the time it got out of the channel of the river. Continuing its destructive course, it overflowed a number of villages, running in every direction where it could find a vent. In one place it came to a great cataract of the river Skapta, about fourteen fathoms in height, over with it was precipitated with tremendous noise, and thrown in great quantities to a very considerable distance. In another place it stopped up the channel of a large river, filled

filled a great valley, and destroyed two villages by approaching only within one hundred fathoms of them. Others were overflowed by inundations of water proceeding from the rivers which had been stopped in their courses; until at last all the passages on the south, east, and west, being stopped, and the spouts still sending up incredible quantities of fresh lava, it burst out to the north and north-east, spreading over a tract of land forty-eight miles long and thirty-six broad. Here it dried up the rivers Tuna and Axafyrdi; but even this vast effusion being insufficient to exhaust the subterraneous resources of liquid fire, a new branch took its course for about eight miles down the channel of the river Ilwerfisfliot, when, coming again to an open country, it formed what our author calls a small lake of fire, about twelve miles in length and six in breadth. At last, however, this branch also stopped on the 16th of August; the fiery fountains ceased to pour forth new supplies, and this most astonishing eruption came to a period.

The whole extent of ground covered by this dreadful inundation was computed at no less than ninety miles long and forty two in breadth; the depth of the lava being from sixteen to twenty fathoms. Twelve rivers were dried up, twenty or twenty-one villages were destroyed, and two hundred and twenty-four people lost their lives. The extent above-mentioned, however, is that only on the south, east, and west; for that towards the north being over uninhabited land, where nobody cared to venture themselves, was not exactly known. Some hills were covered by this lava; others were melted down by its heat; so that the whole had the appearance of a sea of red-hot and melted metal.

After this eruption two new islands were thrown up from the bottom of the sea. One, about three miles in circumference, and about a mile in height, made its appearance in the month of February 1784, where there was formerly one hundred fathoms of water. It was about one hundred miles south-west from Iceland, and forty-eight from a cluster of small islands called Gierfugla. It continued for some time to burn with great violence, sending forth prodigious quantities of pumice-stones, sand, &c. like other volcanoes. The other lay to the north-west, between Iceland and Greenland. It burnt day and night, without intermission, for a considerable time; and was also very high, and larger than the former. Since that time, however, one or both of these islands have been swallowed up.

All the time of this great eruption, and for a considerable time after, the whole atmosphere was loaded with smoke, steam, and sulphureous vapours. The sun was sometimes wholly invisible; and when it could be seen was of a reddish colour. Most of the fisheries were destroyed; the banks where the fish used to resort being so changed, that the fishermen could not know them again; and the smoke was so thick, that they could not go far out to sea. The rain-water, falling through this smoke and steam, was so impregnated with salt and sulphureous matter, that the hair and even the skin of the cattle were destroyed; and the whole grass of the island was so covered with soot and pitchy matter, that what had escaped the destructive effects of the fire became poisonous; so that the cattle died for want of food, or perished by eating those unwholesome vegetables. Nor were the inhabitants in a much better situation; many of them having lost their lives by the poisonous qualities of the smoke and

ſteam with which the whole atmoſphere was filled; particularly old people, and ſuch as had any complaint in the breaſt and lungs.

Before the fire broke out in Iceland, there is ſaid to have been a very remarkable eruption in the uninhabited parts of Greenland; and that in the northern parts of Norway, oppoſite to Greenland, the fire was viſible for a long time. It was alſo related, that, when the wind was in the north, a great quantity of aſhes, pumice, and brimſtone, fell upon the north and weſt coaſts of Iceland, which continued for the whole ſummer whenever the wind was in that quarter; and the air was always very much impregnated with a thick ſmoke and ſulphureous ſmell.

During the fall of the ſharp rain formerly mentioned, there was obſerved at Trondheim, and other places in Norway, and likewiſe at Faw, an uncommon fall of ſharp and ſalt rain, which totally deſtroyed the leaves of the trees, and every vegetable it fell upon, by ſcorching them up, and cauſing them to wither. A conſiderable quantity of aſhes, ſand, and other volcanic matters, fell at Faro, which covered the whole ſurface of the ground whenever the wind blew from Iceland, though the diſtance between the two places is not leſs than four hundred and eighty miles. Ships that were ſailing betwixt Copenhagen and Norway were frequently covered with aſhes and ſulphureous matter, which ſtuck to the maſts, ſails, and decks, beſmearing them all over with a black and pitchy ſubſtance. In many parts of Holland, Germany, and other northern countries, a ſulphureous vapour was obſerved in the air, accompanied with a thick ſmoke, and in ſome places a light-grey coloured ſubſtance fell upon the earth every night; which, by yielding a bluiſh flame when thrown into the fire, evidently ſhewed its ſulphureous nature. On thoſe nights in which this ſubſtance fell in any quantity, there was little or no dew obſerved. Theſe appearances continued, more or leſs, all the months of July, Auguſt, and September.

Some curious particulars relative to the ancient ſtate of this iſland have lately been publiſhed by a Mr. Vhorkelyn, a native of the country. From his work it appears that Iceland, for a very conſiderable ſpace of time, viz. from the beginning of the 10th to the middle of the 13th century, was under a republican form of government. At firſt the father or head of every family was an abſolute ſovereign; but, in the progreſs of population and improvement, it became neceſſary to form certain regulations for the ſettlement of diſputes concerning the frontiers of different eſtates. For this purpoſe the heads of the families concerned aſſembled themſelves, and formed the outlines of a republic. In the mean time they carried on a proſperous trade to different parts; ſending ſhips even to the Levant, and to Conſtantinople, at that time celebrated as the only ſeat of literature and humanity in the world. Deputies were likewiſe ſent from this iſland over-land to that capital, for the improvement of their laws and civilization; and this a whole century before the firſt cruſade. In theſe ancient Icelandic laws, therefore, we meet with evident traces of thoſe of the Greeks and Romans. For example, beſides a body of written laws which were written every third year to the people, they had two men choſen annually by the heads of families, with conſular power, not only to enforce the laws then in being, but, when theſe proved deficient, to act as neceſſity required.

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These laws do not appear to have inflicted capital punishments upon any person. Murderers were banished to the woods; that is, to the interior and uncultivated parts of the island; where no person was allowed to approach them within a certain number of fathoms. In cases of banishment for smaller crimes, the friends of the offender were allowed to supply him with necessaries. The culprit, however, might be killed by any person who found him without his bounds: and he might even be hunted and destroyed in his sanctuary, provided he did not withdraw himself from the island within a twelvemonth after his sentence, which it was supposed he might accomplish by means of the annual arrival and departure of ships. Every man's person was free until he had forfeited his rights by some crime against society; and so great was their respect for independence, that great indulgence was allowed for the power of passion. If any provoking word or behaviour had been used, no punishment was inflicted on the party who resented it, even though he should have killed his adversary.

By the laws of Iceland, the poor were committed to the protection of their nearest kindred, who had a right to their labour as far as they were able to work, and afterwards to indemnification if the poor person should acquire any property. Children were obliged to maintain their parents in their old age; but, if the latter had neglected to give them good education, they were absolved from this duty.

While the republic of Iceland continued free and independent, ships were sent from the island to all parts of the world. Till very lately, however, not a ship belonged to it, the little commerce it enjoyed being monopolized by a Danish company, until in 1786 it was laid open to all the subjects of Denmark. "There is at present a revival of the cod fishery on the coast of Iceland from our kingdom. About a dozen of vessels have of late sailed from the isle of Thanet, and a few from other parts of Great Britain. Pytheas says, that Iceland lies six days sailing from Great Britain. A vessel from Yarmouth was, in the last year, exactly that time in its voyage from the Orkneys to Iceland. With a fair wind it might be performed in less time; but the winds about the Ferro isles are generally changeable."

OF THE DEAF AND DUMB.

THOSE born deaf are also dumb, as not being able to learn any language, at least in the common way. However, as the eyes in some measure serve them for ears, they may understand what is said by the motion of the lips, tongue, &c. of the speaker; and even accustom themselves to move their own, as they see other people do, and by this means learn to speak.—Thus it was that Dr. Wallis taught two young gentlemen born deaf to know what was said to them, and to return pertinent answers. Digby gives us another instance of the same within his own knowledge; and there was a Swiss physician lately living in Amsterdam, one John Conrad Amman, who effected the same in several children born deaf with surprising success. He has reduced the thing to a fixed art or method, which he has published in his *Surdus Loquens*, Amstelod. 1692. and *de Loquela*, ibid. 1700.

In the Phil. Transf, No. 312. we have an account, by Mr. Waller, R. S. Secr. of a man and his sister, each about fifty years old, born in the same town with Mr. Waller, who had neither of them the least sense

ſenſe of hearing; yet both of them knew, by the motion of the lips only, whatever was ſaid to them and would anſwer pertinently to the queſtion propoſed. It ſeems they could both hear and ſpeak when children, but loſt their hearing afterwards: whence they retained their ſpeech, which, though uncouth, was yet intelligible.

Such another inſtance is that of Mr. Goddy's daughter, miniſter of St. Gervais in Geneva, related by Biſhop Burnet. "At two years old they perceived ſhe had loſt her hearing; and ever ſince, though ſhe hears great noiſes, yet hears nothing of what is ſaid to her. But, by obſerving the motions of the mouth and lips of others, ſhe acquired ſo many words, that out of theſe ſhe has formed a ſort of jargon, in which ſhe can hold converſation whole days with thoſe that can ſpeak her language. She knows nothing that is ſaid to her, unleſs ſhe ſees the motion of their mouths that ſpeak to her, ſo that in the night they are obliged to light candles to ſpeak to her. One thing will appear the ſtrangeſt part of the whole narration: ſhe has a ſiſter, with whom ſhe has practiſed her language more than with any body elſe; and in the night, by laying her hand on her ſiſter's mouth, ſhe can perceive by that what ſhe ſaith, and ſo can diſcourſe with her in the dark."

It is obſervable, that deaf perſons, and ſeveral others thick of hearing, hear better and more eaſily if a loud noiſe be raiſed at the time when you ſpeak to them: which is owing, no doubt, to the greater tenſion of the ear-drum on that occaſion. Dr. Wallis mentions a deaf woman, who if a drum were beat in the room could hear any thing very clearly; ſo that her huſband hired a drummer for a ſervant, that by this means he might hold converſation with his wife. The ſame author mentions another, who, living near a ſteeple, could always hear very well if there was a ringing of three or four bells, but never elſe.

Deafneſs has in all ages been conſidered as ſuch a total obſtruction to ſpeech or written language, that an attempt to teach the deaf to ſpeak or read was uniformly regarded as impracticable, till Dr. Wallis and ſome others of late proved, that, although deaf people cannot learn to ſpeak or read by the direction of the ear, there are other ſources of imitation, by which the ſame effect may be produced. The organs of hearing and of ſpeech have little or no connexion. Perſons deprived of the former generally poſſeſs the latter in ſuch perfection, that nothing farther is neceſſary, in order to make them articulate, than to teach them how to uſe theſe organs. This indeed is no eaſy taſk; but experience ſhews that it is practicable. Mr. Thomas Braidwood, late of Edinburgh, was perhaps the firſt who ever brought this ſurpriſing art to any degree of perfection. He began with a ſingle pupil in 1764; and ſince that period has taught great numbers of people born deaf to ſpeak diſtinctly; to read, to write, to underſtand figures, the principles of religion and morality, &c. A few years after the commencement of his practice, he had a conſiderable number of deaf pupils, ſome of them above twenty years of age, all making a rapid and amazing progreſs in thoſe uſeful branches of education.

Mr. Braidwood's principal difficulty, after he had diſcovered this art, was to make people believe in the practicability of it. He advertiſed in the public papers; he exhibited his pupils to many noblemen and gentlemen; ſtill he found the generality of mankind unwilling

willing to believe him. A remarkable instance of this incredulity occurred some years ago. A gentleman in England sent a deaf girl of his to Mr. Braidwood's care. A year or two afterwards, Mr. Braidwood wrote to the father, that his daughter could speak, read, and write, distinctly. The father returned an answer, begging Mr. Braidwood's excuse, as he could not believe it; however, he desired a friend of his, who was occasionally going to Edinburgh, to call on Mr. Braidwood, and enquire into the truth of what he had wrote him: he did so; conversed with Mr. Braidwood, saw the young lady, heard her read, speak, and answer any questions he put to her. On his return he told the father the surprising progress his child had made; but still the father thought the whole an imposition: the girl herself wrote to her father; but he looked upon the letter as a forgery. About this time the father died; and the mother sent an uncle and cousin of the deaf lady's from Shrewsbury, in order to be satisfied of the truth. When they arrived, Mr. Braidwood told the girl her uncle and cousin were in the parlour; and desired her to go and ask them how they did, and how her mother and other friends did. The friends were astonished, and could hardly credit their own ears and eyes.

When we conversed with Mr. Braidwood, concerning the nature and method of teaching this wonderful art, he seemed to be very desirous of communicating and transmitting his discovery to posterity; but observed (from the nature of the thing we believe it to be true) that he could not communicate it so fully in writing as to enable any other person to teach it. The first thing in the method is, to teach the pupil to pronounce the simple sounds of the vowels and consonants. We have even seen him performing this operation; but are unable to give a clear idea of it. He pronounces the sound of *a* slowly, pointing out the figure of the letter at the same time; makes his pupil observe the motion of his mouth and throat; he then puts his finger into the pupil's mouth, depresses or elevates the tongue, and makes him keep the parts in that position; then he lays hold of the outside of the windpipe, and gives it some kind of squeeze, which it is impossible to describe: all the while he is pronouncing *a*, the pupil is anxiously imitating him, but at first seems not to understand what he would have him to do. In this manner he proceeds, till the pupil has learned to pronounce the sounds of the letters. He goes on in the same manner to join a vowel and consonant, till at length the pupil is enabled both to speak and read.

ART OF DYEING LEATHER, SKINS, &c.

BLUE is given by steeping the skins a day in urine and indigo, then boiling it with allum: or it may be given by tempering the indigo with red-wine, and washing the skins therewith. Red is given by washing the skins, and laying them two hours in galls, then wringing them out, dipping them in a liquor made with liguſtrum, and allum, and verdigrease, in water; and lastly, in a dye made of brazil-wood, boiled with ley. Purple is given by wetting the skins with a solution of roche-allum in warm water; and, when dry again, rubbing them with the hand with a decoction of log-wood in colder. Green is given by smearing the skin with sap-green and allum-water boiled. Dark green is also given with steel-filings and sal armoniac steeped in urine

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till ſoft, then ſmeared over the ſkin; which is to be dried in the ſhade. Sky-colour is given with indigo ſteeped in boiling water, and the next morning warmed and ſmeared over the ſkin. Yellow, by ſmearing the ſkin over with aloes and linſeed-oil diſſolved and ſtrained; or by infuſing it in weld. Orange-colour is given by ſmearing with fuſtic berries boiled in allum-water; or, for a deep orange, with turmeric.

Proceſſes for dyeing leather red and yellow as practiſed in Turkey, with directions for preparing and tanning the ſkins; as communicated by Mr. Philippo, a native of Armenia, who has lately received, from the Society for the Encouragement of Arts, &c. one hundred pounds, and alſo the gold medal of the ſociety, as a reward for diſcovering this ſecret.

1. Firſt Preparation of the Skins, both for Red and Yellow Leather, by dreſſing them in Lime.—Let the ſkins, dried with the hair on, be firſt laid to ſoak in clean water for three days; let them then be broken over the fleſh-ſide, put into freſh water for two days longer, and afterwards hung up to drain half an hour. Let them now be broken on the fleſh-ſide, limed in cold lime on the ſame ſide, and doubled together with the grain-ſide outward. In this ſtate they muſt be hung up within doors over a frame for five or ſix days, till the hair be looſe; which muſt then be taken off, and the ſkins returned into the lime-pit for about three weeks. Take them out, and let them be well worked fleſh and grain, every ſixth or ſeventh day, during that time: after which, let them be waſhed ten times in clear water, changing the water at each waſhing. They are next to be prepared in drench, as below mentioned.

2. Second Preparation of the Skins for both the Red and Yellow Dyes by drenching.—After ſqueezing the water out of the ſkins, put them into a mixture of bran and water, warm as new milk, in the following proportions; viz. about three pounds of bran for five ſkins, and water ſufficient to make the mixture moderately fluid; which will be about a gallon to each pound of bran. In this drench let the ſkins lie three days; at the end of which time they muſt be well worked, and afterwards returned into the drench two days longer. They muſt then be taken out and rubbed between the hands; the water ſqueezed from them, and the bran ſcraped off clear from both ſides of the ſkins. After this they muſt be again waſhed ten times in clear water, and the water ſqueezed out of them.

Thus far the preparatory proceſs of all the ſkins, whether intended to be dyed red or yellow, is the ſame; but afterwards thoſe which are to be dyed red muſt be treated as follows:

3. Preparation in Honey and Bran of the Skins that are to be dyed Red.—Mix one pound of honey with three pints of luke-warm water, and ſtir them together till the honey is diſſolved. Then add two double handfuls of bran; and taking four ſkins (for which the above quantity of the mixture will be ſufficient) work them well in it one after another. Afterwards fold up each ſkin ſeparately into a round form, with the fleſh-ſide inwards; and lay them in an earthen pan, or other proper veſſel; if in the ſummer, by the ſide of each other; but, in the winter, on the top of each other. Place the veſſel in a ſloping poſition, ſo that ſuch part of the fluid as may ſpontaneouſly drain from the ſkins may paſs from them. An acid fermentation will then riſe in the liquor, and the ſkins will ſwell conſiderably.

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In this ſtate they muſt continue for ſeven or eight days; but the moiſture that drains from them muſt be poured off, once or twice a-day, as occaſion may require. After this a further preparation in ſalt is neceſſary; and which muſt be performed in the following manner.

4. Preparation in Salt, of the Skins to be dyed Red.—After the ſkins have been fermented in the honey and bran, as above mentioned, let them be taken out of that mixture on the eighth or ninth day, and well rubbed with dry common ſea-ſalt, in the proportion of about half a pound to each ſkin; the ſalt muſt be well rubbed and worked with them. This will make them contract again, and part with a further conſiderable quantity of moiſture; which muſt be ſqueezed out by drawing each ſkin ſeparately through the hands. They muſt next be ſcraped clean on both ſides from the bran, ſuperfluous ſalt, and moiſture, that may adhere to them. After which, dry ſalt muſt be ſtrewed over the grain ſide, and well rubbed in with the hand. They are then to be doubled with the fleſh-ſide outwards, lengthwiſe from neck to tail, and a little more dry ſalt muſt be thinly ſtrewed over the fleſh-ſide, and rubbed in; for the two laſt operations, about a pound and a half of ſalt will be ſufficient for each ſkin. They muſt then be put, thus folded on each other, between two clean boards, placed ſloping, breadthwiſe; and a heavy weight laid on the upper board, in order gradually to preſs out what moiſture they will thus part with. In this ſtate of preſſure, they muſt be continued two days or longer, till it is convenient to dye them, for which they will then be duly prepared.

5. Preparation of the Red Dye, in a proper proportion for four Skins.—Put eight gallons of water into a copper, with ſeven ounces of ſhenan tied up in a linen bag. Light a fire under the copper; and, when the water has boiled about a quarter of an hour, take out the bag of ſhenan, and put into the boiling fluid or lixivium, 1ſt, two drams of allum; 2dly, two drams of pomegranate bark; 3dly, three quarters of an ounce of turmeric; 4thly, three ounces of cochineal; 5thly, two ounces of loaf-ſugar. Let the whole mixture boil about ſix minutes, then cover the fire, and take out a quart of liquor, putting it into a flat earthen pan; and when it is cold as new milk, take one ſkin, folded lengthwiſe, the grain-ſide outwards, and dip it in the liquor, rubbing it gently with the hands. Then, taking out the ſkin, hang it up to drain, and throw away the ſuperfluous dye. Proceed in the ſame manner with the remaining three ſkins; repeating the operation of each ſkin ſeparately eight times, ſqueezing the ſkins by drawing them through the hands before each freſh dipping. Lay them now on one ſide of a large pan, ſet ſloping, to drain off as much of the moiſture as will run from them without preſſure, for about two hours, or till they are cold; then tan them as below directed.—Shenan is a drug much uſed by dyers in the eaſt; and may eaſily be procured at any of the ports of Syria and Africa, in the Levant. It is the eaſtern jointed-kali, called by botaniſts ſalicornia; and grows in great plenty in thoſe and other parts of the eaſt. There is a ſmaller ſpecies of the ſalicornia on our coaſt, which, from its great affinity with the ſhenan, might be preſumed to have the ſame qualities. On ſome trials, however, it has not appeared to anſwer the intention of the ſhenan; but it will not be prudent to purſue the examination of this further, as ſome unknown circumſtances in the collect-

ing or using the English salicornia might occasion the miscarriage. But be this as it may, the eastern shenan may, at all events, be easily procured in any quantity, at a very trifling expence, by any of the captains of Turkey ships, at Aleppo, Smyrna, &c.

6. Tanning the Red Skins.—Powder four ounces of the best white galls, in a marble mortar, sifting it through a fine sieve. Mix the powder with about three quarts of water, and work the skins well in this mixture, for half an hour or more, folding up the skins four-fold. Let them lie in this tan for twenty-four hours; when they must be worked again as before; then taken out, scraped clean on both sides from the first galls, and put into a like quantity of fresh galls and water. In this fresh mixture they must be again well worked for three quarters of an hour; then folded up as before, and left in the fresh tan for three days. On the fourth day they must be taken out, washed clean from the galls in seven or eight fresh quantities of water, and then hung up to dry.

7. Manner of Dressing the Skins after they are tanned.—When the skins have been treated as above, and are very near dry, they should be scraped with the proper instrument or scraper on the flesh-side, to reduce them to a proper degree of thickness. They are then to be laid on a smooth board, and glazed by rubbing them with a smooth glass. After which they must be oiled, by rubbing them with olive-oil, by means of a linen rag, in the proportion of one ounce and a half of oil for four skins: they are then to be grained on a graining-board, lengthwise, breadthwise, and cornerwise, or from corner to corner.

8. Preparations with Galls, for the Skins to be dyed Yellow.—After the four skins are taken out of the drench of bran, and clean washed as before directed, in the second article, they must be very well worked, half an hour or more, in a mixture of a pound and a half of the best white galls, finely powdered, with two quarts of clean water. The skins are then to be separately doubled lengthwise, rolled up with the flesh-side outwards, laid in the mixture, and close pressed down on each other, in which state they must continue two whole days. On the third day let them be again worked in the tan; and afterwards scraped clean from the galls, with an ivory or brass instrument (for no iron must touch them). They must then be put into a fresh tan, made of two pounds of galls finely powdered, with about three quarts of water, and well worked therein fifteen times. After this they must be doubled, rolled up as before, and laid in the second tan for three days. On the third day a quarter of a pound of white sea-salt must be worked into each skin; and the skins doubled up as before, and returned into the tan, till the day following, when they are to be taken out, and well washed six times in cold water, and four times in water luke-warm. The water must be then well squeezed out, by laying the skins under pressure, for about half an hour, between two boards, with the weight of about two hundred or three hundred pounds laid upon the uppermost board, when they will be ready for the dye.

9. Preparation of the Yellow Dye, in the proper proportion for four Skins.—Mix six ounces of cassiari gehira, or dgehira, or the berries of the eastern rhamnus with the same quantity of allum; and pound them together till they be fine, in a marble or brass mortar, with a brass pestle. Then, dividing the materials thus powdered, into

into three equal parts of four ounces each, put one of those three parts into about a pint and a half of water, in a china or earthen vessel, and stir the mixture together. Let the fluid stand to cool till it will not scald the hand. Then spreading one of the skins flat on a table, in a warm room, with the grain-side uppermost, pour a fourth part of the tinging liquor, prepared as above directed, over the upper or grain side, spreading it equally over the skin with the hand, and rubbing it well in. Afterwards do the like with the other three skins, for which the mixture first made will be sufficient.

This operation must be repeated twice more on each skin separately, with the remaining eight ounces of the powder of the berries, and allum, with the above-mentioned due proportions of hot water, put to them as before directed.—The cassiari gehira is the berries of an eastern rhamnus, or buckthorn-tree; and may be had at Aleppo, and other parts of the Levant, at a small price. The common Avignon or yellow berries may be substituted, but not with so good an effect; the cassiari gehira being a stronger and brighter yellow-dye, both for this use and also that of colouring paper-hangings, &c.

The skins, when dyed, are to be hung up on a wooden frame without being folded, with the grain-side outwards, about three quarters of an hour to drain; when they must be carried to a river or stream of running water, and well washed therein six times or more. After this they must be put under pressure for about an hour, till the water be well squeezed out; afterwards the skins must be hung up to dry in a warm room.

This being done, the skins are to be dressed and grained as before directed for those dyed red; except the oiling, which must be omitted.

Blacking Leather.—In the tanning of leather it is so much impregnated with the astringent parts of oak-bark, or with that matter which strikes a black with green vitriol, that rubbing it over three or four times with a solution of the vitriol, or with a solution of iron made in vegetable acids, is sufficient for staining it black. Of this we may be convinced by dropping a little of the solution on the unblacked side of common shoe-leather. This operation is performed by the currier; who, after the colouring, gives a gloss to the leather with a solution of gum-arabic and size made in vinegar. Where the previous astringent impregnation is insufficient to give due colour, and for those sorts of leather which have not been tanned, some galls or other astringents are added to the solution of iron; and in many cases, particularly for the finer sorts of leather, and for renewing the blackness, ivory or lamp-black are used. A mixture of either of these with linseed-oil makes the common oil-blacking. For a shining-blacking, small beer or water are taken instead of oil, in the quantity of about a pint to an ounce of the ivory-black, with the addition of half an ounce of brown sugar and as much gum-arabic. The white of an egg, substituted for the gum, makes the black more shining, but is supposed to hurt the leather, and make it apt to crack. It must be obvious, however, that all these compositions admit of a great many variations.

Gilding of Leather.—Take glair of the whites of eggs, or gum-water, and with a brush rub over the leather with either of them: then lay on the gold or silver, and, letting them dry, burnish them.

To dress or cover Leather with Silver or Gold.—Take brown-red; grind or move it on a stone with a muller, adding water and chalk; and,

and, when the latter is diſſolved, rub or lightly daub the leather over with it, till it looks a little whitiſh; and then lay on the leaf-ſilver or gold before the leather is quite dry, laying the leaves a little over each other, that there may not be the leaſt part uncovered; and when they have well cloſed with the leather, and are ſufficiently dried on and hardened, rub them over with an ivory poliſher, or the fore-tooth of a horſe.

RISE AND PROGRESS OF FREE MASONRY.

THE origin of this ſociety is very ancient; but we have no authentic account of the time when it was firſt inſtituted, or even what was the reaſon of ſuch an aſſociation of people under the title of Maſons, more than of any other mechanical profeſſion.—In Dr. Henry's hiſtory, we find the origin of the Free Maſon Society in Britain attributed to the difficulty found in former times of procuring a ſufficient number of workmen to build the multitude of churches, monaſteries, and other religious edifices, which the ſuperſtition of thoſe ages prompted the people to raiſe. Hence the maſons were greatly favoured by the popes, and many indulgences were granted in order to augment their numbers. In times like thoſe we ſpeak of, it may well be ſuppoſed that ſuch encouragement from the ſupreme paſtors of the church muſt have been productive of the moſt beneficial effects to the fraternity; and hence the increaſe of the ſociety may naturally be deduced. The doctor quotes, in confirmation of this, the words of an author who was well acquainted with their hiſtory and conſtitution. "The Italians (ſays he), with ſome Greek refugees, and with them French, Germans, and Flemings, joined into a fraternity of architects, procuring papal bulls for their encouragement and their particular privileges; they ſtyled themſelves free maſons, and ranged from one nation to another, as they found churches to be built: their government was regular; and, where they fixed near the building in hand, they made a camp of huts. A ſurveyor governed in chief; every tenth man was called a warden, and overlooked each nine. The gentlemen in the neighbourhood, either out of charity or commutation of penance, gave the materials and carriages. Thoſe who have ſeen the accounts in records of the charge of the fabrics of ſome of our cathedrals near four hundred years old, cannot but have a great eſteem for their œconomy, and admire how ſoon they erected ſuch loſty ſtructures."

By other accounts, however, the antiquity of maſonry is carried up much higher, even as early as the building of Solomon's temple. In Britain the introduction of maſonry has been fixed at the year 674, when glaſs-making was firſt introduced; and it appears indeed, that from this time many buildings in the Gothic ſtyle were erected by men in companies, who are ſaid to have called themſelves free, becauſe they were at liberty to work in any part of the kingdom. Others have derived the inſtitution of free maſons from a combination among the people of that profeſſion not to work without an advance of wages, when they were ſummoned from ſeveral countries, by writs of Edward III. directed to the ſheriffs, to aſſiſt in re-building the caſtle, together with the church and chapel of St. George, at Windſor. At this time, it is ſaid, the maſons agreed on certain

tokens

tokens by which they might know and assist each other against being impressed, and not to work unless free and on their own terms.

In a Treatise on Masonry published in 1792 by William Preston, master of the Lodge of Antiquity, the origin of masonry is traced from the creation. "Ever since symmetry began, and harmony displayed her charms (says he), our order has had a being." Its introduction into England he likewise supposes to have been prior to the Roman invasion. There are, according to him, the remains yet existing of some stupendous works executed by the Britons much earlier than the time of the Romans; and even these display no small share of ingenuity of invention; so that we can have no doubt of the existence of masonry in Britain even during these early periods. The Druids are likewise said to have had among them many customs similar to those of the masons, and to have derived their government from Pythagoras; but the resemblance betwixt their usages and those of the free mason societies now existing cannot be accurately traced even by the masons themselves.

Masonry is said to have been encouraged by Cæsar, and many of the Roman generals who where appointed governors of Britain: but though we know, that at this period the fraternity were employed in erecting many magnificent fabrics, nothing is recorded concerning their lodges and conventions; and we have but a very imperfect account of the customs which prevailed in their assemblies.

For a long time the progress of masonry in Britain was obstructed by the frequent wars which took place; and it did not revive till the time of Carausius, by whom it was patronised. This general, who hoped to be the founder of a British empire, encouraged learning and learned men; collecting also the best artificers from many different countries, particularly masons, whom he held in great veneration, and appointing Albanus his steward the principal superintendant of their assemblies. Lodges, or conventions of the fraternity, began now to be introduced, and the business of masonry to be regularly carried on. The masons, through the influence of Albanus, obtained a charter from Carausius to hold a general council, at which Albanus himself sat president, and assisted at the reception of many new members. This Albanus was the celebrated St. Alban, the first who suffered martyrdom in Britain for the Christian faith. Mr. Preston quotes an old MS. destroyed with many others, said to have been in the possession of Nicholas Stone, a curious sculptor under Inigo Jones; from which we learn that St. Alban was a great friend to masons, and gave them two shillings per week, besides three-pence for their chear; while, before that time, they had no more than one penny per day and their meat. He likewise obtained "a charter from the king and his council for them to hold a general council, which was named an assembly." The same circumstances are mentioned in a MS. written in the time of James II. only this increases the weekly salary of the masons to 3s. 6d. and 3d. per day for the bearers of burthens.

The progress of masonry was greatly obstructed by the departure of the Romans from Britain; and in a short time fell into absolute neglect. This was occasioned first by the furious irruptions of the Scots and Picts, which left no time for the cultivation of the arts; and afterwards by the ignorance of the Saxons, whom the ill-advised Britons called in as allies, but who soon became their masters,

After the introduction of Christianity, however, the barbarity of these conquerors began to wear off, the arts received some encouragement, and masonry particularly began to flourish. Lodges were now formed; but these, being under the direction of foreigners, were seldom convened, and never attained to any degree of consideration or importance. In this situation it continued till the year 557, when St. Austin, with forty more monks, among whom the sciences had been preserved, came into England. By these the principles of Christianity were propagated with such zeal, that all the kings of the heptarchy were converted; after which masonry was taken under the patronage of St. Austin, and the Gothic style of building was introduced into England by the numerous foreigners who resorted at this time to the kingdom. Austin himself appeared at the head of the fraternity in founding the old cathedral of Canterbury in 600; that of Rochester in 602; St. Paul's in London in 604; St. Peter's in Westminster in 605, as well as many others. The number of masons in England was thus greatly increased, as well as by his other buildings of castles, &c. throughout the kingdom.

In 640 a few expert brethren arrived from France, and formed themselves into a lodge under the direction of Bennet abbot of Wirral; whom Kenred king of Mercia soon after appointed inspector of the lodges, and general superintendant of the masons. During the whole time of the heptarchy, however, masonry was in a low state, but began to revive in 856 under the patronage of St. Swithin, whom Ethelwolf employed to repair some religious houses; and from that time the art gradually improved till the year 872, when it found a zealous protector in Alfred the Great. This prince was a most eminent patron of all kinds of arts and manufactures; and, with regard to masonry in particular, he appropriated a seventh part of his revenue for maintaining a number of workmen, whom he constantly employed in rebuilding the cities, castles, &c. ruined by the Danes. During the reign of his successor Edward, the masons continued to hold their lodges under the sanction of Ethred, husband to the king's sister, and Ethelward his brother, to whom the care of the fraternity was intrusted. The latter was a great architect, and founded the university of Cambridge.

The true re-establishment of masonry in England, however, is dated from the reign of King Athelstane; and there is still extant a grand lodge of masons at York, who trace their existence from this period. This lodge, the most ancient in England, was founded in 926, under the patronage of Edwin the king's brother, who obtained for them a charter from Athelstane, and became grand-master himself. By virtue of this charter it is said, that all the masons in the kingdom were convened at a general assembly in that city, where they established a general or grand lodge for their future government. Under the patronage and jurisdiction of this lodge it is also alledged that the fraternity increased very considerably, and that kings, princes, and other eminent persons, who had been initiated into the mysteries, paid due allegiance to the assembly. But, as the times were yet turbulent and barbarous, the art of masonry was sometimes more sometimes less patronised; and of course the assembly more or less respected according to the respect which that art itself met with. The appellation of ancient York masons is well known both in Ireland and Scotland; and the general tradition is, that they originated

ginated at Auldby near York; and, as Auldby was a ſeat of Edwin, this tradition gives conſiderable confirmation to the above account. There is indeed great reaſon to believe that York was the original ſeat of maſonic government, no other place having claimed it, and the whole fraternity having at various times owned allegiance to the authority there eſtabliſhed; though we know not whether that allegiance be now given or not. Certain it is, that if ſuch a lodge was once eſtabliſhed there, of which there is no reaſon to doubt, we have no account of its being regularly moved from that place to any other part of the kingdom with conſent of its members. Many reſpectable meetings have indeed been held at different times in other parts of the kingdom; but there is no account of any other general meeting being held in another place than York till very lately.

While prince Edwin lived, the maſons were employed as formerly in building churches, monaſteries, &c. and repairing thoſe which had ſuffered by the ravages of the Danes; and after his death the order was patroniſed by king Athelſtane himſelf; but on his deceaſe the maſons were diſperſed, and remained in an unſettled ſtate till the reign of Edgar in 960. They were now collected by St. Dunſtan, who employed them in works of the ſame kind; but, as no permanent encouragement was given them, their lodges ſoon declined, and maſonry remained in a low ſtate for upwards of fifty years. It revived, however, in 1041, under Edward the Confeſſor, who ſuperintended the execution of ſeveral great works. By the aſſiſtance of Leofric earl of Coventry, he rebuilt Weſtminſter Abbey, the earl being appointed ſuperintendant of the maſons; and by this architect many other magnificent ſtructures were likewiſe erected. After the Conqueſt, in 1066, Gundulph biſhop of Rocheſter and Roger de Montgomery earl of Shrewſbury, both of them excellent architects, became joint patrons of the maſons; and under their auſpices the Tower of London was begun, though finiſhed only in the reign of William Rufus, who likewiſe rebuilt London-bridge with wood, and in 1087 firſt conſtructed the palace and hall of Weſtminſter.

The maſons now continued to be patroniſed by the ſovereigns of England in ſucceſſion. The lodges aſſembled during the reign of Henry I. and during that of Stephen the ſociety were employed in building a chapel at Weſtminſter, now the houſe of commons, and ſeveral other works; the preſident of the lodges being then Gilbert de Clare, the marquis of Pembroke. During the reign of Henry II. the lodges were ſuperintended by the grand-maſter of the knights templars, who employed them in building their temple in Fleet-ſtreet in the year 1155. Maſonry continued under the patronage of this order till the year 1199, when John ſucceeded Richard I. in the throne of England, and Peter de Colechurch was then appointed grand-maſter. He began to rebuild London-bridge with ſtone, which was afterwards finiſhed by William Alemain in 1209. Peter de Rupibus ſucceeded Peter de Colechurch in the office of grand-maſter, and Geoffrey Fitz-Peter, chief ſurveyor of the king's works, acted as deputy under him; maſonry continued alſo to flouriſh under the auſpices of theſe two artiſts during this and the following reign. On the acceſſion of Edward I. in 1272, the ſuperintendance of the maſons was entruſted to Walter Giffard archbiſhop of York, Gilbert de Clare earl of Glouceſter, and Ralph lord of Mount Hermer, the progenitor of the family of the Montagues; and by theſe architects the abbey

of Weſtminſter was finiſhed, after having been begun in 1220, during the minority of Henry II. During the reign of Edward II. the fraternity were employed in building Exeter and Oriel Colleges in Oxford, Clare-hall in Cambridge, &c. under the auſpices of Walter Stapleton biſhop of Exeter, who had been appointed grand-maſter of the maſons in 1307.

Edward III. was a great encourager of learning in general, and not only patroniſed the maſons, but applied very aſſiduouſly to the conſtitutions of the order, reviſed and meliorated the ancient charges, and added ſeveral uſeful regulations to the original code by which the fraternity had been governed. He patroniſed the lodges, and appointed five deputies under him to inſpect their proceedings; and at this period it appears from ſome old records, that the lodges were numerous, and that the fraternity held communications under the protection of the civil magiſtrates. William of Wykeham was continued grand-maſter on the acceſſion of Richard II. and by him both the New College in Oxford and Wincheſter College were founded at his own expence. After the acceſſion of Henry IV. Thomas Fitz-Allan earl of Surrey was appointed grand-maſter, who, after the engagement at Shrewſbury, founded Battle-abbey and Fotheringay; the Guild-hall at London being alſo built in this reign. On the acceſſion of Henry V. the fraternity were directed by Henry Chichely archbiſhop of Canterbury, under whom the lodges and communications of the fraternity were frequent. In 1425, however, during the reign of Henry VI. an act was made againſt the meetings of the chapters and congregations of maſons, becauſe it was ſaid, that by ſuch meetings "the good courſe and effect of the ſtatutes of labourers were openly violated and broken, in ſubverſion of the law, and to the great damage of all the commons." But this act was not put in force, nor did the fraternity ceaſe to meet as uſual under the protection of archbiſhop Chichely, who ſtill continued to preſide over them. The reaſon of this extraordinary edict is ſaid to have been as follows:—The duke of Bedford, at that time regent of the kingdom, being in France, the regal power was veſted in his brother Humphrey duke of Glouceſter, who was ſtiled protector and guardian of the kingdom. The care of the young king's perſon and education was entruſted to Henry Beaufort biſhop of Wincheſter, the duke's uncle. This prelate being of an ambitious diſpoſition, and aſpiring at the ſole government, had continual diſputes with his nephew the protector; and, by reaſon of the violent temper of that prince, gained frequent advantages over him. This animoſity increaſed to ſuch a degree, that the parliament was at length obliged to interpoſe. On the meeting of that aſſembly in the month of April 1425, however, the ſervants and followers of the peers came thither armed with clubs and ſtaves; on which account it received the name of the Bat Parliament, and at this time the act againſt maſons was made. This was owing to the influence of the biſhop, who wiſhed to deſtroy the meetings of the fraternity on account of the ſecrecy obſerved in them. Dr. Anderſon, in the firſt edition of the Book of Conſtitutions, makes the following obſervation upon this act: "It was made in ignorant times, when true learning was a crime, and geometry condemned for conjuration; but it cannot derogate from the honour of the ancient fraternity, who, to be ſure, would never encourage any ſuch confederacy of their working brethren. By tradition, it is believed that the parliament

ment were then too much influenced by the illiterate clergy, who were not accepted masons, nor understood architecture (as the clergy of some former ages), and were generally thought unworthy of this brotherhood. Thinking they had an indefeasible right to know all secrets by virtue of auricular confession, and the masons never confessing any thing thereof, the said clergy were highly offended; and at first, suspecting them of wickedness, represented them as dangerous to the state during that minority; and soon influenced the parliament to lay hold of such supposed arguments of the working masons for making an act that might seem to reflect dishonour upon even the whole fraternity, in whose favour several acts had been made before that period, and were made after it."

The bishop was soon after this diverted from his persecution of the masons by an affair of a more important kind. He had formed a design of surprising the city of London on the evening of St. Simon and St. Jude's day, that on which the lord mayor was invested with his office. But, the plot having been discovered by the duke of Gloucester, the mayor was sent for while at dinner, and ordered to keep a strict watch for that night. The bishop's party accordingly made an attempt to enter by the bridge about nine the next morning, but were repulsed by the vigilance of the citizens. At this the prelate was so much enraged, that he collected a numerous body of archers and men at arms, commanding them to assault the gate with shot. By the prudence of the magistrates, however, all violent measures were stopped; but no reconciliation could be procured betwixt the two parties, though it was attempted by the archbishop of Canterbury, and Peter duke of Coimbra, eldest son to the king of Portugal, with several other persons of distinction. At last the bishop wrote a letter to the duke of Bedford, urging his return to England, and informing him of the danger there was of a civil war, and reflecting upon the duke of Gloucester. This letter had the desired effect: the regent returned, and held a great council at St. Alban's on the 21st of February, but adjoured it to the 15th of March at Northampton, and to the 25th of June at Leicester. Bats and staves were now prohibited at these meetings; but the parties assembled with weapons no less formidable, viz. with slings, stones, and leaden plummets. The duke of Bedford employed all his authority to reconcile the differences; and at last obliged the two rivals to promise before the assembly that they would bury all animosities in oblivion. During the discussion of this matter, five charges were exhibited by the duke of Gloucester against the bishop; one of which was, that "he had, in his letter to the duke of Bedford, at France, plainly declared his malicious purpose of assembling the people, and stirring up a rebellion in the nation, contrary to the king's peace." To this the bishop answered, "That he never had any intention to disturb the peace of the nation or raise a rebellion; but that he sent to the duke of Bedford to solicit his return to England, to settle all those differences which were so prejudicial to the peace of the kingdom: that though he had indeed written in the letter, 'That if he tarried, we should put the land in adventure by a field, such a brother you have here,' he did not mean it of any design of his own, but concerning the seditious assemblies of masons, carpenters, tylers, and plaisterers; who, being distressed by the late act of parliament against the excessive

wages of these trades, had given out many seditious speeches and menaces against certain great men, which tended much to rebellion," &c.

Notwithstanding this heavy charge, the duke of Gloucester, who knew the innocence of the parties accused, took the masons under his protection, and transferred the charge of sedition and rebellion from them to the bishop and his followers. By the interest of the latter, however, the king granted him a pardon for all offences; and, though the duke drew up fresh articles of impeachment against him in 1442, and presented them in person to the king, the council, being composed mostly of ecclesiastics, proceeded so slowly in the business, that the duke, wearied out with the tediousness of the matter, dropped the prosecution entirely.

This contest terminated in the impeachment, imprisonment, and murder, of the duke of Gloucester himself. This event might have been attended with bad consequence, had not their inveterate enemy, the prelate himself, been taken off by death in about two months after the duke. The masons then continued not only to meet in safety, but were joined by the king himself. He was, that very year (1442) initiated into masonry, and from that time spared no pains to become completely master of the art. He perused the ancient charges, revised the constitutions, and, with the consent of his council, honoured them with his sanction. The example of the sovereign was followed by many of the nobility, who assiduously studied the art. The king presided over the lodges in person, nominating William Wanefleet bishop of Winchester grand-master. This bishop at his own expence built Magdalene college, Oxford, and several religious houses. Eton college near Windsor, and King's college at Cambridge, were also founded during this reign. Henry himself founded Christ's college, Cambridge, as his queen Margaret of Anjou did Queen's college in the same university.

About this time also, the masons were protected and encouraged by James I. of Scotland, who, after his return from captivity, became a zealous patron of arts and learning of all kinds. He honoured the lodges with his royal presence, and settled an annual revenue of four pounds Scots (an English noble) to be paid by every master-mason in Scotland to a grand-master chosen by the grand-lodge, and approved by the crown, one nobly born, or an eminent clergyman, who had his deputies in cities and counties; something was likewise paid him by every new brother at his entry. His office intitled him to regulate every thing in the fraternity which could not come under the jurisdiction of law-courts; and, to prevent law-suits, both mason and lord, or builder and founder, appealed to him. In his absence, they appealed to his deputy, or grand-warden, who resided next the premises.

The flourishing state of masonry was interrupted by the civil wars between the houses of York and Lancaster, which brought it almost totally into neglect. About 1471, however, it revived under the auspices of Robert Beauchamp bishop of Sarum, who had been appointed grand-master by Edward IV. and honoured with the title of chancellor of the garter, for repairing the castle and chapel of Windsor. It again declined during the reigns of Edward V. and Richard III. but came once more into repute on the accession of Henry VII. in 1485. It was now patronised by the master and fellows of the order of St. John at Rhodes (now Malta); who assembled their grand-

lodge

lodge in 1500, and chose Henry for their protector. On the 24th of June 1502, a lodge of masters was formed in the palace, at which the king presided as grand-master; and having appointed John Islip abbot of Westminster, and Sir Reginald Bray knight of the garter, his wardens for the occasion, proceeded in great state to the east end of Westminster-abbey, where he laid the first stone of that excellent piece of Gothic architecture called Henry the Seventh's Chapel. The cape-stone of this building was celebrated in 1507. The palace of Richmond, as well as many other noble structures, were raised under the direction of Sir Reginald Bray; and the colleges of Brazen Nose in Oxford, and Jesus and St. John's in Cambridge, were all finished in this reign.

On the accession of Henry VIII. cardinal Wolsey was appointed grand-master; who built Hampton-court, Whitehall, Christ-church college, Oxford, with several other noble edifices; all of which, upon the disgrace of that prelate, were forfeited to the crown in 1530. Wolsey was succeeded as grand-master in 1534 by Thomas Cromwell earl of Essex; who employed the fraternity in building St. James's palace, Christ's hospital, and Greenwich castle. Cromwell being beheaded in 1540, John Touchet lord Audley succeeded to the office of grand-master, and built Magdalen college in Cambridge, and many other structures. In 1547, the duke of Somerset, guardian to the king, and regent of the kingdom, became superintendant of the masons, and built Somerset-house in the Strand, which, on his being beheaded, was forfeited to the crown in 1552.

After the death of the duke of Somerset, John Poynet bishop of Winchester presided over the lodges till the death of the king in 1553. From this time they continued without any patron till the reign of Elizabeth, when Sir Thomas Sackville accepted of the office of grand-master. Lodges, however, had been held during this period in different parts of England; but the general or grand-lodge assembled in the city of York, where the fraternity were numerous and respectable.—Of the queen we have the following curious anecdote with regard to the masons: Hearing that they were in possession of many secrets which they refused to disclose, and being naturally jealous of all secret assemblies, she sent an armed force to York to break up their annual grand-lodge. The design was prevented by the interposition of Sir Thomas Sackville, who took care to initiate some of the chief officers whom she had sent on this duty in the secrets of masonry. These joined in communication with their new brethren, and made so favourable a report to the queen on their return, that she countermanded her orders, and never afterwards attempted to disturb the meeting of the fraternity. In 1567, Sir Thomas Sackville resigned the office of grand-master in favour of Francis Russel earl of Bedford, and Sir Thomas Gresham an eminent merchant. The former had the care of the brethren in the northern part of the kingdom assigned to him, while the latter was appointed to superintend the meetings in the south, where the society had considerably increased, in consequence of the honourable report which had been made to the queen. The general assembly, however, continued to meet at York as formerly; and here all records were kept, and appeals made on every important occasion to the assembly.

Sir Thomas Gresham above-mentioned proposed to erect a building in the city of London for the benefit of commerce, provided the citi-

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zens would purchase a spot proper for the purpose. Accordingly, some houses between Cornhill and Threadneedle-street being pulled down, the foundation-stone of the building was laid on the 7th of June 1566, and with such expedition was the work carried on, that the whole was finished in November 1567. This building, which was constructed on the plan of the exchange of Antwerp, was called at first simply the Bourse, but in January 1570, the queen, having dined with Sir Thomas, returned through Cornhill, entered the Bourse on the south-side, and, having viewed every part of the building, particularly the gallery which extended round the whole structure, and which was furnished with shops filled with all sorts of the finest merchandize in the city, she caused the edifice to be proclaimed, in her presence, by herald and trumpet, the Royal Exchange; and on this occasion, it is said Sir Thomas appeared publicly in the character of grand-master.

The queen, being now thoroughly convinced that the fraternity of masons did not interfere in state-affairs, became quite reconciled to their assemblies, and from this time masonry made a considerable progress; lodges were held in different parts of the kingdom, particularly in London and its neighbourhood, where the number of the brethren increased considerably. Several great works were carried on there under the auspices of Sir Thomas Gresham, from whom the fraternity received every encouragement.

Sir Thomas was succeeded in the office of grand-master by Charles Howard earl of Effingham, who continued to preside over the lodges in the south till the year 1588, when George Hastings earl of Huntingdon was chosen grand-master, and remained in the office till the decease of the queen in 1603.

On the accession of James I. to the crown of England, masonry flourished in both kingdoms, and lodges were held in both kingdoms. A number of gentlemen returned from their travels, with curious drawings of the old Greek and Roman architecture, as well as strong inclination to revive a knowledge of it. Among these was the celebrated Inigo Jones, who was appointed general surveyor to the king. He was named grand-master of England, and was deputed by the king to preside over the lodges. Several learned men were now initiated into the mysteries of masonry, and the society increased considerably in reputation and consequence. Ingenious artists resorted to England in great numbers; lodges were constituted as seminaries of instruction in the sciences and polite arts after the model of the Italian schools; the communications of the fraternity were established, and the annual festivals regularly observed. Under the direction of this accomplished architect, many magnificent structures were raised; and among the rest he was employed, by command of the sovereign, to plan a new palace at Whitehall, worthy of the residence of the kings of England. This was executed; but, for want of a parliamentary fund, no more of the plan was ever finished than the banqueting-house. Inigo Jones continued in the office of grand-master till the year 1618, when he was succeeded by the earl of Pembroke; under whose auspices many eminent and wealthy men were initiated, and the mysteries of the order held in high estimation.

After Charles I. ascended the throne, earl Pembroke was continued in his office till the year 1630, when he resigned in favour of Henry Danvers earl of Danby. This nobleman was succeeded in 1633 by

by Thomas Howard earl of Arundel, the anceſtor of the Norfolk family. In 1635, Francis Ruſſel earl of Bedford accepted the government of the ſociety; but Inigo Jones having continued to patronize the lodges during his lordſhip's adminiſtration, he was re-elected the following year, and continued in office till the year of his death, 1646. The progreſs of maſonry, however, was for ſome time obſtructed by the breaking out of the civil wars; but it began to revive under the patronage of Charles II. who had been received into the order during his exile. Some lodges during this reign were conſtituted by leave of the ſeveral noble grand-maſters, and many gentlemen and famous ſcholars requeſted at that time to be admitted into the fraternity. On the 27th of December 1663, a general aſſembly was held, where Henry Jennyn earl of St. Alban's was elected grand-maſter; who appointed Sir John Denham his deputy, and Mr. Chriſtopher Wren, afterwards the celebrated Sir Chriſtopher Wren, and John Webb, his wardens. At this aſſembly ſeveral uſeful regulations were made for the better government of the lodges; and the greateſt harmony prevailed among the whole fraternity. The earl of St. Alban's was ſucceeded in his office of grand-maſter by earl Rivers in the year 1666, when Sir Chriſtopher Wren was appointed deputy, and diſtinguiſhed himſelf beyond any of his predeceſſors in promoting the proſperity of the lodges which remained at that time, particularly that of St. Paul's, now the lodge of antiquity, which he patronized upwards of eighteen years. At this time he attended the meetings regularly; and during his preſidency made a preſent to the lodge of three mahogany candleſticks, which at that time were very valuable. They are ſtill preſerved, and highly valued as a teſtimony of the eſteem of the donor.

The fire, which in 1666 deſtroyed ſuch a great part of London, afforded ample opportunity for the maſons to exert their abilities. After a calamity ſo ſudden and extenſive, however, it became neceſſary to adopt ſome regulations to prevent ſuch a cataſtrophe in time to come. It was now determined, that, in all the new buildings to be erected, ſtone ſhould be uſed inſtead of timber. Wren was ordered by the king and grand-maſter to draw up the plan of a city with broad and regular ſtreets. Dr. Chriſtopher Wren was appointed ſurveyor-general and principal architect for rebuilding the city, the cathedral of St. Paul, and all the parochial churches enacted by parliament, in lieu of thoſe that were deſtroyed, with other public ſtructures. This gentleman, however, conceiving the charge to be too important for a ſingle perſon, ſelected for his aſſiſtant Mr. Robert Hook, profeſſor of geometry in Greſham college. The latter was immediately employed in meaſuring, adjuſting, and ſetting out, the ground of the private ſtreets to the ſeveral proprietors. The model and plan were laid before the king and houſe of commons, and the practicability of the whole ſcheme, without any infringement of private property: but unfortunately it happened, that the greater part of the citizens were totally averſe to leaving their old habitations, and building houſes in other places; and, ſo obſtinate were they in their determinations, that they choſe rather to have their old city again, under all its diſadvantages, than a new one upon the improved plan. Thus an opportunity was loſt of making the new city the moſt magnificent as well as the moſt convenient for health and commerce of any in Europe. Hence the architect, being cramped in the execution

of his plan, was obliged to alter and abridge it, and to model the city after the manner in which it has since appeared.—In 1673 the foundation-stone of the cathedral of St. Paul's was laid with great solemnity by the king in person, and the mallet which he used on this occasion is still preserved in the lodge of antiquity as a great curiosity.

During the time that the city was rebuilding, lodges were held by the fraternity in different places, and many new ones constituted, to which the best architects resorted. In 1674, earl Rivers resigned the office of grand-master in favour of George Villiers duke of Buckingham, who left the care of the fraternity to his wardens, and Sir Christopher Wren who still continued to act as deputy. In 1679, the duke resigned in favour of Henry Bennet earl of Arlington: but this nobleman was too deeply engaged in state-affairs to attend to his duty as a mason, though the lodges continued to meet under his sanction, and many respectable gentlemen joined the fraternity. During the short reign of James II. the masons were much neglected. In 1685, Sir Christopher Wren was elected to the office of grand-master, who appointed Gabriel Cibber and Mr. Edward Strong his wardens: yet, notwithstanding the great reputation and abilities of this celebrated architect, masonry continued in a declining way for many years, and only a few lodges were held occasionally in different parts of the kingdom.

At the Revolution, the society was in such a low state in the south of England, that only seven regular lodges were held in London and its suburbs; and of these only two, viz. that of St. Paul's and one at St. Thomas's hospital, Southwark, were of any consequence. But in 1695 king William, having been initiated into the mysteries, honoured the lodges with his presence, particularly one at Hampton-court, at which he is said to have frequently presided during the time that the new part of his palace was building. Many of the nobility also were present at a general assembly and feast held in 1697, particularly Charles duke of Richmond and Lenox, who was elected grand-master for that year; but in 1698 resigned his office to Sir Christopher Wren, who continued at the head of fraternity till King William's death in 1702.

During the reign of Queen Anne, masonry made no considerable progress. Sir Christopher's age and infirmities drew off his attention from the duties of his office, the annual festivals were entirely neglected, and the number of masons considerably diminished. It was therefore determined that the privileges of masonry should not be confined to operative masons, but that people of all professions should be admitted to participate in them, provided they were regularly approved and initiated into the order.

Thus the society once more rose into esteem; and on the accession of George I. the masons, now deprived of Sir Christopher Wren, resolved to unite again under a grand-master, and revive the annual festivals. With this view, the members of the only four lodges at that time existing in London met at the Apple-tree tavern in Charles-street, Covent Garden; and, having voted the oldest master-mason then present into the chair, constituted themselves a grand-lodge *pro tempore*. It was now resolved to renew the quarterly communications among the brethren; and, at an annual meeting held on the 24th of June the same year, Mr. Anthony Sayer was elected grand-master, invested by the oldest master-mason there present, installed by the

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maſter of the oldeſt lodge, and had due homage paid him by the fraternity. Before this time a ſufficient number of maſons, met together within a certain diſtrict, had ample power to make maſons without a warrant of conſtitution; but it was now determined, that the privilege of aſſembling as maſons ſhould be veſted in certain lodges or aſſemblies of maſons convened in certain places, and that every lodge to be afterwards convened, excepting the four old lodges then exiſting, ſhould be authorized to act by a warrant from the grand-maſter for the time, granted by petition from certain individuals, with the conſent and approbation of the grand-lodge in communication; and that, without ſuch warrant, no lodge ſhould hereafter be deemed regular or conſtitutional. The former privileges, however, were ſtill allowed to remain to the four old lodges then extant. In conſequence of this, the old maſons in the metropolis veſted all their inherent privileges as individuals in the four old lodges, in truſt that they never would ſuffer the ancient charges and land-marks to be infringed. The four old lodges, on their part, agreed to extend their patronage to every new lodge which ſhould hereafter be conſtituted according to the new regulations of the ſociety; and, while they acted in conformity to the ancient conſtitutions of the order, to admit their maſters and wardens to ſhare with them all the privileges of the grand-lodge, that of precedence only excepted.

Matters being thus ſettled, the brethren of the four old lodges conſidered their attendance on the future communications of the ſociety as unneceſſary; and therefore truſted implicitly to their maſters and wardens, ſatisfied that no meaſure of importance would be adopted without their approbation. It was, however, ſoon diſcovered, that the new lodges, being now equally repreſented with the old ones at the communications, would at length ſo far outnumber them, that by a majority they might ſubvert the privileges of the original maſons of England, which had been centered in the four old lodges; on which account a code of laws was, with the conſent of the brethren at large, drawn up for the future government of the ſociety. To this the following was annexed, binding the grand-maſter for the time being, his ſucceſſors, and the maſter of every lodge to be hereafter conſtituted, to preſerve it inviolably: "Every annual grand-lodge has an inherent power and authority to make new regulations, or to alter theſe for the real benefit of this ancient fraternity, provided always that the old land-marks be carefully preſerved: and that ſuch alterations and new regulations be propoſed and agreed to at the third quarterly communication preceding the annual grand feaſt; and that they be offered alſo to the peruſal of all the brethren before dinner, in writing, even of the youngeſt apprentice; the approbation and conſent of the majority of all the brethren preſent being abſolutely neceſſary to make the ſame binding and obligatory." To commemorate this circumſtance, it has been cuſtomary, ever ſince that time, for the maſter of the oldeſt lodge to attend every grand inſtallation; and, taking precedence of all preſent, the grand-maſter only excepted, to deliver the book of the original conſtitutions to the new inſtalled grand-maſter, on his promiſing obedience to the ancient charges and general regulations.

By this precaution the original conſtitutions were eſtabliſhed as the baſis of all ſucceeding maſonic juriſdiction in the ſouth of England; and the ancient land-marks, as they are called, or the boundaries ſet up as checks againſt innovation, were carefully ſecured from the at-

tacks of any future invaders. No great progreſs, however, was made during the adminiſtration of Mr. Sayer, only two lodges being conſtituted, though ſeveral brethren joined the old ones. In 1718 Mr. Sayer was ſucceeded by Mr. George Payne, who collected many valuable manuſcripts on the ſubject of maſonry, and earneſtly requeſted, that the fraternity would bring to the grand lodge any old writings or records concerning the fraternity, to ſhew the uſages of ancient times: and, in conſequence of this invitation, ſeveral old copies of Gothic conſtitutions were produced, arranged, and digeſted. Another aſſembly and feaſt were held on the 24th of June 1719, when Dr. Deſaguliers was unanimouſly elected grand-maſter. At this feaſt the old, regular, and peculiar, toaſts were introduced; and from this time we may date the riſe of free-maſonry on its preſent plan in the ſouth of England. Many new lodges were eſtabliſhed, the old ones viſited by many maſons who had long neglected the craft, and ſeveral noblemen initiated into the myſteries. In 1720, however, the fraternity ſuſtained an irreparable loſs by the burning of ſeveral valuable manuſcripts, concerning the lodges, regulations, charges, ſecrets, &c. (particularly one written by Mr. Nicholas Stone, the warden under Inigo Jones.) This was done by ſome ſcrupulous brethren, who were alarmed at the publication of the maſonic conſtitutions. At a quarterly communication it was this year agreed, that, for the future, the new grand-maſter ſhall be named and propoſed to the grand lodge ſome time before the feaſt; and, if approved and preſent, he ſhall be ſaluted as grand-maſter elect: and that every grand-maſter, when he is inſtalled, ſhall have the ſole power of appointing his deputy and wardens according to ancient cuſtom.

In the mean time maſonry continued to ſpread in the north as well as the ſouth of England. The general aſſembly, or grand lodge at York, continued to meet as uſual. Several lodges met in 1705, under the direction of Sir John Tempeſt, baronet, then grand-maſter; and many perſons of worth and character were initiated into the myſteries of the fraternity. The greateſt harmony ſubſiſted between the two grand lodges, and private lodges were formed in both parts of the kingdom under their ſeparate juriſdiction. The only diſtinction which the grand-lodge in the north appears to have retained is in the title of the Grand Lodge of all England; while the other was only called the Grand Lodge of England. The latter, however, being encouraged by ſome of the principal nobility, ſoon acquired conſequence and reputation, while the other ſeemed gradually to decline; but, till within theſe few years, the authority of the grand-lodge at York was never challenged; on the other hand, every maſon in the kingdom held that aſſembly in the higheſt veneration, and conſidered himſelf bound by the charges which originated from that aſſembly. It was the glory and boaſt of the brethren in almoſt every country where maſonry was eſtabliſhed to be accounted deſcendants of the original York maſons; and, from the univerſality of the idea that maſonry was firſt eſtabliſhed at York by charter, the maſons of England have received tribute from the firſt ſtates in Europe. At preſent, however, this ſocial intercourſe is aboliſhed, and the lodges in the north and ſouth are almoſt entirely unknown to one another; and neither the lodges of Scotland nor Ireland court the correſpondence of the grand-lodge at London. This is ſaid to have been owing to the introduction of ſome innovations among the lodges in the

the south; but for the coolness which subsists between the two grand-lodges another reason is assigned. A few brethren at York having, on some trivial occasion, seceded from their ancient lodge, they applied to London for a warrant of constitution. Their application was honoured without any inquiry into the merits of the case; and thus, instead of being recommended to the mother-lodge to be restored to favour, these brethren were encouraged to revolt, and permitted, under the sanction of the grand-lodge in London, to open a new lodge in the city of York itself. This illegal extension of power justly offended the grand-lodge at York, and occasioned a breach which has never yet been made up.

The duke of Buccleugh, who in 1723 succeeded the duke of Wharton as grand-master, first proposed the scheme of raising a general fund for distressed masons. The duke's motion was supported by Lord Paisley, Colonel Houghton, and a few other brethren; and, the grand-lodge appointed a committee to consider of the most effectual means of carrying the scheme into execution. The disposal of the charity was first vested in seven brethren; but, this number being found too small, nine more were added. It was afterwards resolved that twelve masters of contributing lodges, in rotation with the grand officers, should form the committee; and, by another regulation since made, it has been determined that all past and present grand officers, with the masters of all regular lodges which shall have contributed within twelve months to the charity, shall be members of the committee. This committee meets four times in the year by virtue of a summons from the grand-master or his deputy. The petitions of the distressed brethren are considered at these meetings; and, if the petitioner be considered as a deserving object, he is immediately relieved with five pounds. If the circumstances of the case are of a peculiar nature, his petition is referred to the next communication, when he is relieved with any sum the committee may have specified, not exceeding twenty guineas at one time. Thus the distressed have always found ready relief from this general charity, which is supported by the voluntary contributions of different lodges out of their private funds, without being burdensome to any member in the society. Thus has the committee of charity for free masons been established; and so liberal have the contributions been, that, though the sums annually expended for the relief of the distressed brethren have for several years past amounted to many thousand pounds, there still remains a considerable sum.

The most remarkable events which of late have taken place in the affairs of masonry, are the initiation of Omitul-Omrah Bahauder, eldest son of the nabob of the Carnatic, who was received by the lodge of Trinchinopoly in the year 1779. The news being officially transmitted to England, the grand lodge determined to send a congratulatory letter to his highness on the occasion, accompanied with an apron elegantly decorated, and a copy of the book of Constitutions superbly bound. The execution of this commission was entrusted to Sir John Duy, advocate-general of Bengal; and, in the beginning of 1780, an answer was received from his highness, acknowledging the receipt of the present, and expressing the warmest attachment and benevolence to his brethren in England. The letter was written in the Persian language, and inclosed in an elegant cover of cloth of gold, and addressed to the grand-master and grand-lodge

of England. A proper reply was made; and a tranſlation of his highneſs's letter was ordered to be copied on vellum; and, with the original, elegantly framed and glazed, and hung up in the hall at every public meeting of the ſociety.

After ſuch a long hiſtory of the riſe and progreſs of maſonry, it muſt be natural to inquire into the uſes of the inſtitution, and for what purpoſe it has been patroniſed by ſo many great and illuſtrious perſonages. The profound ſecrecy, however, in which every thing relating to maſonry is involved, prevents us from being very particular on this head. The maſons themſelves ſay, in general, that it promotes philanthropy, friendſhip, and morality; that, in proportion as maſonry has been cultivated, the countries have been civilized, &c. How far this can be depended upon, the fraternity themſelves beſt know. Another advantage, however, ſeems leſs equivocal, viz. that its ſigns ſerve as a kind of univerſal language, ſo that by means of them people of the moſt diſtant nations may become acquainted, and enter into friendſhip, with one another. This certainly muſt be accounted a very important circumſtance; and, conſidering the great number which have been and daily are admitted to the ſociety, and their inviolable attachment to the art, we muſt certainly conclude, that if it contains nothing of great importance to mankind at large, it muſt at leaſt be extremely agreeable, and even faſcinating, to thoſe who are once initiated.

The Egyptian Maſonry, is a new ſyſtem of maſonry taught by the celebrated impoſtor the Count Caglioſtro.—It is not known whether this ſyſtem was an invention of his own, or whether any ſuch thing really has an exiſtence among the ſuperſtitious Egyptians. The ſcheme was firſt put in execution in London; and, by means of his pretended knowledge in the myſteries of this art, the count procured great ſums of money, and attached to himſelf a vaſt number of followers. The following particulars concerning it were confeſſed by him before the inquiſition at Rome.

The Egyptian maſons are divided into ſeveral ſects, but there are two more eſteemed than the reſt. The firſt is that of the adepts, the members of which (ſay the inquiſitors) profeſs the moſt irreligious ſentiments, and employ magic in their operations; but their principal object is the deſtruction of the Catholic religion and of monarchy. The members of the other pretend to be occupied about the ſecrets of the hermetic art, and more eſpecially the philoſopher's ſtone. Caglioſtro owned that he was aſſociated in London with the ſecond of theſe ſects; that his wife was likewiſe a member, and received a diploma, which coſt five guineas. The lady was preſented with a ribbon, on which were embroidered the words *Union*, *Silence*, and *Virtue*; and ſhe was deſired to ſleep the following night with the ribbon attached to her thigh. When a male candidate is to be admitted, his courage muſt be tried in a number of ways. Caglioſtro himſelf ſubmitted to theſe trials; among which the following are mentioned in the account of his life. He was firſt hoiſted up to the cieling by means of a pulley, and, after ſuffering conſiderable pain, had his hand ſcorched by means of a candle. His eyes were then covered with a bandage, and he received an empty piſtol, with orders to charge it. This being done, he was ordered to diſcharge it againſt his head; and, upon his refuſing to do ſo, the piſtol was taken from him with contempt, but returned after a number of ceremonies.

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This had such an effect upon him, that without any regard to self-preservation, he drew the trigger, and got a smart stroke on the skull, which, however, produced no bad consequence. At the initiation of other candidates, he discovered that the pistol was changed, an unloaded one being put into the hands of the person when blindfolded, and that one of the assistants struck him a smart blow on the head, to make him think himself wounded. The ceremony was concluded with his taking an oath of secrecy and obedience to the grand-master.

THE ORIGIN AND INVENTION OF CLOCKS.

THERE have been very considerable differences among nations with regard to the beginning and ending of their days. The beginning of the day was counted from sun-rise by the Babylonians, Syrians, Persians, and Indians. The civil day of the Jews was begun from sunrise, and their sacred one from sunset; the latter mode of computation being followed by the Athenians, Arabs, ancient Gauls, and other European nations. According to some, the Egyptians began their day at sun-set, while others are of opinion that they computed from noon or from sun-rise: and Pliny informs us that they computed their civil day from one midnight to another. It is probable, however, that they had different modes of computation in different provinces or cities. The Ausonians, the most ancient inhabitants of Italy, computed the day from midnight; and the astronomers of Cathay and Oighur in the East-Indies reckoned in the same manner. This mode of computation was adopted by Hipparchus, Copernicus, and other astronomers, and is now in common use among ourselves. The astronomical day, however, as it is called, on account of its being used in astronomical calculations, commences at noon, and ends at the same time the following day. The Mahometans reckon from one twilight to another. In Italy, the civil day commences at some indeterminate point after sun-set; whence the time of noon varies with the season of the year. At the summer solstice, the clock strikes sixteen at noon, and nineteen at the time of the winter solstice. Thus also the length of each day differs by several minutes from that immediately preceding or following it. This variation occasions a considerable difficulty in adjusting their time by clocks. It is accomplished, however, by a sudden movement which corrects the difference when it amounts to a quarter of an hour; and this it does sometimes at the end of eight days, sometimes at the end of fifteen, and sometimes at the end of forty. Information of all this is given by a printed kalendar, which announces, that from the 16th of February, for instance, to the 24th, it will be noon at a quarter past eighteen; from the 24th of February to the 6th of March, it will be noon at eighteen o'clock precisely; from the first of June to the 13th of July, the hour of noon will be at sixteen o'clock; on the 13th of July it will be at half an hour after sixteen; and so on throughout the different months of the year. This absurd method of measuring the day continues, notwithstanding several attempts to suppress it, throughout the whole of Italy, a few provinces only excepted.

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The subdivisions of the day have not been less various than the computations of the day itself. The most obvious division, and which could at no time, nor in no age, be mistaken, was that of morning and evening. In process of time the two intermediate points of noon and midnight were determined; and this division into quarters was in use long before the invention of hours.

From this subdivision probably arose the method used by the Jews and Romans of dividing the day and night into four vigils or watches. The first began at sun-rising, or six in the morning; the second at nine; the third at twelve; and the fourth at three in the afternoon. In like manner the night was divided into four parts; the first beginning at six in the evening, the second at nine, the third at twelve, and the fourth at three in the morning. The first of the divisions was called by the Jews the third hour of the day; the second the sixth; the third the ninth; and the fourth the twelfth, and sometimes the eleventh. Another division in use, not only among the nations above mentioned, but the Greeks also, was that which reckoned the first quarter from sun-set to midnight; the second from midnight to sun-rise; the third, or morning watch, from morning to noon; and the fourth from noon to sun-set.

It is uncertain at what time the more minute subdivision of the day into hours first commenced. It does not appear from the writings of Moses that he was acquainted with it, as he mentions only the morning, mid-day, evening, and sun-set. Hence we may conclude, that the Egyptians at that time knew nothing of it, as Moses was well skilled in their learning. According to Herodotus, the Greeks received the knowledge of the twelve hours of the day from the Babylonians. It is probable, however, that the division was actually known and in use before the name hour was applied to it; as Censorinus informs us that the term was not made use of in Rome for three hundred years after its foundation; nor was it known at the time the twelve tables were constructed.

The eastern nations divide the day and night in a very singular manner; the origin of which is not easily discovered. The Chinese have five watches in the night, which are announced by a certain number of strokes on a bell or drum. They begin by giving one stroke, which is answered by another; and this is repeated at the distance of a minute or two, until the second watch begin, which is announced by two strokes; and so on throughout the rest of the watches. By the ancient Tartars, Indians, and Persians, the day was divided into eight parts, each of which contained seven hours and a half. The Indians on the coast of Malabar divide the day into six parts, called najika; each of these six parts is subdivided into sixty others, called venaigas; the venaiga into six birpes; the birpe into ten kenikans; the kenikan into four mattires; the mattire into eight kannimas or caignodes; which divisions, according to our mode of computation, stand as follow:

Najika,	Venaiga,	Birpe,	Kenikan,	Mattire,	Caignode.
24 min.	24 sec.	4 sec.	2-5 sec.	1-10 sec.	1-80 sec.

The day of the Chinese is begun at midnight, and ends with the midnight following. It is divided into twelve hours, each distinguished by a particular name and figure. They also divide the natural day into one hundred parts, and each of these into one hundred minutes; so that the whole contains ten thousand minutes. In the northern

northern parts of Europe, where only two seasons are reckoned in the year, the divisions of the day and night are considerably larger than with us. In Iceland the twenty-four hours are divided into eight parts; the first of which commences at three in the morning; the second at five; the third at half an hour after eight; the fourth at eleven; the fifth at three in the afternoon; the sixth at six in the evening; the seventh at eight, and the last at midnight. In the eastern part of Turkestam, the day is divided into twelve equal parts, each of which is distinguished by the name of some animal. These are subdivided into eight keh; so that the whole twenty-four hours contain ninety-six keh.

The modern divisions of the hour in use among us are into minutes, seconds, thirds, fourths, &c. each being a sixtieth part of the former subdivision. By the Chaldæans, Jews, and Arabians, the hour is divided into one thousand and eighty scruples; so that one hour contains sixty minutes, and one minute, eighteen scruples. The ancient Persians and Arabs were likewise acquainted with this division; but the Jews are so fond of it, that they pretend to have received it in a supernatural manner: "Issachar (say they) ascended into heaven, and brought from thence one thousand and eighty parts for the benefit of the nation."

The division of the day being ascertained, it soon became an object to indicate in a public manner the expiration of any particular hour or division; as, without some general knowledge of this kind, it would be in a great measure impossible to carry on business. The methods of announcing this have been likewise very different. Among the Egyptians it was customary for the priests to proclaim the hours like watchmen among us. The same method was followed at Rome; nor was there any other method of knowing the hours until the year 293 B. C. when Papirius Cursor first set up a sun-dial in the Capitol. A similar method is practised among the Turks, whose priests proclaim, from the top of their mosques, the cock-crowing, day-break, mid-day, three o'clock in the afternoon, and twilight, being their appointed times of worship.

As this mode of proclaiming the hour could not but be very inconvenient, as well as imperfect, the introduction of an instrument which every one could have in his possession, and which might answer the same purpose, must have been considered as a valuable acquisition. One of the first of these was the clepsydra or water-clock. Various kinds of these were in use among the Egyptians at a very early period. The invention of the instrument is attributed to Thoth or Mercury, and it was afterwards improved by Ctesibius of Alexandria. It was a common measure of time among the Greeks, Indians, and Chaldæans, as well as the Egyptians, but was not introduced into Rome till the time of Scipio Nasica. The Chinese astronomers have long made use of it; and, by its means divided the zodiac into twelve parts; but, it is a very inaccurate measure of time, varying, not only according to the quantity of water in the vessel, but according to the state of the atmosphere.

The clepsydra was succeeded by the gnomon or sun-dial.—This at first was no more than a stile erected perpendicularly to the horizon; and it was a long time before the principles of it came to be thoroughly understood. The invention is with great probability attributed to the Babylonians, from whom the Jews received it before the

the time of Ahaz, when we know that a ſun-dial was already erected at Jeruſalem. The Chineſe and Egyptians alſo were acquainted with the uſe of the dial at a very early period, and it was conſiderably improved by Anaximander or Anaximenes, one of whom is for that reaſon looked upon to be the inventor. Various kinds of dials, however, were invented and made uſe of in different nations long before their introduction at Rome. The firſt erected in that city, as has been already mentioned, was that by Papirius Curſor; and, thirty years after, Valerius Meſſala brought one from Sicily, which was uſed in Rome for no leſs than ninety-nine years, though conſtructed for a Sicilian latitude, and conſequently incapable of ſhewing the hours exactly in any other place; but, at laſt, another was conſtructed by L. Philippus, capable of meaſuring time with greater accuracy.

It was long after the invention of dials before mankind began to form any idea of clocks; nor is it well known at what period they were firſt invented. A clock was ſent by Pope Paul I. to Pepin king of France, which at that time was ſuppoſed to be the only one in the world. A very curious one was alſo ſent to Charles the Great from the khalif Haroun Alraſchid, which the hiſtorians of the time ſpeak of with ſurpriſe and admiration: but the greateſt improvement was that of Mr. Huygens, who added the pendulum to it. Still, however, the inſtruments for dividing time were found to be inaccurate for nice purpoſes. The expanſion of the materials by heat, and their contraction by cold, which cauſe a very perceptible alteration in the going of an inſtrument in the ſame place at different times of the year, and much more if carried from one climate to another. Various methods have been contrived to correct this; which indeed can be done very effectually at land by a certain conſtruction of the pendulum; but at ſea, where a pendulum cannot be uſed, the inaccuracy is of conſequence much greater: nor was it thought poſſible to correct the errors ariſing from theſe cauſes in any tolerable degree, until the late invention of Mr. Harriſon's time-piece, which may be conſidered as making perhaps as near an approach to perfection as poſſible

ART OF SPEAKING IN PUBLIC.

ACCORDING to the manners and cuſtoms of the preſent age, public harangues are made only in the pulpit; in the ſenate, in council, or other public aſſembly; by public profeſſors; or on the theatre.

With regard to the declamation of the pulpit, the dignity and ſanctity of the place, and the importance of the ſubject, require the preacher to exert the utmoſt powers of his voice to produce a pronunciation that is perfectly diſtinct and harmonious, and that he obſerve a deportment and action which are expreſſive and graceful. No man, therefore, who is deſtitute of a voice, ſhould aſcend the pulpit, and there act the part of a pantomime before his audience. The preacher ſhould not, however, roar like a common cryer, and rend the ear with a voice of thunder; for ſuch kind of declamation is not only without meaning and without perſuaſion, but highly incongruous with the meek and gentle expreſſions of the goſpel. He ſhould

ſhould likewiſe take particular care to avoid a monotony; his voice ſhould riſe from the beginning, as it were by degrees, and its greateſt ſtrength ſhould be exerted in the application. Each inflexion of the voice ſhould be adapted to the phraſe, and to the meaning of the words; and each remarkable expreſſion ſhould have its peculiar inflexion. The dogmatic requires a plain uniform tone of voice only; and the menaces of the goſpel demand a greater force than do its promiſes and rewards: but the latter ſhould not be pronounced in the ſoft tone of a flute, nor the former with the loud ſound of a trumpet. The voice ſhould ſtill retain its natural tone in all its various inflexions. Happy is that preacher, to whom nature has given a voice that is at once ſtrong, flexible, and harmonious.

An air of complacency and benevolence, as well as devotion, ſhould be conſtantly viſible in the countenance of the preacher. But every appearance of affectation muſt be carefully avoided: for nothing is ſo diſguſtful to an audience, as even the ſemblance of diſſimulation. Eyes conſtantly rolling, turned towards heaven, and ſtreaming with tears, rather denote a hypocrite, than a man poſſeſſed of the real ſpirit of religion, and that feels the true import of what he preaches. An air of affected devotion infallibly deſtroys the efficacy of all that the preacher can ſay, however juſt and important it may be. On the other hand, he muſt avoid every appearance of mirth or raillery, or of that cold unfeeling manner which is ſo apt to freeze the hearts of his hearers.

The body ſhould be in general erect, and in a natural and eaſy attitude. The perpetual movement, or contortion, of the body, has a ridiculous effect in the pulpit, and makes the figure of a preacher and a harlequin much too ſimilar. But, on the other hand, he ought not to remain conſtantly upright and motionleſs, like a ſpeaking ſtatue.

The motions of the hands give a ſtrong expreſſion to a diſcourſe; but they ſhould be conſtantly decent, grave, noble, and expreſſive. *The preacher, who is inceſſantly in action, who is perpetually* claſping his hands, or who menaces with a clenched fiſt, or counts his arguments on his fingers, will only excite mirth among his auditory. In a word, declamation is an art that the ſacred orator ſhould ſtudy with the utmoſt aſſiduity. The deſign of a ſermon is to convince, to affect, and to perſuade. The voice, the countenance, and the action, which are to produce this triple effect, are therefore the objects to which the preacher ſhould particularly apply himſelf.

The declamation of a miniſter or ſtateſman in the ſenate, in council, or other public aſſembly, is of a more unconfined nature. To perſuade, to move the paſſions, and gain an aſcendancy in a public aſſembly, the orator ſhould himſelf feel the force of what he ſays, and the declamation ſhould only expreſs that internal ſenſation. But nothing ſhould be carried to exceſs. A ſuavity in the tone of voice, a dignity of deportment, a graceful action, and a certain tranquillity of countenance, ſhould conſtantly accompany the ſtateſman when he ſpeaks in public, even when he is moſt earneſtly engaged in debate, or when he is addreſſing his ſovereign in perſon. A pleaſing tone of voice and a diſtinct pronunciation prejudice the hearers greatly in the ſpeaker's favour. A young man may improve theſe to a ſurpriſing degree. Demoſthenes, who had a natural impediment in his ſpeech, was accuſtomed to go to the ſea-ſhore, and, partly filling his mouth with pebbles, he declaimed with a loud voice. The ſtones by

degrees gave a volubility to his tongue, and the roaring of the waves reconciled him insensibly to the noise of the multitude.

The principal object of a public professor is the instruction of the studious youth: for which purpose, he is to convince and persuade. Every tone of voice, every expression of the countenance, or action of the body, which can produce this effect by enforcing the words, should therefore be employed by those who are to teach the sciences. There is, moreover, one very essential reflection which every professor ought to make, and which is, that the chair from which he harangues is surrounded by young students, naturally possessed with vivacity, not unfrequently ludicrous, and for the most part previously instructed in the preparatory sciences. They are therefore constantly inclined to criticise, to jest, and to ridicule: for which reason, the professor should endeavour to inspire them with respect and attention, by a grave, commanding, and venerable, countenance, and carefully avoid all appearance of grimace in his action, and every kind of affectation in his discourse, that he may not afford the least opportunity of pleasantry.

Theatric declamation was very different among the ancients from what it is with us, from the nature of the thing itself, and from the difference of circumstances. Numberless passages in Quintilian, and other ancient historians, critics, grammarians, and commentators, evidently prove, that the ancient dramatic declamation was subservient to the rules of the musical rhythmus; and by this, according to Aristides, their action, as well as recital, was regulated. But to explain this seeming paradox, it will be necessary to make here some preliminary remarks. The ancients gave a much more extensive signification than we do to the word music (musica), which they derived from the muses, or at least from some of them. It is for this reason that the same Aristides and Quintilian define it to be "An art that teaches all that relates to the use of the voice, and the manner of performing all the motions of the body with grace:" *Ars decoris invocibus & motibus.* Therefore poetry, declamation, dancing, pantomimes, and many other gestures and exercises, were subservient to this art.

That part of general music which taught the art of declamation and gesture, according to the rules of an established method, was distinguished by the name of hypocritic music: and this musical art was called by the Greeks *orchesis*; and by the Romans *saltatio.* It was, however, so far from being an advantage to the ancients to have had this art, which we have not, that it was, on the contrary, a mark of great imperfection. For, in the first place, it was an instance of high absurdity to represent a tragedy, or comedy, before an audience of twenty thousand people, the far greatest part of whom could neither hear nor see what passed to any good purpose, unless they were possessed of organs which we have not. The theatres of London and Paris may conveniently contain about fifteen hundred persons; and that is found sufficient in the most populous cities, where there are several places of entertainment on the same day, and where the people are reasonable enough to succeed each other in their diversions. As the features of the face could not be distinguished at so great a distance, and still less the alteration of countenance in order to represent the different passions, they were obliged to have recourse to masks; a wretched childish invention, that destroyed all the strength

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and variety of expression. Their action became extravagant; and, at the same time, subservient to a regular mechanism, which prevented all the refinement, and all the pleasure of surprise, in the performance; and must have had an effect horribly disagreeable to those who were placed near the stage.

The egregious imperfection of their language likewise, which consisted of syllables long and short, whose duration was determined by a set measure of time, and their manner of tuning these syllables after the method of the orchesis of the Greeks, was another disadvantage. For by this means they determined by notes or characters, placed after the long and short syllables, not only the nature, but the duration, of each action. Now, nothing could be more affected, more constrained and disgustful, than such a method of declaiming. How far superior in this respect are the moderns, who consult nature alone in their theatric declamation; who can make the audience hear each sigh; who can accompany it with a proper attitude; who can seize the lucky moment, and make the countenance fully express the sensations of the mind! Nature does all here; and art, infinitely inferior to nature, did all among the ancients. Modern declamation cannot be subservient to a musical rhythmus, seeing we speak rapidly, and without affectation. Our actors learn their art without art, from nature itself, assisted by reflection; and they arrive at a degree of excellence infinitely greater than that of the ancients, by a method far more simple, and by efforts incomparably more easy.

We do not, moreover, precisely know what the theatric declamation of the ancients was; nor what were the musical instruments which accompanied that declamation. The title to the Eunuch of Terence says, for example, "that Flaccus, the freedman of Claudius, made the music of that piece, in which he employed the two flutes, the right and the left." These flutes, it is likely, gave the tone to the actor, which must have had a very odd effect on the audience. Most of the ancient pieces have similar titles. They, who would be particularly informed of the art of declaiming among the Greeks and Romans, may read to advantage the Critical Reflections on Poetry and Painting by the Abbe du Bos. The third part of that work consists entirely of learned researches and ingenious reflections on this silly practice of the ancients. But, as this art has happily no place in modern declamation, and can at best serve only to make a parade of erudition, we shall say no more of it, but pass to matters of real utility.

We think there is good reason to believe, moreover, that the most polished nations of modern Europe do not accompany their discourses in general with so many gesticulations as did the Greeks, the Romans, and other inhabitants of warm climates. They appear to have found the method of animating a discourse, and giving it an expression, by the simple inflections of the voice, and by the features of the countenance; which is far more decent, more just and rational, than all those contortions which perpetually derange the natural attitude of the body and its members, and give the speaker the air of a harlequin.

Expression, therefore, forms at once the essence and the end of declamation; and the means of producing it consists in a pronunciation that is sonorous, distinct, and pleasing, supported by an action that is decent and proper to the subject. If the best dramatic poet has

need of a good declaimer or actor to make his writing produce its proper effect, the actor has likewise need of a good poet to enable him to please and affect by his action: for it is to little purpose that he endeavours to charm his auditory by uniting, with nature, all the powers of art, if the poet has not furnished him with sentiments that are rational and affecting.

The actor, in studying his part before a large mirror, where he can see his whole figure, in order to determine the most proper expression for every thought, should consult nature, and endeavour to imitate her. But, in this imitation, he should take care not to make too servile a copy. He has this to observe, in common with his colleagues, the masters in all the polite arts: the theatre is intended to exhibit an imitation of nature, and not nature itself. Tragedy and comedy form pictures of human life; but these pictures are also pieces of perspective, which require strokes somewhat stronger than nature, that they may be discerned at a distance. The actor is elevated to a considerable height from the ground; he is surrounded by scenery, he is separated from the audience by the orchestra, and he speaks in verse: all this is not natural: but the spectator is to accede to this necessary illusion, in order to promote his own pleasure, which would not be so great as it is were all these matters otherwise disposed. Declamation, therefore, should somewhat exceed, but never lose sight of, nature.

The tone of the actor's voice should be natural, but regulated by the extent of the theatre; sufficiently loud to be heard by all the audience, but not so violent as to rend their ears. A pure and graceful pronunciation, without any provincial accent, is likewise a great merit in an actor; and he should also habituate himself to speak in a manner perfectly distinct. It is a capital point in the pronouncing of verse, not to separate the two hemistichs, by resting too long on the cæsura in the middle, or dwelling on the end of each hemistich: for, by so doing, the actor falls into a monotony, an insufferable uniformity of cadence, in a piece that consists of some thousand verses. The gradations of the voice demand also a very judicious observance. The speaker, who begins in a high tone, will find it very difficult to sustain it through the whole piece; and he, who clamours incessantly, will find his lungs fail him in those parts where the vehemence of passion requires the strongest efforts. If we may be allowed the expression, the strongest touches, the boldest figures, will not there stand out from the picture in a striking manner.

The deportment of an actor should be constantly graceful, decent, and proper to the character he represents. An old man has a different position of body from a young petit maître; an aged queen from a young princess, a noble gallant from a valet de chambre. A rational observance of nature, and an imitation of the best actors, are here the surest guides. The same may be said of the action of the hands, the theatric step, &c. An inanimated figure, a body in the position of a statue, and hands immoveable, are as displeasing in the scene, as a player whose incessant gesticulation resembles the action of a puppet.

Those who desire to excel in public speaking, especially in the senate, or in public assemblies, should attentively study all the classic orators, but particularly Demosthenes, who was deservedly called the prince of orators. Indeed no orator had ever a finer field than

Demosthenes

Demosthenes in his Olynthiacs and Philippics, which are his capital orations; and undoubtedly to the greatness of the subject, and to that integrity and public spirit which breathe in them, they owe a large portion of their merit. The subject is, to excite the indignation of his countrymen against Philip of Macedon, the public enemy of the liberties of Greece; and to guard them against the treacherous measures by which that crafty tyrant endeavoured to lull them into a neglect of their danger. To attain this end, we see him use every proper means to animate a people distinguished by justice, humanity, and valour, but in many instances become corrupt and degenerate. He boldly accuses them of venality, indolence, and indifference to the public good; while, at the same time, he reminds them of their former glory, and of their present resources. His contemporary orators, who were bribed by Philip, and who persuaded the people to peace, he openly reproaches as traitors to their country. He not only prompts to vigorous measures, but teaches how they are to be carried into execution. His orations are strongly animated, and full of the impetuosity and ardour of public spirit. His composition is not distinguished by ornament and splendour. It is an energy of thought, peculiarly his own, which forms his character, and raises him above his species. He seems not to attend to words, but to things. We forget the orator, and think of the subject. He has no parade and ostentation, no studied introductions: but is like a man full of his subject; who, after preparing his audience by a sentence or two for the reception of plain truths, enters directly on business.

The style of Demosthenes is strong and concise; though sometimes, it must be confessed, harsh and abrupt. His words are highly expressive, and his arrangement firm and manly. Negligent of smaller graces, he seems to have aimed at that sublime which lies in sentiment. His actions and pronunciation are said to have been uncommonly vehement and ardent; which, from the manner of his writings, we should readily believe. His character appears to have been of an austere rather than of a gentle kind. He is always grave, serious, passionate; never degrading himself, nor attempting any thing like pleasantry. If his admirable eloquence be in any respect faulty, it is that he sometimes borders on the hard and dry. He may be thought to want smoothness and grace; which is attributed to his imitating too closely the manner of Thucydides, who was his great model for style, and whose history he is said to have transcribed eight times with his own hand. But these defects are more than atoned for by that masterly force of masculine eloquence, which, as it overpowered all who heard it, cannot in the present day be read without emotion.

Cicero calls him a perfect model, and such as he himself wished to be. These two great princes of eloquence have been often compared together; but the judgment hesitates to which to give the preference. The Archbishop of Cambray, however, seems to have stated their merits with great justice and perspicuity in his Reflections on Rhetoric and Poetry. The passage is as follows: "I do not hesitate to declare that I think Demosthenes superior to Cicero. I am persuaded no one can admire Cicero more than I do. He adorns whatever he attempts. He does honour to language. He disposes of words in a manner peculiar to himself. His style has great variety of

of character. Whenever he pleases, he is even concise and vehement; for instance, against Catiline, against Verres, against Antony. But ornament is too visible in his writings. His art is wonderful, but it is perceived. When the orator is providing for the safety of the republic, he forgets not himself, nor permits others to forget him. Demosthenes seems to escape from himself, and to see nothing but his country. He seeks not elegance of expression; unsought for, he possesses it. He is superior to admiration. He makes use of language, as a modest man does of dress, only to cover him. He thunders, he lightens. He is a torrent which carries every thing before it. We cannot criticise, because we are not ourselves. His subject enchains our attention, and makes us forget his language. We lose him from our sight: Philip alone accupies our minds. I am delighted with both these orators; but I confess that I am less affected by the infinite art and magnificent eloquence of Cicero than by the rapid simplicity of Demosthenes."

CONSTRUCTION OF DECOY-PONDS FOR TAKING WILD-FOWL.

A DECOY should be made where there is a large pond surrounded with wood, and beyond that a marshy and uncultivated country: if the piece of water is not thus surrounded, it will be attended with the noise and other accidents which may be expected to frighten the wild-fowl from a quiet haunt where they mean to sleep, during the day-time, in security. If these noises or disturbances are wilful, it hath been held that an action will lie against the disturber.—As soon as the evening sets in, the decoy rises (as they term it), and the wild-fowl feed during the night. If the evening is still, the noise of their wings, during their flight, is heard at a very great distance, and is a pleasing though rather melancholy sound. This rising of the decoy in the evening is in Somersetshire called radding.

The decoy-ducks are fed with hempseed, which is thrown over the skreens in small quantities, to bring them forwards into the pipes or canals, and to allure the wild-fowl to follow, as this seed is so light as to float.

There are several pipes, as they are called, which lead up a narrow ditch that closes at last with a funnel-net. Over these pipes (which grow narrower from their first entrance) is a continued arch of netting suspended on hoops. It is necessary to have a pipe or ditch for almost every wind that can blow, as upon this circumstance it depends which pipe the fowl will take to; and the decoy-man always keeps on the leeward side of the ducks, to prevent his effluvia reaching their sagacious nostrils. All along each pipe, at certain intervals, are placed skreens made of reeds, which are so situated, that it is impossible the wild-fowl should see the decoy-man before they have passed on towards the end of the pipe, where the purse-net is placed. The inducement to the wild-fowl to go up one of these pipes is, because the decoy-ducks trained to this lead the way, either after hearing the whistle of the decoy-man, or enticed by the hempseed; the latter will dive under water, whilst the wild-fowl fly on, and are taken in the purse.

It

It often happens, however, that the wild-fowl are in ſuch a ſtate of ſleepineſs and dozing, that they will not follow the decoy-ducks. Uſe is then generally made of a dog, who is taught his leſſon: he paſſes backwards and forwards between the reed ſkreens (in which are little holes, both for the decoy-man to ſee and the little dog to paſs through); this attracts the eye of the wild-fowl, who, not chooſing to be interrupted, advance towards the ſmall and contemptible animal, that they may drive him away. The dog all the time, by the direction of the decoy-man, plays among the ſkreens of reeds, nearer and nearer the purſe-net; till at laſt, perhaps, the decoy-man appears behind a ſkreen, and the wild-fowl not daring to paſs by him in return, nor being able to eſcape upwards on account of net-covering, ruſh on into the purſe-net. Sometimes the dog will not attract their attention, if a red handkerchief, or ſomething very ſingular, is not put about him.

The general ſeaſon for catching fowl in decoys, is from the latter end of October till February: the taking of them earlier is prohibited by an act 10 George II. c. 32. which forbids it from June 1ſt to October 1ſt, under the penalty of five ſhillings for each bird deſtroyed within that ſpace.

The Lincolnſhire decoys are commonly ſet at a certain annual rent, from five to twenty pounds a-year: and there is one in Somerſetſhire that pays thirty pounds. The former contribute principally to ſupply the markets in London. Amazing numbers of ducks, wigeons, and teal, are taken: by an account ſent us of the number caught a few winters paſt, in one ſeaſon, and in only ten decoys, in the neighbourhood of Wainfleet, it appeared to amount to 31,200, in which are included ſeveral other ſpecies of ducks: it is alſo to be obſerved, that, in the above particular, wigeon and teal are reckoned but as one, and conſequently ſell but at half the price of the ducks. This quantity makes them ſo cheap on the ſpot, that we have been aſſured, ſeveral decoy-men would be content to contract for years to deliver their ducks at Boſton for ten pence per couple. The account of the numbers here mentioned relates only to thoſe that were ſent to the capital.

It was cuſtomary formerly to have in the fens an annual driving of the young ducks before they took wing. Numbers of people aſſembled, who beat a vaſt tract, and forced the birds into a net placed at the ſpot where the ſport was to terminate. A hundred and fifty dozens have been taken at once: but this practice, being ſuppoſed to be detrimental, has been aboliſhed by act of parliament.

SYSTEMS OF EDUCATION IN DIFFERENT COUNTRIES.

IN different periods of ſociety, in different climates, and under different forms of government, various inſtitutions have naturally prevailed in the education of youth; and even in every different family, the children are educated in a different manner, according to the varieties in the ſituation, diſpoſitions, and abilities, of the parents. In the infancy of ſociety, very little attention can be paid to the education of youth. Before men have riſen above a ſavage ſtate, they are almoſt entirely the creatures of appetite and inſtinct. The impulſe of appetite hurries them to propagate their ſpecies. The power of

inſtinctive

instinctive affection is often, though not always, so strong as to compel them to preserve and nurse the fruit of their embraces. But even when their wants are not so urgent, nor their hearts so destitute of feeling, as to prompt them to abandon their new-born infants to the ferocity of wild beasts or the severity of the elements, yet still their uncomfortable and precarious situation, their ignorance of the laws of nature, their deficiency of moral and religious principles, and their want of dexterity or skill in any of the arts of life, all these together must render them unable to regulate the education of their children with much attention or sagacity. They may relate to them the wild inconsistent tales in which all their notions concerning superior beings, and all their knowledge of the circumstances and transactions of their ancestors, are contained: they may teach them to bend the bow, to point their arrows, to hollow the trunk of a tree into a canoe, and to trace the almost imperceptible path of an enemy or a wild beast over dreary mountains or through intricate forests: but they cannot impress their minds with very just ideas concerning their social relations towards each other, or concerning their obligations to a Supreme Being, the framer and upholder of nature; they teach them not to repress their irregular appetites, nor to restrain the sallies of passion when they exceed just bounds or are improperly directed; nor can they inform their understandings with very accurate or extensive views of the phenomena of nature. Besides, they know not how far implicit obedience to his parents commands is to be required of the boy or youth, nor how far he ought to be left to the guidance of his own reason or humour. Among savages the influence of parental authority soon expires, nor is the parent solicitous to maintain it. As the eagle expels his young from his lofty nest as soon as they become able to support themselves in the air; so the savage generally ceases to care for his child, or assume any power over him, as soon as he becomes capable of procuring the means necessary for his own subsistence. Savages being scarcely connected by any social ties, being unacquainted with the restraint of civil laws, and being unable to contribute in any great degree to the maintenance or protection of one another; each individual among them, as soon as he attains that degree of strength and dexterity which may enable him to procure the necessaries of life, stands single and alone, independent on others, and scorning to submit to their commands. The parent conscious of his inability to confer any important benefits on his child, after he has advanced even a very short way towards manhood, no longer endeavours to controul his actions; and the child, proud of his independence, scarcely submits to ask his parent's advice. And, even before reaching this period of independence, so few are the benefits which parents can bestow (being confined to supplying the necessaries of life, and communicating the knowledge of a very few of the rudest simplest arts), that children regard them with little deference, nor do they always insist on implicit submission. Want of natural affection, and consciousness of superior strength, often prompt the parent to abuse the weakness of his child. Yet though small the skill with which the savage can cultivate the understanding or form the dispositions of his child, though few the arts which he can teach him, and though not very respectful or submissive the obedience or deference which he requires; yet is there one quality of mind which the savage is more careful to inspire than those parents who are directed in edu-

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cating their children by all the lights of civilized ſociety. That quality is indeed abſolutely neceſſary to fit the ſavage for his ſituation; without it, the day on which he ceaſed to enjoy the protection of his parents would moſt probably be the laſt day of his life: that quality is fortitude.. We may perhaps think, that the hardſhips to which the young ſavage is from the period of his birth unavoidably expoſed, might be enough to inſpire him with fortitude; but, as if theſe were inſufficient, other means are applied to inſpire him with what the ſtoics have regarded as the firſt of virtues. He is compelled to ſubmit to many hardſhips unneceſſary, but from a view to this. Children are there called to emulate each other in bearing the ſevereſt torments. Charlevoix relates, that he has ſeen a boy and girl bind their arms together, place a burning coal between them, and try who could longeſt endure without ſhrinking the pain to which they thus expoſed themſelves.

Still, however, the young ſavage owes his education rather to nature and the circumſtances in which he is placed, and the accidents which befal him, than to the kindneſs or prudence of his parents. Nature has endowed him with certain powers of underſtanding, ſentiments, ſenſations, and bodily organs; he has been placed in certain circumſtances, and is expoſed to a certain train of events; and by theſe means chiefly, not by the watchful induſtry of inſtructors, does he become ſuch as he appears when he has reached the years of maturity.

But man was not deſigned by his wiſe and beneficent Creator to remain long in a ſavage ſtate; the principles of his nature incline him to ſocial life. Reaſon, diſtinguiſhing the ſuperior advantages to be enjoyed in ſociety, concurs with the ſocial principle in his breaſt, in prompting him to ſeek the company and converſation of others of the human race. When men enter into ſociety, they always unite their powers and talents, in a certain degree, for the common advantage of the ſocial body. In conſequence of this, laws come in time to be inſtituted; new arts are invented; progreſs is made in the knowledge of nature; moral duties are better underſtood, and defined; juſter ideas are gradually acquired of all our ſocial relations; friendſhip, love, filial, parental, and conjugal, affection, all are heightened and refined. All theſe advantages do not inſtantly reſult from men's entering into a ſocial ſtate; the improvement of the human mind, and the civilization of ſociety, are gradual and progreſſive: but, as it is natural for men to unite in a ſocial ſtate, ſo it is no leſs natural for ſociety to be gradually improved and civilized till it attain an high degree of perfection and refinement.

When men have attained to ſuch knowledge and improvement as to be intitled to a more honourable appellation than that of ſavages, one part of their improvements generally conſiſts in becoming more judicious and attentive in directing the education of their youth. They have now acquired ideas of dependance and ſubordination; they have arts to teach and knowledge to communicate; they have moral principles to inſtil; and have formed notions of their relation and obligation to ſuperior powers, which they are deſirous that their children ſhould alſo entertain. Their affection to their offſpring is now alſo more tender and conſtant. We obſerve at preſent in that ſtate of ſociety in which we live, that the poor, who can ſcarcely earn for themſelves and their children the neceſſaries of life, are generally

less susceptible of parental affection, in all its anxious tenderness, than the rich, or those whom Providence had placed in easy circumstances; and we may make use of this fact in reasoning concerning the different degrees of the same affection felt by the savage and the member of a civilized society. The savage may be considered as the poor man, who with difficulty procures the necessaries of life even for himself; the other, as the man in affluent circumstances, who is more at leisure to listen to the voice of tender and generous affection.

In this improved state of society, the education of youth is viewed as an object of higher importance. The child is dearer to his parent; and the parent is now more capable of cultivating the understanding and rectifying the dispositions of his child. His knowledge of nature, and his dexterity in the arts of life, give him more authority over a child than what the savage can possess. Obedience is now enforced, and a system of education is adopted, by means of which the parent attempts to form his child for acting a part in social life. Perhaps the legislature interferes; the education of the youth is regarded as highly worthy of public concern; it is considered that the foolish fondness or the unnatural caprice of parents may, in the rising generation, blast the hopes of the state.

In reviewing ancient history, we find that this actually took place in some of the most celebrated governments of antiquity. The Persians, the Cretans, and the Lacedemonians, were all of them too anxious to form their youth for discharging the duties of citizens to entrust the education of the children solely to the parents. Public establishments were formed among those nations, and a series of institutions enacted, for carrying on and regulating the education of their youths: not such as our European universities, in which literary knowledge is the sole object of pursuit, the student is maintained solely at his parent's expence, and attends only if his parents think proper to send him; but of a very different nature, and on a much more enlarged plan.

The Persians, according to the elegant and accurate account delivered by Xenophon in the beginning of his Cyropædia, divided the the whole body of their citizens into four orders; the boys, the youth, the full-grown men, and those who were advanced beyond that period of life during which military service was required. For each of these orders particular halls were appropriated. Each of them was subjected to the inspection of twelve rulers. The adults and the superannuated were required to employ themselves in the performance of particular duties, suitable to their age, their abilities, and their experience; while the boys and the youth were engaged in such a course of education as seemed likely to render them worthy and useful citizens.

The boys were not employed, in their places of instruction, in acquiring literary accomplishments; for to such the Persians were strangers. They went thither to learn justice, temperance, modesty; to shoot the bow, and to launch the javelin. The virtues and the bodily exercises where what the Persians laboured to teach their children. These were the direct, and not subordinate, purposes of their system of education. The masters used to spend the greatest part of the day in dispensing justice to their scholars; who carried before them actions for thefts, robberies, frauds, and other such grounds of complaint against one another.—Such were the means by which

which the Persians endeavoured to instil, even in early youth, a regard for the laws of natural equity, and for the institutions of their country. Till the age of sixteen or seventeen, the boys were busied in acquiring those parts of education. At that period they ceased to be considered as boys, and were raised to the order of the youths. After they entered this order, the same views were still attended to in carrying on their education. They were still inured to bodily labour. They were to attend the magistrates, and to be always ready to execute their commands. They were led out frequently to the chase; and on such expeditions they were always headed by the king, as in time of war. Here they were taught to expose themselves fearlessly to danger; to suffer, without repining or complaint, hunger, thirst, and fatigue; and to content themselves with the coarsest, simplest, fare, for relieving the necessities of nature. In short, whether at home or out on some hunting expedition, they were constantly employed in acquiring new skill and dexterity in military exercises, new vigour of mind and body, and confirmed habits of temperance, fortitude, abstinence, patience, patriotism, and noble integrity. After spending ten years in this manner, their course of education was completed; they were admitted into the class of adults, and were esteemed qualified for public offices. It must not escape our notice, that the citizens were not compelled to send their children to pass through this course of education in the public halls; but none except such as passed through this course of education were capable of civil power, or admitted to participate in public offices or public honours.

If we examine into the principles on which this system of education proceeds, we shall find it peculiarly suitable for a nation just emerging from the rudeness and ignorance of barbarity to a knowledge of social and civil relations, and of the duties connected with such relations. They have sacrificed their independence, to obtain the comfort and security of a social state. They now glory in the appellation of citizens, and are desirous to discharge the duties incumbent on a citizen. They must inform their children in the nature of their social relations, and impress them with habits of discharging their social duties; otherwise the society will soon be dissolved, and their posterity will fall back into the same wild miserable state from which they have emerged. But perhaps the circumstances, or abilities, or dispositions, of individuals, render them unequal to this weighty task. It becomes therefore naturally an object of public care. The whole social body find it necessary to deliberate on the most proper means for discharging it aright. A plan of education is then formed; the great object of which is, to fit the youth for discharging the duties of citizens. Arts and sciences are hitherto almost wholly unknown: and all that can be communicated to the youth is only a skill in such exercises as are necessary for their procuring subsistence, or defending themselves against human enemies or beasts of prey; and habits of performing those duties, the neglect of which must be fatal to the society or the individual. And some such establishment appears necessary to prevent the society from falling back into their former barbarity. It will prevent their virtue and valour from decaying, though it may perhaps at the same time prevent them from making any very rapid progress in civilization and refinement. Yet the industry, the valour, the integrity, and the patriotism, which it inspires, must necessarily produce some favourable

change in their circumstances; and that change in their circumstances will be followed by a change in their system of education.

The Cretans, too, the wisdom of whose laws is so much celebrated in the records of antiquity, had a public establishment for the education of their youth. Minos, whom they revered as their great legislator, was also the founder of that establishment. Its tendency was similar to that of the course of education pursued among the Persians,—to form the soldier and the citizen. The Cretans were divided into three classes; the boys, the youth, and the adults. Between seven and seventeen years of age, the boy was employed in learning to shoot the bow, and in acquiring the knowledge of his duties as a man and a citizen, by listening to the conversation of the old men in the public halls, and observing their conduct. At the age of seven, he was conducted to the public halls to enter on this course of education. He was taught to expose himself boldly to danger and fatigue; to aspire after skill and dexterity in the use of arms and in the gymnastic exercises; to repeat the laws and hymns in honour of the gods. At the age of seventeen he was enrolled among the youth. Here his education was still continued on the same plan. He was to exercise himself among his equals in hunting, wrestling, and the military exercises; and, while thus engaged, his spirits were roused and animated by strains of martial music played on such instruments as were then in use among the inhabitants of Crete. One part of the education of the Cretan youth, in which they were particularly desirous to excel, was the Pyrrhic dance; which was the invention of a Cretan, and consisted of various military evolutions performed to the sound of instruments.

Such were the principles and arts in which the Cretan legislature directed the youth to be instructed. This course of education could not be directed or superintended by the parent. It was public, and carried on with a view to fit the boy for discharging the duties of a citizen when he should attain to manhood. It is easy to see, that such a system of education must have been instituted in the infancy of society, before many arts had been invented, or the distinctions of rank had arisen; at a time when men subsisted in a considerable degree by hunting, and when the intercourse of nations was on such a footing, that war, instead of being occasional, was the great business of life. Such a system of life would then naturally take place, even though no sage legislator had arisen to regulate and enforce it.

Lycurgus, the celebrated lawgiver of Lacedemon, thought it necessary to direct the education of youth in a particular manner, in order to prepare them for paying a strict obedience to his laws. He regarded children as belonging more properly to the state than to their parents, and wished that patriotism should be still more carefully cherished in their breasts than filial affection. The spirit of his system of education was pretty similar to that among the Persians and the Cretans.

As soon as a boy was born, he was submitted to the inspection of the elders of that tribe to which his parents belonged. If he was well shaped, strong, and vigorous, they directed him to be brought up, and assigned a certain portion of land for his maintenance. If he was deformed, weak, and sickly, they condemned him to be exposed, as not being likely ever to become an useful citizen. If the boy appeared worthy of being brought up, he was entrusted to the care

care of his parents till he attained the age of seven years; but his parents were strictly charged not to spoil either his mind or his bodily constitution by foolish tenderness. Probably, too, the state of their manners was at that time such as not to render the injunction peculiarly necessary.

At the age of seven, however, he was introduced to a public class, consisting of all the boys of the same age. Their education was committed to masters appointed by the state; and what was chiefly inculcated on them in the course of it, was submissive obedience and respect to their superiors; quickness and brevity in their conversation, and replies to such questions as were put to them; dexterity and address in performing what was commanded them, and firmness and patience in bearing every pain or hardship to which they might be exposed. One of the means used to form them to habits of activity and address, was to permit, nay, to direct them to commit little acts of theft; which, if they performed them so dexterously as to avoid detection, they might afterwards boast of as noble exploits: but, if detected in such enterprises, the aukward artless boy was exposed both to punishment and disgrace. To avoid the punishment and disgrace incurred by being detected in an act of theft, the Spartan boy would often suffer with unshrinking fortitude the severest torments. It is related of one of them, that rather than be discovered with a young fox under his cloak, which he had stolen, he suffered the little animal to tear open his bowels. Not content with beholding the children suffer by submitting voluntarily to such hardships, the Spartans also endeavoured to form them to fortitude, by whipping them on their religious festivals, sometimes with such severity that they expired under the lash. The Lacedemonian youth were also taught such bodily exercises, and the use of such warlike weapons, as were necessary to render them expert and skilful soldiers.

They too, as well as the Cretans and Persians, among whom we have seen that somewhat similar modes of education prevailed, were to be citizens and soldiers; not husbandmen, mechanics, artists, merchants, &c. Therefore the mode of education established among them was simple and uniform. Its aim was, to acquaint them with the nature of their social duties, and to form them to such vigour of body and such firmness of mind as might render them fit for the station in which they were to be placed, and adequate to the part which they were to act. This establishment for education was perfectly consistent with the other parts of that legislature which was instituted by Lycurgus. Youth educated among the Lacedemonians could hardly fail to become worthy members of that singular republic. Let us not however regard the Spartans as singularly inhumane in their treatment of youth. Let us reascend, in imagination, to that period in the progress of society from rudeness to refinement, to which they had attained when Lycurgus arose among them. What were then their circumstances, their arts and manners, their moral principles, and military discipline? Not very different from those which the laws of Lycurgus rendered so long stationary among them. He, no doubt, rectified some abuses, and introduced greater order and equality. But man is not to be so easily metamorphosed into a new form. As you cannot, at once, raise an acorn to a venerable oak; so neither will you be able to change the savage, at once, into the citizen. All the art or wisdom of Lycurgus, even though as-

sisted by all the influence of the prophetic Apollo, could never have established his laws among his countrymen, had not their character and circumstances previously disposed them to receive them. But, grant this, and you must, of consequence, allow, that what to us may appear cruel and inhumane must have affected their feelings in a different manner. The change introduced in the treatment of youth by the establishment of this system of education was probably recommended by its being more humane than what before prevailed. Corrupted as are our manners, and effeminate our modes of education; yet we would not perhaps act wisely in laying them aside, to adopt precisely those of the ancients. Yet the Spartan education was peculiarly well fitted to form citizens for the republic of Lycurgus; it was happily adapted to that state of society in which it was introduced. And, if we should enquire by what means Lycurgus was enabled to fix the arts, the manners, and in short the civilization, of his country, for so long a period in a stationary state; we sho uld perhapsfind reason to ascribe that effect to the public establishment which he instituted for the education of youth; to his confining the Spartan citizens to the profession of arms, and assigning all servile offices to the Helots; and to his prohibiting the use of gold and silver. Among these however his establishment for education occupies the chief place. Never was any state adorned with more patriotic citizens than those of Sparta. With them every private affection seemed to be swallowed up by the *amor patriæ:* the love of their country was at least their ruling passion. Pœdaretes, being rejected when he offered himself a candidate for a seat among the council of three hundred, returned home, rejoicing that there were in Sparta no fewer than three hundred whom his countrymen found reason to regard as better citizens than himself. This was not a seeming joy, assumed to conceal the pain which he suffered from the disappointment; it was heartfelt and sincere. Such were the patrotism and integrity of heart produced by their system of education; but which modern refinement and a narrow policy have nearly, if not totally, eradicated from the schools.

STORY OF GENERAL PUTNAM AND THE WOLF.

SOON after Mr. Putnam removed to Connecticut, the wolves, then very numerous, broke into his sheep-fold, and killed seventy fine sheep and goats, besides wounding many lambs and kids. This havoc was committed by a she-wolf, which, with her annual whelps, had for several years infested the vicinity. The young were commonly destroyed by the vigilance of the hunters, but the old one was too sagacious to come within reach of gun-shot: upon being closely pursued, she would generally fly to the western woods, and return the next winter with another litter of whelps.

This wolf, at length, became such an intolerable nuisance, that Mr. Putnam entered into a combination with five of his neighbours to hunt alternately until they could destroy her. Two, by rotation, were to be constantly in pursuit. It was known, that, having lost the toes from one foot, by a steel-trap, she made one track shorter than the other. By this vestige, the pursuers recognized, in a light snow, the route of this pernicious animal. Having followed her to Connecticut

necticut river, and found she had turned back in a direct course towards Pomfret, they immediately returned, and by ten the next morning the blood-hounds had driven her into a den, about three miles distant from the house of Mr. Putnam: the people soon collected with dogs, guns, straw, fire, and sulphur, to attack the common enemy. With this apparatus several unsuccessful efforts were made to force her from the den. The hounds came back badly wounded, and refused to return. The smoke of blazing straw had no effect. Nor did the fumes of burnt brimstone, with which the cavern was filled, compel her to quit the retirement. Wearied with such fruitless attempts (which had brought the time to ten o'clock at night), Mr. Putnam tried once more to make his dog enter, but in vain; he proposed to his negro man to go down into the cavern and shoot the wolf: the negro declined the hazardous service. Then it was that the general, angry at the disappointment, and declaring that he was ashamed to have a coward in his family, resolved himself to destroy the ferocious beast, lest she should escape through some unknown fissure of the rock. His neighbours strongly remonstrated against the perilous enterprise: but he, knowing that wild animals were intimidated by fire, and having provided several strips of birch-bark, the only combustible material which he could obtain, that would afford light in this deep and darksome cave, prepared for his descent. Having, accordingly, divested himself of his coat and waistcoat, and having a long rope fastened round his legs, by which he might be pulled back, at a concerted signal, he entered head foremost, with the blazing torch in his hand.

The aperture of the den, on the east side of a very high ledge of rocks, is about two feet square; from thence it descends obliquely fifteen feet, then running horizontally about ten more, it ascends gradually sixteen feet towards its termination. The sides of this subterraneous cavity are composed of smooth and solid rocks, which seem to have been divided from each other by some former earthquake. The top and bottom are also of stone, and the entrance, in winter, being covered with ice, is exceedingly slippery. It is in no place high enough for a man to raise himself upright; nor in any part more than three feet in width.

Having groped his passage to the horizontal part of the den, the most terrifying darkness appeared in front of the dim circle of light afforded by his torch. It was silent as the house of death. None but monsters of the desert had ever before explored this solitary mansion of horror. He, cautiously proceeding onward, came to the ascent; which he slowly mounted on his hands and knees until he discovered the glaring eye-balls of the wolf, who was sitting at the extremity of the cavern. Startled at the sight of fire, she gnashed her teeth, and gave a sullen growl. As soon as he had made the necessary discovery, he kicked the rope as a signal for pulling him out. The people, at the mouth of the den, who had listened with painful anxiety, hearing the growling of the wolf, and supposing their friend to be in the most imminent danger, drew him forth with such celerity, that his shirt was stripped over his head, and his skin severely lacerated. After he had adjusted his clothes, and loaded his gun with nine buck-shot, holding a torch in one hand, and the musquet in the other, he descended a second time. When he drew nearer than before, the wolf, assuming a still more fierce and terrible appearance, howling, rolling

rolling her eyes, snapping her teeth, and dropping her head between her legs, was evidently in the attitude and on the point of springing at him. At the critical instant he levelled and fired at her head. Stunned with the shock, and suffocated with the smoke, he immediately found himself drawn out of the cave. But having refreshed himself, and permitted the smoke to dissipate, he went down the third time. Once more he came within sight of the wolf, who appearing very passive, he applied the torch to her nose; and, perceiving her dead, he took hold of her ears, and then kicking the rope (still tied round his legs) the people above, with no small exultation, dragged them both out together.

Another bold and almost presumptuous deed, in this veteran hero, has rendered remarkable a precipice at Horseneck, in this state, (Connecticut.) The story is this. About the middle of the winter of 1778, general Putnam was on a visit to his out-post at Horseneck: he found governor Tryon advancing upon that town with a corps of fifteen hundred men—to oppose these, general Putnam had only a picket of one hundred and fifty men, and two iron field-pieces, without horse or drag-ropes. He, however, planted his cannon on the high ground by the meeting-house, and retarded their approach by firing several times; until, perceiving the horse (supported by the infantry) about to charge, he ordered the picket to provide for their safety by retiring to a swamp inaccessible to horse; and secured his own by plunging down the steep precipice at the church upon a full trot. This precipice is so steep, where he descended, as to have artificial stairs composed of nearly one hundred stone steps for the accommodation of foot passengers. There the dragoons, who were but a sword's length from him, stopped short. For the declivity was so abrupt, that they ventured not to follow: and, before they could gain the valley by going round the brow of the hill in the ordinary road, he was far enough beyond their reach.

OF THE PHENOMENA OF EARTHQUAKES.

THOUGH there are no phenomena in nature more calculated to impress the human mind with terror, and consequently to be well remembered and taken notice of, than earthquakes; yet the philosophy of them is but lately arrived at any degree of perfection; and even at this day the history of earthquakes is very incomplete. The destruction occasioned by them engrosses the mind too much to admit of philosophical speculations at the time they happen: the same thing prevents the attentive consideration of the alterations that take place in the atmosphere after the earthquake is over, and which might probably throw some light on the causes which produced it; and the suddenness of its coming on prevents an exact attention to those slight appearances in the earth or air, which, if carefully observed, might serve as warnings to avoid the destruction.—From what observations have been made, however, the following phenomena may be deduced, and reckoned pretty certain.

1. Where there are any volcanoes or burning mountains, earthquakes may reasonably be expected more frequently than in other countries. 2. If the volcano hath been for a long time quiet, a violent

lent earthquake is to be feared, *& vice versa*. But to this there are many exceptions. 3. Earthquakes are generally preceded by long droughts; but they do not always come on as soon as the drought ceases. 4. They are also preceded by electrical appearances in the air; such as the aurora borealis, falling stars, &c. but this does not hold universally. 5. A short time before the shock, the sea swells up and makes a great noise; fountains are troubled, and send forth muddy water; and the beasts seem frighted, as if sensible of an approaching calamity. 6. The air at the time of the shock is generally calm and serene; but afterwards commonly becomes obscure and cloudy. 7. The shock comes on with a rumbling noise, sometimes like that of carriages; sometimes a rushing noise like wind, and sometimes explosions like the firing of cannon are heard. Sometimes the ground heaves perpendicularly upwards, and sometimes rolls from side to side. Sometimes the shock begins with a perpendicular heave, after which the other kind of motion commences. A single shock is but of very short duration, the longest scarcely lasting a minute; but they frequently succeed each other at short intervals for a considerable length of time. 8. During the shock, chasms are made in the earth; from which sometimes flames, but oftener great quantities of water, are discharged. Flame and smoke are also emitted from places of the earth where no chasms can be perceived. Sometimes these chasms are but small; but, in violent earthquakes, they are frequently so large, that whole cities sink down into them at once. 9. The water of the ocean is affected even more than the dry land. The sea swells to a prodigious height; much more than we could suppose it raised by the mere elevation of its bottom by the shock. Sometimes it is divided to a considerable depth; and great quantities of air, flames, and smoke, are discharged from it. The like irregular agitations happen to the waters of ponds, lakes, and even rivers. 10. The shock is felt at sea as well as on land. Ships are affected by a sudden stroke, as if they had run aground or struck upon a rock. 11. The effects of earthquakes are not confined to one particular district or country, but often extend to very distant regions; though no earthquake hath yet been known extensive enough to affect the whole globe at one time. In those places also where the shock is not felt on dry land, the irregular agitation of the waters above mentioned is perceived very remarkably.

All these positions are verified by the accounts of those earthquakes which have been particularly described by witnesses of the best character. In 1692, an earthquake happened in Jamaica, attended with almost all the terrible circumstances above mentioned. In two minutes, it destroyed the town of Port Royal, at that time the capital of the island; and sunk the houses in a gulph forty fathoms deep. It was attended with an hollow rumbling noise like that of thunder; the streets rose like the waves of the sea; first lifting up the houses, and then immediately throwing them down into deep pits. All the wells discharged their waters with the most violent agitation. The sea burst over its bounds. The fissures of the earth were in some places so great, that one of the streets appeared twice as broad as formerly. In many places it opened and closed again; and continued this agitation for some time. Of these openings, great numbers might be seen at a time. In some of them, the people were swallowed up at once; in others, the earth caught them

by the middle, and crushed them to death; while others, more fortunate, were swallowed up in one chasm, and thrown out alive by another. Other chasms were large enough to swallow up whole streets; and others, still more formidable, spouted up immense quantities of water, drowning such as the earthquake had spared. The whole was attended with stenches and offensive smells, the noise of falling mountains at a distance, &c. and the sky, in a minute's time, was turned dull and reddish, like a glowing oven. Yet, as great a sufferer as Port-Royal was, more houses were left standing therein than on the whole island besides. Scarce a planting-house, or sugar-house, was left standing in all Jamaica. A great part of them were swallowed up, houses, people, trees, and all, in one gap: in lieu of which, afterwards appeared great pools of water; which, when dried up, left nothing but sand, without any mark that ever tree or plant had grown thereon. The shock was so violent, that it threw people down on their knees or their faces as they were running about for shelter. Several houses were shuffled some yards out of their places, and yet continued standing. One Hopkins had his plantation removed half a mile from the place where it stood, without any considerable alteration. All the wells in the island, as well as those of Port-Royal, from one fathom to six or seven deep, threw their water out at the top with great violence. Above twelve miles from the sea, the earth gaped, and spouted out, with a prodigious force, vast quantities of water into the air: yet the greatest violences were among the mountains and rocks; and it is a general opinion, that the nearer the mountains, the greater the shock; and that the cause thereof lay among them. Most of the rivers were stopped up for twenty-four hours by the falling of the mountains; till, swelling up, they made themselves new tracks and channels; tearing up, in their passage, trees, &c. After the great shock, those people who escaped got on-board ships in the harbour, where many continued above two months; the shocks all that time being so violent, and coming so thick, sometimes two or three in an hour, accompanied with frightful noises like a rushing wind, or a hollow rumbling thunder, with brimstone-blasts, that they durst not come ashore. The consequence of the earthquake was a general sickness, from the noisome vapours belched forth, which swept away above three thousand persons.

A still more terrible account, if possible, is that given by Kircher of the earthquake which happened in Calabria in the year 1638. This instance is an exception to the second general position above laid down. In Italy there had been an eruption of Mount Vesuvius five years before; and in Sicily there had been an eruption of Ætna only two years before this earthquake. The event, however, plainly shewed, that the cause of the earthquake, whatever it was, had a connection not only with Mount Ætna, which lies in the neighbourhood, but also with the volcano of Stromboli, which is sixty miles distant. "On the 24th of March (says Kircher), we launched (in a small boat) from the harbour of Messina in Sicily, and arrived the same day at the promontory of Pelorus. Our destination was for the city of Euphemia in Calabria; but on account of the weather, we were obliged to continue three days in Pelorus. At length, wearied with the delay, we resolved to prosecute our voyage; and, although the sea seemed more than usually agitated, yet we ventured forward. The gulph of Charybdis, which we approached, seemed

seemed whirled round in such a manner as to form a vast hollow, verging to a point in the centre. Proceeding onward, and turning my eyes to Mount Ætna, I saw it cast forth large volumes of smoke, of mountainous size, which entirely covered the island, and blotted out even the shores from my view. This, together with the dreadful noise, and the sulphureous stench, which was strongly perceived, filled me with apprehensions that some more dreadful calamity was impending. The sea itself seemed to wear a very unusual appearance; those who have seen a lake in a violent shower of rain, all covered over with bubbles, will have some idea of its agitations. My surprise was still increased by the calmness and serenity of the weather; not a breeze, not a cloud, which might be supposed to put all nature thus into motion. I therefore warned my companion, that an earthquake was approaching; and, after some time, making for the shore with all possible diligence, we landed at Tropæa. But we had scarcely arrived at the Jesuits college in that city, when our ears were stunned with an horrid sound, resembling that of an infinite number of chariots driven fiercely forward, the wheels rattling and the thongs cracking. Soon after this, a most dreadful earthquake ensued; so that the whole track upon which we stood seemed to vibrate, as if we were in the scale of a balance that continued waving. This motion, however, soon grew more violent; and, being no longer able to keep my legs, I was thrown prostrate upon the ground. After some time, finding that I remained unhurt amidst the general concussion, I resolved to venture for safety; and, running as fast as I could, reached the shore. I did not search long here, till I found the boat in which I had landed, and my companions also. Leaving this seat of desolation, we prosecuted our voyage along the coast; and the next day came to Rochetta, where we landed, although the earth still continued in violent agitations. But we were scarcely arrived at our inn, when we were once more obliged to return to the boat; and in about half an hour we saw the greatest part of the town, and the inn at which we had set up, dashed to the ground, burying all its inhabitants beneath its ruins. Proceeding onward in our little vessel, we at length landed at Lopizium, a castle mid-way between Tropæa and Euphemia, the city to which we were bound. Here, wherever I turned my eyes, nothing but scenes of ruin and horror appeared; towns and castles levelled to the ground; Stromboli, though at sixty miles distance, belching forth flames in an unusual manner, and with a noise which I could distinctly hear. But my attention was quickly turned from more remote to contiguous danger. The rumbling sound of an approaching earthquake, which by this time we were grown acquainted with, alarmed us for the consequences. It every moment seemed to grow louder, and to approach more near. The place on which we stood now began to shake most dreadfully; so that, being unable to stand, my companions and I caught hold of whatever shrub grew next us, and supported ourselves in that manner. After some time, the violent paroxysm ceasing, we again stood up, in order to prosecute our voyage to Euphemia, which lay within sight. In the mean time, while we were preparing for this purpose, I turned my eyes towards the city; but could see only a frightful dark cloud, that seemed to rest upon the place. This the more surprised us, as the weather was so very serene. We waited, therefore, till the cloud was passed away: then,

turning to look for the city, it was totally ſunk; and nothing but a diſmal and putrid lake was to be ſeen where it ſtood."

In 1693 an earthquake happened in Sicily, which may juſtly be accounted one of the moſt terrible of which we have any account. It ſhook the whole iſland: and not only that, but Naples and Malta ſhared in the ſhock. It was impoſſible for any body in this country to keep on their legs on the dancing earth; nay, thoſe that lay on the ground were toſſed from ſide to ſide as on a rolling billow: high walls leaped from their foundations ſeveral paces, &c. The miſchief it did is amazing; almoſt all the buildings in the countries were thrown down. Fifty-four cities and towns, beſides an incredible number of villages, were either deſtroyed or greatly damaged. We ſhall only inſtance the fate of Catania, one of the moſt famous, ancient, and flouriſhing, cities in the kingdom; the reſidence of ſeveral monarchs, and an univerſity. This once famous city had the greateſt ſhare in the tragedy. Father Anthon. Serrovita, being on his way thither, and at the diſtance of a few miles, obſerved a black cloud like night hovering over the city; and there aroſe from the mouth of Montgibello great ſpires of flame, which ſpread all around. The ſea all of a ſudden began to roar and riſe in billows; and there was a blow, as if all the artillery in the world had been at once diſcharged. The birds flew about aſtoniſhed; the cattle in the fields ran crying, &c. His and his companions horſes ſtopped ſhort, trembling; ſo that they were forced to alight. They were no ſooner off, but they were lifted from the ground above two palms; when caſting his eyes towards Catania, he with amazement ſaw nothing but a thick cloud of duſt in the air. This was the ſcene of their calamity; for of the magnificent Catania there was not the leaſt footſtep to be ſeen. S. Bonajutus aſſures us, that of 18,900 inhabitants, 18,000 periſhed therein.

The great earthquake, however, which happened on the 1ſt of November 1755, affords the cleareſt example of all the phenomena above mentioned; having been felt violently in many places both on land and at ſea, and extended its effects to the waters in many other places where the ſhocks were not perceived. At Liſbon in Portugal its effects were moſt ſevere. In 1750, there had been a ſenſible trembling of the earth felt in this city: for four years afterwards, there had been an exceſſive drought; inſomuch that ſome ſprings, formerly very plentiful of water, were dried and totally loſt. The predominant winds were north and north-eaſt, accompanied with various, though very ſmall, tremors of the earth. The year 1755 proved very wet and rainy; the ſummer cooler than uſual; and, for forty days before the earthquake, the weather was clear, but not remarkably ſo. The laſt day of October, the ſun was obſcured, with a remarkable gloomineſs in the atmoſphere. The firſt of November, early in the morning, a thick fog aroſe, which was ſoon diſſipated by the heat of the ſun; no wind was ſtirring; the ſea was calm; and the weather as warm as in June or July in this country. At thirty-five minutes after nine, without the leaſt warning, except a rumbling noiſe not unlike the artificial thunder in our theatres, a moſt dreadful earthquake ſhook, by ſhort but quick vibrations, the foundations of all the city, ſo that many buildings inſtantly fell. Then, with a ſcarcely perceptible pauſe, the nature of the motion was changed, and the houſes were toſſed from ſide to ſide, with a motion like that of a

waggon

waggon violently driven over rough ſtones. This ſecond ſhock laid almoſt the whole city in ruins, with prodigious ſlaughter of the people. The earthquake laſted in all about ſix minutes. At the moment of its beginning, ſome perſons on the river, near a mile from the city, heard their boat make a noiſe as if it had run aground, though they were then in deep water; and at the ſame time they ſaw the houſes falling on both ſides of the river. The bed of the river Tagus was in many places raiſed to its ſurface. Ships were driven from their anchors, and joſtled together with great violence; nor did their maſters know whether they were afloat or aground. A large new quay ſunk to an unfathomable depth, with ſeveral hundreds of people who were upon it; nor was one of the dead bodies ever found. The bar was at firſt ſeen dry from ſhore to ſhore: but ſuddenly the ſea came rolling in like a mountain; and about Belem Caſtle the water roſe fifty feet almoſt in an inſtant. About noon there was another ſhock; when the walls of ſeveral houſes that yet remained were ſeen to open from top to bottom more than a quarter of a yard, and afterwards cloſed again ſo exactly that ſcarcely any mark of the injury was left.

At Colares, about twenty miles from Liſbon, and two miles from the ſea, on the firſt of November, the day broke with a ſerene ſky, the wind continuing at eaſt; but about nine o'clock the ſun began to grow dim; and about half an hour after was heard a rumbling noiſe like that of chariots, which increaſed to ſuch a degree, that it became equal to the exploſions of the largeſt cannon. Immediately a ſhock of an earthquake was felt, which was quickly ſucceeded by a ſecond and third; and at the ſame time ſeveral light flames of fire iſſued from the mountains, reſembling the kindling of charcoal. In theſe three ſhocks, the walls of the buildings moved from eaſt to weſt.

At Oporto (near the mouth of the river Douro), the earthquake began about forty minutes paſt nine. The ſky was very ſerene; when a dreadful hollow noiſe like thunder, or the rattling of coaches at a diſtance, was heard, and almoſt at the ſame inſtant the earth began to ſhake. In the ſpace of a minute or two, the river roſe and fell five or ſix feet, and continued to do ſo for four hours. It ran up at firſt with ſo much violence, that it broke a ſhip's hawſer. In ſome parts the river opened, and ſeemed to diſcharge vaſt quantities of air; and the agitation in the ſea was ſo great about a league beyond the bar, that air was ſuppoſed to have been diſcharged there alſo.

St. Ube's, a ſea-port town about twenty miles ſouth of Liſbon, was entirely ſwallowed up by the repeated ſhocks and the vaſt ſurf of the ſea. Huge pieces of rock were detached at the ſame time from the promontory at the weſt end of the town, which conſiſts of a chain of mountains containing fine jaſper of different colours.

The ſame earthquake was felt all over Spain, except in Catalonia, Arragon, and Valencia.—At Ayamonte (near where Guadiana falls into the Bay of Cadiz), a little before ten o'clock on the firſt of November, the earthquake was felt; having been immediately preceded by a hollow ruſhing noiſe. Here the ſhocks continued for fourteen or fifteen minutes, damaged almoſt all the buildings, throwing down ſome, and leaving others irreparably ſhattered. In little more than half an hour after, the ſea and river, with all the canals, overflowed their banks with great violence, laying under water all the coaſts of the iſlands adjacent to the city and its neighbourhood, and

and flowing into the very ſtreets. The water came on in vaſt black mountains, white with foam at the top, and demoliſhed more than one half of a tower at the bar named De Canala. In the adjacent ſtrands every thing was irrecoverably loſt; for all that was overflowed ſunk, and the beach became a ſea, without the leaſt reſemblance of what it was before. Many perſons periſhed; for, although they got aboard ſome veſſels, yet part of theſe ſoundered; and others being forced out to ſea, the unhappy paſſengers were ſo terrified, that they threw themſelves overboard. The day was ſerene, and not a breath of wind ſtirring.

At Cadiz, ſome minutes after nine in the morning, the earthquake began, and laſted about five minutes. The water of the ciſterns under ground waſhed backwards and forwards, ſo that a great froth aroſe. At ten minutes after eleven, a wave was ſeen coming from the ſea, at eight miles diſtance, at leaſt ſixty feet higher than uſual. It daſhed againſt the weſt part of the town, which is very rocky. Though theſe rocks broke a good deal of its force, it at laſt came upon the city walls, beat in the breaſt-work, and carried pieces of the building of eight or ten ton weight to the diſtance of forty or fifty yards.—When the wave was gone, ſome parts that are deep at low water were left quite dry; for the water returned with the ſame violence with which it came. At half an hour after eleven came a ſecond wave, and after that four other remarkable ones; the firſt at ten minutes before twelve; the ſecond, half an hour before one; the third, ten minutes after one; and the fourth, ten minutes before two. Similar waves, but ſmaller, and gradually leſſening, continued with uncertain intervals till the evening.

At Gibraltar, the earthquake was not felt till after ten. It began with a tremulous motion of the earth, which laſted about half a minute. Then followed a violent ſhock; after that, a trembling of the earth for five or ſix ſeconds; then another ſhock not ſo violent as the firſt, which went off gradually as it began. The whole laſted about two minutes. Some of the guns on the battery were ſeen to riſe, others to ſink, the earth having an undulating motion. Moſt people were ſeized with giddineſs and ſickneſs, and ſome fell down; others were ſtupified; and many that were walking or riding felt no motion in the earth, but were ſick. The ſea roſe ſix feet every fifteen minutes; and then fell ſo low, that boats and all the ſmall craft near the ſhore were left aground, as were alſo numbers of ſmall fiſh. The flux and reflux laſted till next morning, having decreaſed gradually from two in the afternoon.

At Madrid the earthquake came on at the ſame time as at Gibraltar, and laſted about ſix minutes. At firſt every body thought they were ſeized with a ſwimming in their heads; and afterwards, that the houſes were falling. It was not felt in coaches, nor by thoſe who walked on foot, except very ſlightly; and no accident happened, except that two lads were killed by the fall of a ſtone-croſs from the porch of a church.

Malaga (a ſea-port on the Mediterranean) felt a violent ſhock; the bells rung in the ſteeples; the water of a well overflowed, and as ſuddenly retired.

At Seville ſeveral houſes were ſhaken down; the famous tower of the cathedral called La Giralda opened in the four ſides; and the

waters were so violently agitated, that all the vessels in the river were driven ashore.

In Africa, the earthquake was felt almost as severely as it had been in Europe. Great part of the town of Algiers was destroyed. At Arzilla (a town in the kingdom of Fez), about ten in the morning, the sea suddenly rose with such impetuosity, that it lifted up a vessel in the bay, and dropped it with such force on the land, that it was broke to pieces; and a boat was found two musket-shot within land from the sea. At Fez and Mequinez, great numbers of houses fell down, and a multitude of people were buried in the ruins.

At Morocco, by falling down of a great number of houses, many people lost their lives: and about eight leagues from the city the earth opened and swallowed up a village with all the inhabitants, who were known by the name of the Sons of Besumba, to the number of about eight thousand or ten thousand persons, together with all their cattle, &c. and, soon after, the earth closed again in the same manner as before.

At Salle, a great deal of damage was done. Near a third part of the houses were overthrown; the waters rushed into the city with great rapidity, and left behind them great quantities of fish.

At Tangier, the earthquake began at ten in the morning, and lasted ten or twelve minutes. The sea came up to the walls (a thing never heard of before); and went down immediately with the same rapidity with which it arose, leaving a great quantity of fish behind it. These commotions were repeated eighteen times, and lasted till six in the evening.

In the city of Funchal, in the island of Madeira, a shock of this earthquake was first perceived at thirty-eight minutes past nine in the morning. It was preceded by a rumbling noise in the air, like that of empty carriages passing hastily over a stone pavement. The observer felt the floor immediately to move with a tremulous motion, vibrating very quickly. The shock continued more than a minute; during which space, the vibrations, though continual, were weakened and increased in force twice very sensibly. The increase after the first remission of the shock was the most intense. The noise in the air accompanied the shock during the whole of its continuance, and lasted some seconds after the motion of the earth had ceased; dying away like a peal of distant thunder rolling through the air. At three quarters past eleven, the sea, which was quite calm, it being a fine day, and no wind stirring, retired suddenly some paces; then rising with a great swell without the least noise, and as suddenly advancing, overflowed the shore, and entered the city. It rose fifteen feet perpendicular above the high-water mark, although the tide, which flows there seven feet, was then at half-ebb. The water immediately receded; and, after having fluctuated four or five times between high and low water mark, it subsided, and the sea remained calm as before. In the northern part of the island the inundation was more violent, the sea there retiring above one hundred paces at first, and suddenly returning, overflowed the shore, forcing open doors, breaking down the walls of several magazines and storehouses leaving great quantities of fish ashore and in the streets of the village of Machico. All this was the effect of one rising of the sea, for it never afterwards flowed high enough to reach the high-water mark. It continued, however, to fluctuate here much longer before it subsided

ſided than at Funchal; and in ſome places, farther to the weſtward, it was hardly, if it all, perceptible.

Theſe were the phenomena with which this remarkable earthquake was attended in thoſe places where it was violent. The effects of it, however, reached to an immenſe diſtance; and were perceived chiefly by the agitations of the waters, or ſome ſlight motion of the earth. The utmoſt boundaries of this earthquake to the ſouth are unknown; the barbarity of the African nations rendering it impoſſible to procure any intelligence from them, except where the effects were dreadful. On the north, however, we are aſſured, that it reached as far as Norway and Sweden. In many places alſo of Germany its effects were very perceptible. Throughout the Duchy of Holſtein, the waters were violently agitated, particularly thoſe of the Elbe and Trave. In Brandenburg, the water of a lake called Libſec ebbed and flowed ſix times in half an hour, with a dreadful noiſe, the weather being then perfectly calm. The ſame agitation was obſerved in the waters of the lakes called Muplgaſt and Netzo; but at this laſt place they alſo emitted an intolerable ſtench.

In Holland, the agitations were more remarkable. At Alphen on the Rhine, between Leyden and Woerden, in the afternoon of the firſt of November, the waters were agitated to ſuch a violent degree, that buoys were broken from their chains, large veſſels ſnapped their cables, ſmaller ones were thrown out of the water upon the land, and others lying on land were ſet afloat. At Amſterdam, about eleven in the forenoon, the air being perfectly calm, the waters were ſuddenly agitated in their canals, ſo that ſeveral boats broke looſe; chandeliers were obſerved to vibrate in the churches; but no motion the earth, or concuſſion of any building, was obſerved. At Haerlem, in the forenoon, for near four minutes together, not only the water in the rivers, canals, &c. but alſo all kinds of fluids in ſmaller quantities, as in coolers, tubs, backs, &c. were ſurpriſingly agitated, and daſhed over the ſides, though no motion was perceptible in the veſſels themſelves. In theſe ſmall quantities alſo the fluid apparently aſcended prior to its turbulent motion; and, in many places, even the rivers and canals roſe twelve inches perpendicular. At Leyden, between half an hour after ten and eleven in the forenoon, the waters roſe ſuddenly in ſome of the canals, and made ſeveral very ſenſible undulations, ſo that the boats were ſtrongly agitated.

Round the iſland of Corſica, the ſea was violently agitated, and moſt of the rivers of the iſland overflowed their banks.—In the city of Milan in Italy, and throughout that diſtrict, ſhocks were felt. At Turin in Savoy, there was felt a very violent ſhock.

In Switzerland, many rivers turned ſuddenly muddy without rain. The lake of Neufchatel ſwelled to the height of near two feet above its natural level for the ſpace of a few hours. An agitation was alſo perceived in the waters of the lake of Zurich.

At the iſland of Antigua, there was ſuch a ſea without the bar as had not been known in the memory of man; and, after it, all the water at the wharfs, which uſed to be ſix feet deep, was not two inches. —At Barbadoes, about two in the afternoon, the ſea ebbed and flowed in a ſurpriſing manner. It ran over the wharfs and ſtreets into the houſes, and continued thus ebbing and flowing till ten at night.

The agitation of the waters was perceived in great numbers of places in Great Britain and Ireland.—At Barlborough in Derbyſhire, between

between eleven and twelve in the forenoon, in a boat-house on the west side of a large body of water called Pibley Dam, supposed to cover at least thirty acres of land, was heard a surprising and terrible noise; a large swell of water came in a current from the south, and rose two feet on the sloped dam-head at the north end of the water. It then subsided; but returned again immediately, though with less violence. The water was thus agitated for three quarters of an hour; but the current grew every time weaker and weaker, till at last it entirely ceased.—At Busbridge in Surrey, at half an hour after ten in the morning, the weather being remarkably still, without the least wind, in a canal near seven hundred feet long and fifty-eight broad, with a small spring constantly running through it, a very unusual noise was heard at the east end, and the water there observed to be in great agitation. It raised itself in a heap or ridge in the middle; and this heap extended lengthwise about thirty yards, rising between two and three feet above the usual level. After this, the ridge heeled or vibrated towards the north side of the canal with great force, and flowed above eight feet over the grass walk on that side. On its return back into the canal, it again ridged in the middle, and then heeled with yet greater force to the south side, and flowed over its grass walk. During this latter motion, the bottom on the north side was left dry for several feet. This appearance lasted for about a quarter of an hour, after which the water became smooth and quiet as before. During the whole time, the sand at the bottom was thrown up and mixed with the water; and there was a continual noise like that of water turning a mill.—At Cobham in Surrey, between ten and eleven o'clock, a person was watering a horse at a pond fed by springs. Whilst the animal was drinking, the water suddenly ran away from him, and moved towards the south with such swiftness, that the bottom of the pond was left bare. It returned again with such impetuosity, that the man leaped backwards to secure himself from its sudden approach. The ducks were alarmed at the first agitation, and instantly flew all out of the pond.—At Dunstall in Suffolk, the water of a pond rose gradually for several minutes in the form of a pyramid, and fell down like a water-spout. Other ponds in the neighbourhood had a smooth flux and reflux from one end to the other.—Near the city of Durham, a gardener was alarmed by a sudden rushing noise from a pond, as if the head of the pond had been broken down: when casting his eye on the water, he saw it gradually rise up, without any fluctuating motion, till it reached a grate which stood some inches higher than the common water-level. After this it subsided, and then swelled again; thus continuing to rise and fall during the space of six or seven minutes, making four or five returns in the space of one minute. The pond was about forty yards long and ten broad.—At Earsy Court, Berks, about eleven o'clock, as a gardener was standing by a fish-pond, he felt a violent trembling of the earth, which lasted about a minute. Immediately after, he observed a motion of the water from the south to the north end of the pond, leaving the bottom at the south end altogether dry for about six feet. It then returned, and flowed at the south end, rising three feet up the slope bank; and immediately after returned to the north bank, rising there also about three feet. In the time between the flux and reflux, the water swelled up in the middle of the pond, collected in a ridge about twenty inches higher than

the level on each ſide, and boiled like a pot. This agitation from ſouth to north laſted about four minutes.—At Eaton-bridge, Kent, in a pond about an acre in ſize, a dead calm, and no wind ſtirring, ſome perſons heard a noiſe, and, imagining ſomething had been tumbling in, ran to ſee what was the matter. On their arrival at the pond, to their ſurpriſe they ſaw the water open in the middle, ſo that they could ſee a poſt a good way down, almoſt to the bottom. The water in the mean time daſhed up over a bank two feet high, and perpendicular to the pond. This was repeated ſeveral times with a great noiſe.—At Eyam-bridge, Derbyſhire (in the Peak), the overſeer of the lead-mines, ſitting in his writing-room about eleven o'clock, felt a ſudden ſhock, which very ſenſibly raiſed him up in his chair, and cauſed ſeveral pieces of plaſter to drop from the ſides of the room. The roof was ſo violently ſhaken, that he imagined the engine-ſhaft had been falling in. Upon this he immediately ran to ſee what was the matter, but found every thing in perfect ſafety. At this time two miners were employed in carting the ore and other materials to be raiſed up at the ſhafts. The drift in which they were working was about one hundred twenty yards deep, and the ſpace from one end to the other fifty yards or upwards. The miner at the end of the drift had juſt loaded his cart, and was drawing it along; but he was ſuddenly ſurpriſed by a ſhock, which ſo terrified him, that he immediately quitted his employment, and ran to the weſt end of the drift to his partner, who was no leſs terrified than himſelf. They durſt not attempt to climb the ſhaft, leſt that ſhould be running in upon them: but, while they were conſulting what means they ſhould take for their ſafety, they were ſurpriſed by a ſecond ſhock more violent than the firſt; which frightened them ſo much, that they both ran precipitately to the other end of the drift. They then went down to another miner who worked about twelve yards below them. He told them that the violence of the ſecond ſhock had been ſo great, that it cauſed the rocks to grind upon one another. His account was interrupted by a third ſhock, which, after an interval of four or five minutes, was ſucceeded by a fourth; and, about the ſame ſpace of time after, by a fifth; none of which were ſo violent as the ſecond. They heard, after every ſhock, a loud rumbling in the bowels of the earth, which continued about half a minute, gradually decreaſing, or ſeeming to remove to a greater diſtance.—At Shirburn-caſtle, Oxfordſhire, at a little after ten in the morning, a very ſtrange motion was obſerved in the water of a moat which encompaſſes the houſe. There was a pretty thick fog, not a breath of air, and the ſurface of the water all over the moat as ſmooth as a looking-glaſs, except at one corner, where it flowed into the ſhore, and retired again ſucceſſively, in a ſurpriſing manner. In what manner it began to move is uncertain, as nobody obſerved the beginning of its motion. The flux and reflux, when ſeen by Lord Viſcount Parker, were quite regular. Every flood began gently; its velocity increaſed by degrees, when at laſt it ruſhed in with great impetuoſity, till it had attained its full height.—At White Rock in Glamorganſhire, about two hours ebb of the tide, and near three quarters after ſix in the evening, a vaſt quantity of water ruſhed up with a prodigious noiſe; floated two large veſſels, the leaſt of them above two hundred tons; broke their moorings, drove them acroſs the river, and had like to have overſet them. The whole riſe and fall of this extraordinary

body

body of water did not last above ten minutes, nor was it felt in any other part of the river, so that it seemed to have gushed out of the earth at that place.

At Loch Lomond in Scotland, about half an hour after nine in the morning, all of a sudden, without the least gust of wind, the water rose against its banks with great rapidity, but immediately subsided, till it was as low in appearance as any body then present had ever seen it in the greatest summer-drought. A large stone lying at some distance from shore, but in such shallow water that it could easily be seen, was forced out of its place in the lake upon dry land, leaving a deep furrow in the ground all along the way in which it had moved.

At Kinsale, between two and three in the afternoon, the weather being very calm, and the tide near full, a large body of water suddenly poured into the harbour with such rapidity, that it broke the cables of two sloops, each moored with two anchors, and of several boats not very far from the town. But, just at the time that a great deal of mischief was apprehended by all the vessels running foul of each other, an eddy whirled them round several times, and then hurried them back again with the same rapidity as before. This was several times repeated; and, while the current rushed up at one side of the harbour, it poured down with equal violence at the other. A vessel that lay all this time in the pool did not seem to be any ways affected by it; nor was the violence of the currents much perceived in the deeper parts of the harbour, but raged with most violence on the flats. The bottom of the harbour, which is muddy, was much altered; the mud being washed from some places, and deposited in others. The waters did not rise gradually at first; but, with a hollow and horrid noise, rushed in like a deluge, rising six or seven feet in a minute, and as suddenly subsiding. They were as thick as puddle, very black, and stank intolerably.—From different accounts it appeared, that the water was affected in a similar manner all along the coast to the westward of Kinsale.

In France, shocks were perceived in several places; as at Bayonne, Bourdeaux, and Lyons. Commotions of the waters also were observed at Angoulesme, Bleville, Havre de Grace, &c. but not attended with the remarkable circumstances above mentioned.

These are the most striking phenomena with which the earthquake of November 1, 1755, was attended on the surface of the earth. Those which happened below ground cannot be known but by the changes observed in springs, &c. which were in many places very remarkable.—At Colares, on the afternoon of the 31st of October, the water of a fountain was greatly decreased: on the morning of the first of November it ran very muddy; and, after the earthquake, returned to its usual state both as to quantity and clearness. On the hills, numbers of rocks were split; and there were several rents in the ground, but none considerable. In some places where formerly there had been no water, springs burst forth, which continued to run.—Some of the largest mountains in Portugal were impetuously shaken as it were from their foundation; most of them opened at their summits, split and rent in a wonderful manner, and huge masses of them were thrown down into the subjacent valleys.—From the rock called Pedra de Alvidar, near the hill Fojo, a kind of parapet was broken off, which was thrown up from its foundation in the sea.—

At Varge, on the river Macaas, at the time of the earthquake, many ſprings of water burſt forth, ſome ſpouted to the height of eighteen or twenty feet, throwing up ſand of various colours, which remained on the ground. A mountainous point, ſeven or eight leagues from St. Ube's, cleft aſunder, and threw off ſeveral vaſt maſſes of rock.—In Barbary, a large hill was rent in two; the two halves fell different ways, and buried two large towns. In another place, a mountain burſt open, and a ſtream iſſued from it as red as blood. At Tangier, all the fountains were dried up, ſo that there was no water to be had till night.—A very remarkable change was obſerved on the medicinal waters of Toplitz, a village in Bohemia famous for its baths. Theſe waters were diſcovered in the year 762; from which time the principal ſpring of them had conſtantly thrown out hot water in the ſame quantity, and of the ſame quality. On the morning of the earthquake, between eleven and twelve in the forenoon, the principal ſpring caſt forth ſuch a quantity of water, that in the ſpace of half an hour all the baths ran over. About half an hour before this great increaſe of the water, the ſpring flowed turbid and muddy; then, having ſtopped entirely for a minute, it broke forth again with prodigious violence, driving before it a conſiderable quantity of reddiſh ochre. After this it became clear, and flowed as pure as before. It ſtill continues to do ſo; but the water is in greater quantity, and hotter, than before the earthquake. At Angouleſme in France, a ſubterraneous noiſe like thunder was heard; and preſently after the earth opened, and diſcharged a torrent of water mixed with red ſand. Moſt of the ſprings in the neighbourhood ſunk in ſuch a manner, that for ſome time they were thought to be quite dry. In England, no conſiderable alteration was obſerved in the earth, except that, near the lead-mine above mentioned in Derbyſhire, a cleft was obſerved about a foot deep, ſix inches wide, and one hundred and fifty yards in length.—At ſea, the ſhocks of this earthquake were felt moſt violently. Off St. Lucar, the captain of the Nancy frigate felt his ſhip ſo violently ſhaken, that he thought ſhe had ſtruck the ground; but, on heaving the lead, found he was in a great depth of water. Captain Clark from Denia, in N. Lat. 36. 24. between nine and ten in the morning, had his ſhip ſhaken and ſtrained as if ſhe had ſtruck upon a rock, ſo that the ſeams of the deck opened, and the compaſs was overturned in the binacle. The maſter of a veſſel bound to the American iſlands, being in N. Lat. 25°, W. Long. 40°, and writing in his cabin, heard a violent noiſe, as he imagined, in the ſteerage; and, while he was aſking what the matter was, the ſhip was put into a ſtrange agitation, and ſeemed as if ſhe had been ſuddenly jerked up and ſuſpended by a rope faſtened to the maſt-head. He immediately ſtarted up with great terror and aſtoniſhment; and, looking out at the cabin-window, ſaw land, as he took it to be, at the diſtance of about a mile. But, coming upon the deck, the land was no more to be ſeen, but he perceived a violent current croſs the ſhip's way to the leeward. In about a minute, this current returned with great impetuoſity, and at a league's diſtance he ſaw three craggy-pointed rocks throwing up water of various colours reſembling fire. This phenomenon, in about two minutes, ended in a black cloud, which aſcended very heavily. After it had riſen above the horizon, no rocks were to be ſeen; though the cloud, ſtill aſcending, was long viſible, the weather being extremely clear.—

Between

Between nine and ten in the morning, another ship, forty leagues west of St. Vincent, was so strongly agitated, that the anchors, which were lashed, bounced up, and the men were thrown a foot and an half perpendicularly up from the deck. Immediately after this, the ship sunk in the water as low as the main chains. The lead shewed a great depth of water, and the line was tinged of a yellow colour and smelt of sulphur. The shock lasted about ten minutes, but they felt smaller ones for the space of twenty-four hours.

Such were the phenomena of this very remarkable and destructive earthquake, which extended over a tract of at least four millions of square miles. The earthquakes, however, which in the year 1783 ruined a great part of Italy and Sicily, though much more confined in their extent, seem to have been not at all inferior in violence. From the most authentic reports and accounts received by his Sicilian majesty's secretary of state, it was learned, that the part of Calabria which had been most affected by this heavy calamity, is that comprehended between the 38th and 39th degree of latitude: that, the greatest force of the earthquake seemed to have exerted itself from the foot of those mountains of the Apennines called the Monte Dijo, Monte Sacro, and Monte Caulene, extending westward to the Tyrrhene sea: that the towns, villages, and farm-houses, nearest these mountains, situated either on the hills or the plain, were totally ruined by the shock of the 5th of February about noon: that, as the towns and villages were at a greater distance from this centre, the damage they received was less considerable; but that even these more distant towns had been greatly damaged by the subsequent shocks of the earthquakes, and effectually by those of the 7th, 26th, and 28th, of February, and that of the 1st of March; that, from the first shock of the 5th of February, the earth had been in a continual tremor; and that the shocks were more sensibly felt at times in some parts of the afflicted provinces than at others; that the motion of the earth had been either whirling like a vortex, horizontal, or by pulsations, or by beatings from the bottom upwards. This variety of motions increased the apprehensions of the miserable inhabitants, who expected every moment that the earth would open under their feet, and swallow them up. It was said also that the rains had been continued and violent, frequently accompanied with irregular and furious gusts of wind; and that from all these causes, the face of that part of Calabria comprehended between the 38th and 39th degrees was entirely altered, particularly on the western side of the mountains above mentioned: that many openings and cracks had been made in those parts; some hills had been much lowered, and others entirely swallowed up; deep chasms had been made, by which many roads were rendered impassable; huge mountains were split asunder, and parts of them driven to a considerable distance; deep valleys were filled up by the concourse of the mountains which formed them before; the course of the rivers were altered; many springs of water dried up, and new ones formed in their place. A singular phenomenon was said to have been observed at Laureana in Calabria Ultra; viz. that two whole tenements, with large plantations of olive and mulberry trees, situated in a valley perfectly level, had been detached by the earthquake, and transplanted, with the trees still remaining in their places, to the distance of about a mile from their first situations; and that from the spot on which they formerly

merly ſtood, hot water had ſprung up to a conſiderable height, mixed with ſand of a ferruginous nature: that near this place alſo ſome countrymen and ſhepherds had been ſwallowed up, with their teams of oxen, and their flocks of goats and ſheep. The number of lives loſt was eſtimated at 32,367; but Sir William Hamilton is of opinion, that, including ſtrangers, it could not be leſs than 40,000.

The fate of the inhabitants of Scilla was extremely affecting. On the firſt ſhock of the earthquake February 5th, they had fled along with their prince to the ſea-ſhore, where they hoped for ſafety; but in the night-time a furious wave (ſaid to have been boiling hot, and by which many people were alleged to have been ſcalded) overflowed the land for three miles, ſweeping off in its return 2473 of the inhabitants, (among whom was the prince himſelf,) who were at that time either on the ſtrand or in boats near the ſhore. But the moſt ſingular of all the phenomena enumerated in theſe accounts was, that a hill, about five hundred palms in height, and one thouſand three hundred in circumference at its baſis, jumped to the diſtance of about four miles from the place where it formerly ſtood. At the ſame time the hill on which the town of Oppido ſtood, which extended about three miles, parted in two; and, as its ſituation was between two rivers, both of theſe were of courſe ſtopped up; two great lakes were formed; and by their continual increaſe threatened to infect the air by their noxious exhalations.

Sir Wm. Hamilton, who made a tour of curioſity through the country that ſame year, ſet ſail, and landed on the 6th of May at the town of Pizzo in Calabria Ultra. Here he was aſſured, that the volcano of Stromboli, which is oppoſite, and in full view of the town, though diſtant about fifty miles, had ſmoked leſs and thrown up a ſmaller quantity of inflamed matter during the earthquakes than it had done for ſome years before; and that ſlight ſhocks ſtill continued to be felt. Sir William had ſoon a convincing proof that this laſt information was true; for, ſleeping that night in his boat, (called a Malteſe Speronara,) he was awakened with a ſmart ſhock, which ſeemed to lift up the bottom of the boat, but was not attended with any ſubterraneous noiſe.

From Pizzo he paſſed through a moſt beautiful country to Monteleone. Here Sir William had an opportunity of ſeeing many people who had been thrown down by the violence of the ſhocks. Several peaſants told him, that the motion of the earth was ſo violent, that the heads of the largeſt trees almoſt touched the ground from ſide to ſide; that during a ſhock, the horſes and oxen extended their legs wide aſunder, that they might not be thrown down; and that they gave evident ſigns of being ſenſible of the approach of each ſhock.

From Monteleone Sir William deſcended into the plain, having paſſed through many towns and villages which had been more or leſs ruined according to their vicinity to the plain. The town of Mileto, ſtanding in a bottom, was totally ruined, not a houſe being left ſtanding. At ſome diſtance he ſaw Soriano, and the noble Dominican convent, a heap of ruins. Paſſing through the ruined town of St. Pietro, in his way to Roſarno, he had a diſtant view of Sicily and the ſummit of Mount Etna, which then ſet forth a conſiderable ſmoke. Juſt before his arrival at Roſarno, he paſſed over the river Meſſano or Metauro on a ſtrong timber-bridge, ſeven hundred palms long, lately built by the duke of Monteleone. From the cracks made in

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the banks and in the bed of the river by the earthquake, it was quite separated in one part; and, the level on which the piers were placed having been variously altered, the bridge had taken an undulated form, so that the rail on each side was curiously scolloped; but, the separated parts having been joined again, it was then passable. Our author was also informed, that at the time of the earthquake the river was perfectly dry for some seconds, and then returned with violence and overflowed; and that the bridge undulated in a most extraordinary manner.

The town of Rosarno, with the duke of Monteleone's palace there, was entirely ruined; but the walls remained about six feet high, and were at that time fitting up as barracks. The only building that remained unhurt at Rosarno was the town-gaol, in which were three notorious villains, who would probably have lost their lives if they had been at liberty.

From Rosarno Sir William proceeded to Laureana, where he was conducted to the place above described, where the two tenements were said to have exchanged situations. In this neighbourhood were several cracks, none of them above a foot wide; but our author was assured, that during the earthquake they had opened very wide, and swallowed up an ox with near one hundred goats.

Passing through the same beautiful country to the town of Polistene, he did not perceive a single house standing. "I travelled (says he) four days in the plain, in the midst of such misery as cannot be described. The force of the earthquake there was so great, that all the inhabitants of the towns were buried, alive or dead, in the ruins of their houses in an instant. The town of Polistene was large, but ill situated between two rivers that were subject to overflow. Two thousand one hundred, out of six thousand, lost their lives here on the fatal 5th of February." At Casal Nuova, the princess Gerace Grimaldi, with four thousand of her subjects, perished on the same day by the explosion; for such it appears to have been. Some who had been dug alive out of the ruins, told our author, that they had felt their houses fairly lifted up, without having the least previous notice. An inhabitant of Casal Nuova was at that moment on a hill overlooking the plain; when, feeling the shock, and turning round, instead of the town he saw only a thick cloud of white dust-like smoke, the natural effect of the crushing of the buildings and the mortar flying off.

The town of Casal Nuova was so effectually destroyed by this dreadful shock, that neither vestige of house or street remained, but all lay in one confused heap of ruins. Castillace and Milicusco, which our author next visited, were both in the same situation. Terra Nuova, situated in the same plain, stood between two rivers, which, with the torrents from the mountains, had, in the course of ages, cut deep and wide chasms in the soft sandy clay soil of which it is composed. At Terra Nuova the ravine or chasm is not less than five hundred feet deep, and three quarters of a mile broad. Here the accounts of the earthquake were confused, by not having the situation of the place and nature of the soil explained. It was said, that a town had been thrown a mile from the place on which it stood, without mentioning a word of the ravine; that woods and cornfields had been removed in the same manner, "when in truth (says our author) it was but upon a large scale what we see every day

upon a ſmaller; when pieces of the ſides of hollow ways, having been undermined by rain waters, are detached by their own weight. Here, from the great depth of the ravine, and the violent motion of the earth, two huge portions of the latter, on which a great part of the town ſtood, which conſiſted of ſome hundred houſes, had been detached into the ravine, and nearly acroſs it, at about the diſtance of half a mile from the place where they formerly ſtood; and what is very extraordinary, many of the inhabitants who had taken this ſingular leap in their houſes were nevertheleſs dug out alive, and ſome unhurt." Our author's guide, there, who was both a prieſt and phyſician, having been buried in the ruins of his houſe by the firſt ſhock, was blown out of it and delivered by the ſecond, which immediately followed the firſt; and there were many well-atteſted inſtances of the ſame thing having happened in different parts of Calabria. At Terra Nuova, however, only four hundred out of one thouſand ſix hundred inhabitants were left alive.

In other parts of the plain, ſituated near the ravine, and near the town of Terra Nuova, our author ſaw many acres of land, with trees and corn-fields, that had been detached into the ravine, frequently without having been overturned; ſo that the crops were growing as well as if they had been planted there. Other ſuch pieces were lying in the bottom in an inclined ſituation; and others again that had been quite overturned. In one place, two of theſe immenſe pieces of land, having been detached oppoſite to one another, had filled the valley, and ſtopped the courſe of the river, the waters of which were forming a great lake; "and this (ſays our author) is the true ſtate of what the accounts mention of mountains that had walked, and joined together, ſtopped the courſe of a river, and formed a lake."

At the moment of the earthquake the river diſappeared as at Roſarno; and, returning ſoon after, overflowed the bottom of the ravine about three feet in depth; ſo that the poor people who had been thrown with their houſes into the ravine from the top of it, and had eſcaped with broken bones, were now in danger of being drowned. Our author was aſſured, that the water was ſalt like that of the ſea; but this circumſtance ſeemed to want confirmation. The ſame cauſe, however, given for the ſudden diſappearing of the river Metauro at Roſarno will account for the like phenomenon here, and in every part of the country where the rivers were dried up at the moment of the earthquake.

The whole town of Mollochi di Sotto was likewiſe detached into the ravine, and a vineyard of many acres lay near it in the bottom in perfect order, but in an inclined ſituation. There was a foot-path through this vineyard which had a ſingular effect in its then impracticable ſituation. Some water-mills which were on the river, being jammed between two ſuch detached pieces as above deſcribed, were lifted up by them, and were then to be ſeen on an elevated ſituation many feet above the level of the river.

In ſeveral parts of the plain, the ſoil, with timber-trees and crops of corn, conſiſting of many acres, had ſunk eight and ten feet below the level of the plain, and riſen as many in other places. To explain this, it is neceſſary to remark, that the ſoil of the plain is a clay mixed with ſand, which is eaſily moulded into any ſhape. In the plain, near the ſpots where the above-mentioned pieces had been detached into the ravine, there were ſeveral parallel cracks; ſo that, had

had the violence of the earthquake continued, these pieces would also probably have followed. It was constantly remarked by our author, that near every ravine, or hollow way, the parts of the plain adjoining were full of large parallel cracks. The earth rocking from side to side, and being supported only on one side, accounts very well for this circumstance.

From Terra Nuova our author continued his journey to Oppido. This city stands on a mountain of a ferruginous sort of gritty stone, unlike the clay soil of its neighbourhood; and is surrounded by two rivers in a ravine deeper and broader than that at Terra Nuova. Here, a countryman, who was ploughing his field with a pair of oxen, was transported with his field and team clear from one side of the ravine to the other, and neither he nor his oxen were hurt.

"Having walked over the ruins of Oppido (says Sir William), I descended into the ravine, and examined carefully the whole of it. Here I saw indeed the wonderful force of the earthquake, which has produced exactly the same effects as those described in the ravine at Terra Nuova, but on a scale infinitely greater. The enormous masses of the plain, detached from each side of the ravine, lie sometimes in confused heaps, forming real mountains, and, having stopped the course of two rivers (one of which is very considerable), great lakes are already formed; and if not assisted by nature or art, so as to give the rivers their due course, must infallibly be the cause of a general infection in the neighbourhood. Sometimes I met with a detached piece of the surface of the plain (of many acres in extent) with the large oaks and olive-trees, with corn or lupins under them, growing as well and in as good order at the bottom of the ravine as their companions from whence they were separated do on their native soil, at least five hundred feet higher, and at the distance of about three quarters of a mile. I met with whole vineyards in the same order in the bottom that had likewise taken the same journey. As the banks of the ravine from whence these pieces came are now bare and perpendicular, I perceived that the upper soil was a reddish earth, and the under one a sandy white clay, very compact, and like a soft stone. The impulse these huge masses received, either from the violent motion of the earth alone, or that assisted with the additional one of the volcanic exhalations set at liberty, seems to have acted with greater force on the lower and more compact stratum than on the upper cultivated crust: for I constantly observed, where these cultivated lands lay, the under stratum of compact clay had been driven some hundred yards farther, and lay in confused blocks; and, as I observed, many of these blocks were in a cubical form. The under soil having had a greater impulse, and leaving the upper in its flight, naturally accounts for the order in which the trees, vineyards, and vegetation, fell, and remain at present in the bottom of the ravine."

From Oppido Sir William proceeded to the towns of Seminara and Palmi. The former, being situated higher up, had suffered less than Palmi which stood nearer the sea. Fourteen hundred lives were lost at this place, and some singular circumstances occurred. The town being a great market for oil, there were upwards of four thousands barrels of that liquid in it at the time of its destruction; so that, by the breaking of these barrels and jars, a rivulet of oil ran from the ruins for many hours into the sea. Here our author was informed by the person who conducted him, that he had been buried in the

ruins of his houſe by the firſt ſhock; and that after the ſecond, which followed immediately, he found himſelf ſitting aſtride a beam at leaſt fifteen feet high in the air. After Sir William's departure from Palmi, in going through one of the narrow paſſes among the mountains of Bagnara and Solano, he felt a very ſmart ſhock of an earthquake attended with a loud exploſion like that of ſpringing a mine; but fortunately it did not detach any rocks or trees from the high mountains which hung over their heads. In this country he was aſſured by ſeveral fiſhermen, that during the earthquake on the 5th of February, at night, the ſea was hot, and that they ſaw fire iſſue from the earth in many parts. This laſt circumſtance was frequently repeated in different parts of the plain, ſo that there ſeems to remain no doubt of its authenticity. The idea of Sir William Hamilton is, that "the exhalations which iſſued during the violent commotions of the earth were full of electrical fire; juſt as the ſmoke of volcanoes conſtantly is during violent eruptions: for I ſaw no mark (ſays he,) in any part of my journey, of any volcanic matter having iſſued from the fiſſures of the earth; and I am convinced that the whole has been done by vapours and exhalations only. The firſt ſhock felt at this place, as I was aſſured, was lateral, and then vorticoſe, and exceedingly violent; but what they call violent here muſt have been nothing in compariſon of what was felt in the plain of Caſa Nuova, Poliſtene, Palmi, Terra Nuova, Oppido, &c.&c. where all agreed that the violence of the fatal ſhock of February was inſtantaneous, without warning, and from the bottom upwards."

At Reggio the ſhock had been much leſs violent than in the places hitherto viſited by our author; and, "though there was not a houſe in it inhabited or habitable, yet (ſays he) after having been ſeveral days in the plain, where every building is levelled with the ground, a houſe with a roof, or a church with a ſteeple, was to me a new and refreſhing object." He was here informed, that all animals and birds are in a greater or ſmaller degree much more ſenſible of an approaching ſhock of an earthquake than any human being; but that dogs and geeſe, above all, ſeem to be the ſooneſt and moſt alarmed at the approach of a ſhock: if in the water, they quit it immediately; and there are no means of driving them into it for ſome time after; and the howlings of the dogs in the ſtreets of Meſſina were ſo loud, that orders were iſſued to kill them. The ſhock which damaged Reggio came on gently, ſo that the people had time to make their eſcape, and only one hundred and twenty-ſix were killed; but in the plain this ſhock was as inſtantaneous as it was violent and deſtructive.

On the 14th of May, Sir William Hamilton, having taken leave of Reggio, ſet ſail for Meſſina, where he found that the ſhock had been far inferior to what he had ſeen the effects of in other places.

Notwithſtanding this comparative mildneſs, however, the miſchief had been very terrible. All the beautiful front of the palazzate, which extended in very lofty uniform buildings, in the ſhape of a crescent, had been in ſome parts totally ruined, in others leſs; and there were cracks in the earth of the quay, a part of which had ſunk above a foot below the level of the ſea It is ſaid, that during the earthquake fire had been ſeen to iſſue from the cracks of the quay; but our author is perſuaded that this, as in other caſes, was only a vapour charged with electrical fire or a kind of inflammable air. Here alſo he was informed, that the ſhock of the 5th of February had been

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from the bottom upwards; but the subsequent ones generally horizontal or vorticose. A remarkable circumstance was observed at Messina, and through the whole coast of Calabria, which had been most affected by the earthquake, viz. that a small fish called cicirelli, resembling the English white-bait, but larger, and which usually lie at the bottom of the sea buried in the sand, had, ever after the commencement of the earthquakes to the time this account was written, continued to be taken near the surface, and that in such abundance as to be common food for the poorest sort of people; whereas before the earthquakes this fish was rare, and reckoned among the greatest delicacies. Fish of all kinds also were taken in greater abundance on these coasts after the commencement of the earthquakes than before; which Sir William supposes to have been occasioned either by the volcanic matter having heated the bottom of the sea, or that the continual tremor of the earth had forced them out of their retreats. At Messina our author was likewise informed, that on the 5th of February, and for three days following, the sea about a quarter of a mile from the citadel rose and boiled in an extraordinary manner, and with a most horrid and alarming noise; the water in other parts of the strait being perfectly calm.

The earthquakes were not perfectly settled even in 1784, when Sir William Hamilton wrote the account of the state of Vesuvius, &c. to the Royal Society. In a postscript to that letter he adds the following confirmation of his conjecture, that the volcanic matter, which he supposed to have occasioned the earthquakes, had vented itself at the bottom of the sea betwixt Calabria and Sicily. "The pilot of one of his Sicilian majesty's sciabecques having some time after the earthquakes cast anchor off the point of Palizzi, where he had often anchored in twenty-five fathom water, found no bottom till he came to sixty-five; and, having sounded for two miles out at sea towards the point of Spartivento in Calabria, he still found the same considerable alteration in the depth. The inhabitants of Palizzi likewise declare, that during the great earthquake on the 5th of February 1783, the sea had boiled and frothed up tremendously off their point."

To explain the phenomena of earthquakes, various hypotheses have been invented. Till lately, the hypotheses of modern philosophers were much the same with those of the ancients. Anaxagoras supposed the cause of earthquakes to be subterraneous clouds bursting out into lightning, which shook the vaults that confined them. Others imagined, that the arches, which had been weakened by continual subterraneous fires, at length fell in. Others derived these accidents from the rarefied stream of waters, heated by some neighbouring fires; and some, among whom was Epicurus, and several of the Peripatetic school, ascribed these terrible accidents to the ignition of certain inflammable exhalations.

This last hypothesis has been adopted by many of the most celebrated moderns, at Gassendus, Kircher, Schottus, Varenius, Des Cartes, Du Hamel, Honorius, Fabri, &c. The philosopher last mentioned indeed supposed, that waters prodigiously rarefied by heat might sometimes occasion earthquakes. The others supposed, as their hypothesis necessarily requires, that there are many and vast cavities under ground which have a communication with one another: some of which abound with waters; others with vapours and ex-

halations, arising from inflammable substances, as nitre, bitumen, sulphur, &c. These combustible exhalations they supposed to be kindled by a subterraneous spark, or by some active flame gliding through a narrow fissure from without, or by the fermentation of some mixture; and when this happened, they must necessarily produce pulses, tremors, and ruptures, at the surface, according to the number and diversity of the cavities, and the quantity and activity of the inflammable matter. This hypothesis is illustrated by a variety of experiments, such as mixtures of iron-filings and brimstone buried in the earth, gun-powder confined in pits, &c. by all which a shaking of the earth will be produced.

Though none of these hypotheses were sufficient for explaining the phenomena of earthquakes in a satisfactory manner, one or other of them continued to be adopted by almost all philosophers till the year 1749. In the month of March that year, an earthquake was felt at London and several other places in Britain. Dr. Stukeley, who had been much engaged in electrical experiments, began to suspect that phenomena of this kind ought to be attributed not to vapours or fermentations, generated in the bowels of the earth, but to electricity. In a paper published by him on this subject, he rejects all the above-mentioned hypotheses, and says, he had always thought that an earthquake was a shock of the same kind as those which commonly occur in electrical experiments. And this hypothesis was confirmed by the phenomena attending earthquakes; particularly those of 1749 and 1750, which gave rise to his publication.

The weather, for five or six months before, had been uncommonly warm; the wind south and south-west, without rain; so that the earth must have been in a state peculiarly ready for an electrical shock. The flat country of Lincolnshire had been under an exceeding great drought. The uncommonness of the first of these circumstances, he remarks, is the reason why earthquakes are less frequently experienced in the northern than in the southern regions of the world, where the warmth and dryness of the air, so necessary to electricity, are more usual:—And the latter shews how fit the dry surface was for an electrical vibration; and (which is of great importance) that earthquakes reach but little below the surface of the earth. Before the earthquake at London, all vegetables had been uncommonly forward. And electricity is well known to quicken vegetation. The aurora borealis had been frequent about that time; and, just before the earthquake, had been twice repeated in such colours as had never been seen before. It had also removed southerly, contrary to what is common in England; so that the Italians, and those among whom earthquakes were frequent, actually foretold the earthquake. The year had been remarkable for fire-balls, lightning, and coruscations; and these are rightly judged to be meteors of an electrical nature. In these circumstances of the earth and air, nothing, he says, is wanting to produce an earthquake, but the touch of some non-electric body; which must necessarily be had *ab extra* from the region of the air or atmosphere. Hence he infers, that if a non-electric cloud discharge its contents upon any part of the earth, in that highly-electrical state, an earthquake must necessarily ensue. As the discharge from an excited tube produces a commotion in the human body, so the discharge of electric matter from the compass of many miles of solid earth must needs be an earthquake;

quake; and the ſnap from the contact, the horrid uncouth noiſe attending it. The doctor had been informed by thoſe who were up and abroad the night preceding the earthquake, and early in the morning, that coruſcations in the air were extremely frequent; and that, a little before the earthquake, a large black cloud ſuddenly covered the atmoſphere, which probably occaſioned the ſhock by the diſcharge of a ſhower. A ſound was obſerved to roll from the Thames towards Temple Bar before the houſes ceaſed to nod, juſt as the electrical ſnap precedes the ſhock. This noiſe (which generally precedes earthquakes) the doctor thought could be accounted for only on electrical principles: for, in a ſubterraneous eruption, the direct contrary would happen. The flames and ſulphureous ſmells, which are ſometimes obſerved in earthquakes, might, he thought, be more eaſily accounted for, on the ſuppoſition of their being electrical phenomena, than from their being occaſioned by eruptions from the bowels of the earth. So alſo the ſuddenneſs and expedition of the concuſſion, it being felt at the ſame inſtant over ſuch a large ſurface, ſufficiently point out what ſort of a motion it is: not a convulſion of the bowels of the earth; but an uniform vibration along its ſurface, like that of a muſical ſtring, or a glaſs when rubbed on the edge with one's finger. The circumſtance of earthquakes chiefly affecting the ſea-coaſt, places along rivers and ponds, (and, adds Doctor Prieſtley, eminences,) is a farther argument of their being electrical phenomena. This is illuſtrated by a particular account of the direction in which the earthquake was conveyed. The laſt argument he uſes is taken from the effects which it had on perſons of weak conſtitutions, who were, for a day or two after it happened, troubled with pains in the back, rheumatiſms, hyſterics, and nervous diſorders; juſt in the ſame manner as they would have been after an actual electrification: to ſome theſe diſorders proved fatal. The ſame hypotheſis was advanced by Signior Beccaria, without knowing any thing of Dr. Stukeley's diſcoveries; and the ſame hath been ſince fully confirmed by the experiments of the learned and ingenious Dr. Prieſtley.

The only power with which we are acquainted, and which is capable of producing earthquakes, then, being that of the electrical fluid, it only remains to conſider what uſes they may be thought to anſwer in the ſyſtem of nature. As they are the effects of the very higheſt natural power, it cannot be ſuppoſed that they are produced merely for the purpoſes of deſtruction; and, on the other hand, as they certainly do a great deal of miſchief, it ſeems as difficult to aſſign any benevolent purpoſe they can anſwer. It is very generally ſuppoſed, indeed, that earthquakes are the means by which nature raiſes mountains and land from the bottom of the ſea; but this can never be admitted. We have many inſtances of mountains being ſwallowed up and loſt by earthquakes, but not a ſingle well-atteſted one of a mountain being raiſed by them; and even when volcanoes are taken into the account, by which ſome mountains and iſlands have certainly been raiſed, the balance appears againſt them, and more land ſeems to have been ſunk by them than ever was raiſed. It ſeems moſt probable that earthquakes are accidental, and that the miſchief they do is to prevent a greater evil. This we ſee takes place throughout the whole ſyſtem of nature. Thunder and lightning, violent rains, ſtorms of wind, &c. are all productive of much damage

damage on certain occasions; but we by no means suppose these phenomena to take place merely for destruction; and therefore we name such effects accidents. To the same account, though on a larger scale, must we place earthquakes; and it only now remains to consider what are the disasters still more terrible than earthquakes, which we should have occasion to dread, did they not interpose to prevent them. These evils are naturally to be dreaded from any general commotion of the electric fluid dispersed through the whole globe of earth. That it does pervade it to the centre, is what we can have no reason to doubt; but in the internal parts it seems to lie dormant, or to be employed in operations which never manifest themselves to us. Towards the surface it is manifestly set in motion by the light of the sun; which is the very same fluid. This produces a constant current through the bowels of the earth from the equator towards the poles; for, as the equatorial parts absorb more of the light than those farther south or north, it must naturally be driven out in the northern and southern regions in proportion to the quantity absorbed at the equator. In what manner earthquakes are then produced by it, has already been explained at length. They are the shocks occasioned by its passing in great quantity from one place where it is pressed and confined, to another from which it has a free passage; or from a part of the earth positively electrified, to one that is negatively so. Let us suppose, however, that such obstructions are thrown in its way, that it cannot get out of the earth by any passage. The consequence of this must very soon be, that the motion of the light acting upon the equatorial parts would be propagated through the whole globe; and this would be productive of consequences much more terrible than any we can conceive. We see that, by setting it in motion in a small part of the atmosphere or of the earth, the most violent effects ensue; but, should this tremendous fluid be obliged to put forth all its strength, the earth must be shaken from the centre. Instead of plantations and little hills removed from their places, as in Calabria, it is more than probable that the largest islands and continents would be detached from their bases, or perhaps an universal dissolution ensue. Happily, however, such an effect never can take place, because the electric matter always vents itself by the superficial parts; for the depths to which even the causes of earthquakes and volcanoes descend, are undoubtedly superficial in comparison of the vast thickness of the body of the earth itself. The great bulk of electric fluid therefore lies quietly in the central parts; and is never moved by the commotions of that which lies on the surface, any more than the water at the bottom of the ocean is moved by the storms which ruffle the upper part.

In the earthquakes in Calabria, the progress of the electric matter northward might be traced both through the bowels of the earth and through the atmosphere. The great shocks happened in the month of February, but continued more or less through the whole summer. It was observed that Stromboli smoked less than usual, and no particular eruption happened either of Ætna or Vesuvius. This shewed that the electric matter was going somewhere else; nor was it long in discovering the course it had taken. In the beginning of summer a violent volcanic eruption took place in Greenland; its extent and power, however, were not known; but in the beginning of June a volcanic earthquake commenced in Iceland, and continued for

for eleven days without intermission. This was followed by the most extraordinary effusion of lava recorded in history, which continued till the 12th of August. All this time there were violent and numerous thunder-storms, first in the southern and then in the more northerly parts of Europe; the air was covered with a never-ceasing haze, not of a moist nature, as our author in the Journal de Physique supposes, and which he absurdly says dried the grapes in Burgundy, but plainly of some other kind, and which prevented the light of the sun from having its usual effect. Six days after the immense volcanic eruption in Iceland had ceased, the great meteor made its appearance, which no doubt was the very same quantity of electric matter, that had raised such horrid commotions in the earth and atmosphere, returning through the higher spaces to the south, from whence it had originally proceeded.

DREADFUL DEVASTATIONS OF THE LOCUSTS.

THE annals of most of the warm countries are filled with accounts of the devastations produced by locusts, who sometimes make their appearance in clouds of vast extent. They seldom visit Europe in such swarms as formerly; yet in the warmer parts of it are still formidable.—Those, which have at uncertain intervals visited Europe in our memory, are supposed to have come from Africa: they are a large species about three inches long. The head and horns are of a brownish colour; it is blue about the mouth, as also on the inside of the larger legs. The shield which covers the back is greenish; and the upper side of the body brown, spotted black, and the under side purple. The upper wings are brown, with small dusky spots, and one larger spot at the tips. The under wings are more transparent, and of a light brown tinctured with green, but there is a dark cloud of spots near the tips.—These insects are bred in the warm parts of Asia and Africa, from whence they have often taken their flight into Europe, where they committed terrible devastations. They multiply faster than any other animal in the creation, and are truly terrible in the countries where they breed. Some of them were seen in different parts of Britain in the year 1748, and great mischiefs were apprehended: but, happily for us, the coldness of our climate, and the humidity of our soil, are very unfavourable to their production; so that, as they are only animals of a year's continuance, they all perished without leaving a young generation to succeed them.

When the locusts take the field, it is said they have a leader at their head, whose flight they observe, and pay a strict regard to all his motions. They appear at a distance like a black cloud, which, as it approaches, gathers upon the horizon, and almost hides the light of day. It often happens, that the husbandman sees this imminent calamity pass away without doing him any mischief; and the whole swarm proceeds onward to settle upon some less fortunate country. In those places, however, where they alight, they destroy every green thing, stripping the trees of their leaves, as well as devouring the corn and grass. In the tropical climates they are not so pernicious as in the more southern parts of Europe. In the first, the power of vegetation is so strong, that an interval of three or four days repairs the damage; but in Europe this cannot be done till next year.

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Besides, in their long flights to this part of the world, they are famished by the length of their journey, and are therefore more voracious wherever they happen to settle. But as much damage is occasioned by what they destroy as by what they devour. Their bite is thought to contaminate the plant, and either to destroy or greatly to weaken its vegetation. To use the expression of the husbandmen, they burn wherever they touch, and leave the marks of their devastation for three or four years ensuing. When dead, they infect the air in such a manner that the stench is insupportable.—Orosius tell us, that in the year of the world 3800, Africa was infested with a multitude of locusts. After having eaten up every thing that was green, they flew off and were drowned in the sea; where they caused such a stench as could not have been equalled by the putrefying carcases of 100,000 men.

In the year 1650, a cloud of locusts was seen to enter Russia in three different places; and from thence they spread themselves over Poland and Lithuania in such astonishing multitudes, that the air was darkened and the earth covered with their numbers. In some places they were seen lying dead, heaped upon each other to the depth of four feet; in others, they covered the surface like a black cloth; the trees bent with their weight, and the damage which the country sustained exceeded computation.

In Barbary, their numbers are formidable; and Dr. Shaw was a witness of their devastations there in 1724. Their first appearance was in the latter end of March, when the wind had been southerly for some time. In the beginning of April, their numbers were so vastly increased, that, in the heat of the day, they formed themselves into large swarms that appeared like clouds, and darkened the sun. In the middle of May they began to disappear, retiring into the plains to deposit their eggs. In June the young brood began to make their appearance, forming many compact bodies of several hundred yards square; which afterwards, marching forward, climbed the trees, walls, and houses, eating every thing that was green in their way. The inhabitants, to stop their progress, laid trenches all over their fields and gardens, which they filled with water. Some placed large quantities of heath, stubble, and such like combustible matter, in rows, and set them on fire on the approach of the locusts. But all this was to no purpose; for the trenches were quickly filled up, and the fires put out by the great numbers of swarms that succeeded each other. A day or two after one of these was in motion, others that were just hatched came to glean after them, gnawing off the young branches, and the very bark of the trees. Having lived near a month in this manner, they arrived at their full growth, and threw off their worm-like state, by casting their skins. To prepare themselves for this change, they fixed their hinder part to some bush or twig, or corner of a stone, when immediately, by an undulating motion used on this occasion, their heads would first appear, and soon after the rest of their bodies. The whole transformation was performed in seven or eight minutes time, after which they remained for a little while in a languishing condition; but as soon as the sun and air had hardened their wings, and dried up the moisture that remained after casting off their sloughs, they returned to their former greediness, with an addition both of strength and agility. But they did not long continue in this state before they were

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entirely dispersed. After laying their eggs, they directed their course northward, and probably perished in the sea.—In that country, however, the amazing fertility of the soil and warmness of the climate generally render the depredations of these insects of little consequence; besides that many circumstances concur to diminish their number. Though naturally herbivorous, they often fight with each other, and the victor devours the vanquished. They are the prey, too, of serpents, lizards, frogs, and the carnivorous birds. They have been found in the stomachs of the eagle and different kinds of owls. They are also used as food by the Moors; who go to hunt them, fry them in oil or butter, and sell them publicly at Tunis and other places.

In 1754, 1755, 1756, and 1757, great devastations were committed in Spain by a species of locusts, of which we have the following description by Don Guillermo Bowles, published in Dillon's Travels through that country. "The locusts are continually seen in the southern parts of Spain, particularly in the pastures and remote uncultivated districts of Estramadura, but in general are not taken notice of, if not very numerous, as they commonly feed upon wild herbs, without preying upon gardens and cultivated lands, or making their way into houses. The peasants look at them with indifference while they are frisking about in the field, neglecting any measure to destroy them till the danger is immediate and the favourable moment to remedy the evil is elapsed. Their yearly number is not very considerable, as the males are far more numerous than the females. If an equal proportion were allowed only for ten years, their numbers would be so great as to destroy the whole vegetative system. Beasts and birds would starve for want of subsistence, and even mankind would become a prey to their ravenous appetites. In 1754, their increase was so great from the multitude of females, that all La Mancha and Portugal were covered with them and totally ravaged. The horrors of famine were spread even farther, and assailed the fruitful provinces of Andalusia, Murcia, and Valencia.

"The amours of these creatures are objects of surprise and astonishment, and their union is such that it is difficult to separate them. When this separation is voluntary, after having lasted some hours, they are so exhausted, that the male retires immediately to the water for refreshment, where, losing the use of his limbs, he soon perishes, and becomes an easy prey to the fish; having given life to his offspring at the expence of his own. The female, disembarrassed, though not without violent struggles, spends the remainder of her days in some solitary place, busy in forming a retreat under ground, where she can secure her eggs, of which she generally lays about forty, screening them by her sagacity from the intemperature of the air, as well as the more immediate danger of the plough or the spade, one fatal blow of which would destroy all the hopes of a rising generation.

"The manner of her building this cell is equally surprising. In the hinder part of her body, nature has provided her with a round smooth instrument, eight lines in length, which at its head is as big as a writing-quill, diminishing to a hard sharp point, hollow within like the tooth of a viper, but only to be seen with a lens. At the root of this vehicle there is a cavity, with a kind of bladder, containing a glutinous matter, of the same colour, but without the con-

sistency or tenacity, of that of the silk-worm, as I found by an experiment, made for the purpose, by an infusion in vinegar, for several days, without any effect. The orifice of the bladder corresponds exactly with the instrument which serves to eject the glutinous matter. It is hid under the skin of the belly, and its interior surface is united to the moveable parts of the belly, and can partake of its motions, forming the most admirable contexture for every part of its operations, as she can dispose of this ingredient at pleasure, and eject the fluid, which has three very essential properties: first, being indissoluble in water, it prevents its young from being drowned; next, it resists the heat of the sun, otherwise the structure would give way and destroy its inhabitants; lastly, it is proof against the frost of winter, so as to preserve a necessary warmth within. For greater security, this retreat is always contrived in a solitary place: for, though a million of locusts were to light upon a cultivated field, not one would deposit her eggs there; but, wherever they meet a barren and lonesome situation, there they are sure to repair and lay their eggs.

"These locusts seem to devour, not so much from a ravenous appetite, as from a rage of destroying every thing that comes in their way. It is not surprising, that they should be fond of the most juicy plants and fruits, such as melons, and all manner of garden fruits and herbs, and feed also upon aromatic plants, such as lavender, thyme, rosemary, &c. which are so common in Spain, that they serve to heat ovens: but it is very singular, that they equally eat mustard-seed, onions, and garlic; nay even hemlock, and the most rank and poisonous plants, such as the thorn-apple and deadly night-shade. They will even prey upon crowfoot, whose causticity burns the very hides of beasts; and such is their universal taste, that they do not prefer the innocent mallow to the bitter furze, or rue to worm-wood, consuming all alike, without predilection or favour; with this remarkable circumstance, that, during the four years they committed such havock in Estramadura, the love-apple, or *lycopersicon solanum* of Linnæus, was the only plant that escaped their rapacious tooth, and claimed a respect to its root, leaves, flowers, and fruit. Naturalists may search for their motives which I am at a loss to discover; the more as I saw millions of them light on a field near Almaden, and devour the woollen and linen garments of the peasants, which were lying to dry on the ground. The curate of the village, a man of veracity, at whose house I was, assured me, that a tremendous body of them entered the church, and devoured the silk garments that adorned the images of the saints, not sparing even the varnish on the altars. The better to discover the nature of such a phenomenon, I examined the stomach of the locust, but only found one thin and soft membrane, with which, and the liquor it contains, it destroys and dissolves all kind of substances, equally with the most caustic and venomous plants; extracting from them a sufficient and salutary nourishment.

"Out of curiosity to know the nature of so formidable a creature, I was urged to examine all its parts with the utmost exactness; its head is of the size of a pea, though longer, its forehead pointing downwards like the handsome Andalusian horse, its mouth large and open, its eyes black and rolling, added to a timid aspect not unlike a hare. With such a dastardly countenance, who would imagine this creature to be the scourge of mankind! In its two jaws it has

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four incisive teeth, whose sharp points traverse each other like scissars, their mechanism being such as to gripe or to cut. Thus armed, what can resist a legion of such enemies? After devouring the vegetable kingdom, were they, in proportion to their strength and numbers, to become carnivorous like wasps, they would then be able to destroy whole flocks of sheep, even to the dogs and shepherds; as we are told of ants in America, that will overcome the fiercest serpents.

"The locust spends the months of April, May, and June, in the place of its birth: at the end of June its wings have a fine rose-colour, and its body is strong. Being then in their prime, they assemble for the last time, and burn with a desire to propagate their species: this is observed by their motions, which are unequal in the two sexes. The male is restless and solicitous; the female is coy, and eager after food, flying the approaches of the male, so that the morning is spent in the courtship of the one and the retreat of the other. About ten o'clock, when the warmth of the sun has cleared their wings from the dampness of the night, the females seem uneasy at the forwardness of the males, who continuing their pursuit, they rise together five hundred feet high, forming a black cloud that darkens the rays of the sun. The clear atmosphere of Spain becomes gloomy, and the finest summer-day of Estramadura more dismal than the winter of Holland. The rustling of so many millions of wings in the air, seems like the trees of a forest agitated by the wind. The first direction of this formidable column is always against the wind, which if not too strong, the column will extend about a couple of leagues. The locusts then make a halt, when the most dreadful havock begins; their sense of smell being so delicate, they can find at that distance a corn-field or a garden, and, after demolishing it, rise again in pursuit of another: this may be said to be done in an instant. Each seems to have, as it were, four arms and two feet: the males climb up the plants, as sailors do the shrouds of a ship, and nip off the tendrest buds, which fall to the females below.

"Many old people assured me, when so much mischief was done in 1754, it was the third time in their remembrance, and that they always are found in the pasture-grounds of Estramadura, from whence they spread into the other provinces of Spain. They are certainly indigenous, being of a different shape from those of the north or the Levant, as is evident in comparing them with such in the cabinets of natural history. The locust of Spain is the only one that has rose-coloured wings: besides, it is impossible they can come from any other part. From the north it is clear they do not, by the observation of so many ages; from the south they cannot, without crossing the sea, which is hardly possible by the shortness of their flight: and, like birds of passage, they would be known. I once saw a cloud of them pass over Malaga, and move towards the sea, and go over it, for about a quarter of a league, to the great joy of the inhabitants, who concluded they would soon be drowned; but, to their disappointment, they suddenly veered about towards the coast, and pitched upon an uncultivated space surrounded with vineyards, which they soon after quitted. When once they appear, let the number demolished be ever so great, the proportion remaining is still too considerable: therefore, the only way to put an end to such a calamity is to attack them before-hand, and destroy their eggs, by which means they might be totally extirpated."

NATURAL CAUSES OF THE LOVE OF LIFE.

AGE, that lessens the enjoyment of life, encreases our desire of living. Those dangers which, in the vigour of youth, we had learned to despise, assume new terrors as we grow old. Our caution, encreasing as our years encrease, fear becomes at last the prevailing passion of the mind; and the small remainder of life is taken up in useless efforts to keep off our end, or provide for a continued existence.

Strange contradiction in our nature, and to which even the wise are liable! If I should judge of that part of life which lies before me by that which I have already seen, the prospect is hideous. Experience tells me, that my past enjoyments have brought no real felicity; and sensation assures me, that those I have felt are stronger than those which are yet to come. Yet experience and sensation in vain persuade; hope, more powerful than either, dresses out the distant prospect in fancied beauty; some happiness, in long perspective, still beckons me to pursue; and, like a losing gamester, every new disappointment encreases my ardour to continue the game.

Whence then is this encreased love of life, which grows upon us with our years? whence comes it, that we thus make greater efforts to preserve our existence, at a period when it becomes scarce worth the keeping? Is it that nature, attentive to the preservation of mankind, encreases our wishes to live, while she lessens our enjoyments; and, as she robs the senses of every pleasure, equips imagination in the spoils? Life would be insupportable to an old man, who, loaded with infirmities, feared death no more than when in the vigour of manhood; the numberless calamities of decaying nature, and the consciousness of surviving every pleasure, would at once induce him, with his own hand, to terminate the scene of misery; but happily the contempt of death forsakes him at a time when it could only be prejudicial; and life acquires an imaginary value, in proportion as its real value is no more.

Our attachment to every object around us, encreases, in general, from the length of our acquaintance with it. "I would not chuse," says a French philosopher, "to see an old post pulled up, with which I had been long acquainted." A mind long habituated to a certain set of objects, insensibly becomes fond of seeing them; visits them from habit, and parts from them with reluctance: from hence proceeds the avarice of the old in every kind of possession; they love the world and all that it produces; they love life and all its advantages; not because it gives them pleasure, but because they have known it long.

Chinvang the Chaste, ascending the throne of China, commanded that all who were unjustly detained in prison during the preceding reigns should be set free. Among the number who came to thank their deliverer on this occasion, there appeared a majestic old man, who, falling at the emperor's feet, addressed him as follows: "Great father of China, behold a wretch, now eighty-five years old, who was shut up in a dungeon at the age of twenty-two. I was imprisoned, though a stranger to crime, or without being even confronted by my accusers. I have now lived in solitude and darkness

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for more than fifty years, and am grown familiar with distress. As yet, dazzled with the splendour of that sun to which you have restored me, I have been wandering the streets to find out some friend that would assist, or relieve, or remember, me; but my friends, my family, and relations, are all dead; and I am forgotten. Permit me then, O Chinvang, to wear out the wretched remains of life in my former prison; the walls of my dungeon are to me more pleasing than the most splendid palace: I have not long to live, and shall be unhappy except I spend the rest of my days where my youth was passed; in that prison from whence you were pleased to release me."

The old man's passion for confinement is similar to that we all have for life. We are habituated to the prison, we look round with discontent, are displeased with the abode, and yet the length of our captivity only encreases our fondness for the cell. The trees we have planted, the houses we have built, or the posterity we have begotten, all serve to bind us closer to the earth, and embitter our parting. Life sues the young like a new acquaintance; the companion, as yet unexhausted, is at once instructive and amusing; its company pleases, yet, for all this, it is but little regarded. To us, who are declined in years, life appears like an old friend; its jests have been anticipated in former conversation; it has no new story to make us smile, no new improvement with which to surprise, yet still we love it; destitute of every enjoyment, still we love it, husband the wasting treasure with encreasing frugality, and feel all the poignancy of anguish in the fatal separation.

Sir Philip Mordaunt was young, beautiful, sincere, brave, an Englishman. He had a complete fortune of his own, and the love of the king his master, which was equivalent to riches. Life opened all her treasures before him, and promised a long succession of happiness. He came, tasted of the entertainment, but was disgusted even at the beginning. He professed an aversion to living; was tired of walking round the same circle; had tried every enjoyment, and found them all grow weaker at every repetition. "If life be, in youth, so displeasing," cried he to himself, "what will it appear when age comes on? if it be at present indifferent, sure it will then be execrable." This thought embittered every reflection; till, at last, with all the serenity of perverted reason, he ended the debate with a pistol! Had this self-deluded man been apprised, that existence grows more desirable to us the longer we exist, he would have then faced old age without shrinking; he would have boldly dared to live; and served that society by his future assiduity, which he basely injured by his desertion.

DESCRIPTION OF GREENLAND.

THIS country is divided into West and East Greenland.—West Greenland is now determined by our latest maps to be a part of the continent of America, though upon what authority is not very clear. That part of it which the Europeans have any knowledge of is bounded on the west by Baffin's Bay, on the south by Davis's Straits, and on the east by the northern part of the Atlantic Ocean. It is a very mountainous country, and some parts of it so high that they may be discerned thirty leagues off at sea. The inland moun-

tains, hills, and rocks, are covered with perpetual snow; but the low lands on the sea-side are clothed with verdure in the summer season. The coast abounds with inlets, bays, and large rivers; and is surrounded with a vast number of islands of different dimensions. In a great many places, however, on the eastern coast especially, the shore is inaccessible by reason of the floating mountains of ice. The principal river, called Baal, falls into the sea in the 64th degree of latitude, where the first Danish lodge was built in 1721; and has been navigated about forty miles up the country.

West Greenland was first peopled by Europeans in the eighth century. At that time a company of Icelanders, headed by one Fricke Rande, were by accident driven on the coast. On his return he represented the country in such a favourable light, that some families again followed him thither, where they soon became a thriving colony, and bestowed on their new habitation the name of Groenland, or Greenland, on account of its verdant appearance. This colony was converted to Christianity by a missionary from Norway, sent thither by the celebrated Olaf, the first Norwegian monarch who embraced the true religion. The Greenland settlement continued to increase and thrive under his protection; and in a little time the country was provided with many towns, churches, convents, bishops, &c. under the jurisdiction of the archbishop of Drontheim. A considerable commerce was carried on between Greenland and Norway; and a regular intercourse maintained between the two countries till the year 1406, when the last bishop was sent over. From that time all correspondence was cut off, and all knowledge of Greenland has been buried in oblivion.

This strange and abrupt cessation of all trade and intercourse has been attributed to various causes; but the most probable is the following. The colony, from its first settlement, had been harassed by the natives, a barbarous and savage people; agreeing in customs, garb, and appearance, with the Esquimaux found about Hudson's Bay. This nation, called Schrellings, at length prevailed against the Iceland settlers who inhabited the western district, and exterminated them in the 14th century: insomuch, that when their brethren of the eastern district came to their assistance, they found nothing alive but some cattle and flocks of sheep running wild about the country. Perhaps they themselves afterwards experienced the same fate, and were totally destroyed by these Schrellings, whose descendants still inhabit the western parts of Greenland, and from tradition confirm this conjecture. They affirm that the houses and villages, whose ruins still appear, were inhabited by a nation of strangers, whom their ancestors destroyed. There is reason, however, for believing that there may be still some descendants of the ancient Iceland colony remaining in the eastern district, though they cannot be visited by land, on account of the stupendous mountains, perpetually covered with snow, which divide the two parts of Greenland; while they have been rendered inaccessible by sea, by the vast quantity of ice driven from Spitzbergen, or East Greenland. One would imagine that there must have been some considerable alteration in the northern parts of the world since the 15th century, so that the coast of Greenland is now become almost totally inaccessible, though formerly visited with very little difficulty. It is also natural to ask, By what means the people of the eastern colony surmounted the above-mentioned

tioned obstacles when they went to the assistance of their western friends; how they returned to their own country; and in what manner historians learned the success of their expedition? Concerning all this we have very little satisfactory information. All that can be learned from the most authentic records is, that Greenland was divided into two districts, called West Bygd and East Bygd: that the western division contained four parishes and one hundred villages: that the eastern district was still more flourishing, as being nearer to Iceland, sooner settled, and more frequented by shipping from Norway. There are also many accounts, though most of them romantic and slightly attested, which render it probable that part of the eastern colony still subsists, who, at some time or other, may have given the imperfect relation above-mentioned. This colony, in ancient times, certainly comprehended twelve extensive parishes, one hundred and ninety villages; a bishop's see, and two monasteries. The present inhabitants of the western district are entirely ignorant of this part, from which they are divided by rocks, mountains, and deserts, and still more effectually by their apprehensions: for they believe the eastern Greenlanders to be a cruel barbarous nation, that destroy and eat all strangers who fall into their hands. About a century after all intercourse between Norway and Greenland had ceased, several ships were sent successively by the kings of Denmark in order to discover the eastern district; but all of them miscarried. Among these adventurers, Mogens Heinson, after having surmounted many difficulties and dangers, got sight of the land; which, however, he could not approach. At his return, he pretended that the ship was arrested in the middle of her course by certain rocks of loadstone at the bottom of the sea. The same year, 1576, in which this attempt was made, has been rendered remarkable by the voyage of Captain Martin Frobisher, sent upon the same errand by Queen Elizabeth. He likewise descried the land; but could not reach it, and therefore returned to England; yet not before he had sailed sixty leagues in the strait which still retains his name, and landed on several islands, where he had some communication with the natives. He had likewise taken possession of the country in the name of Queen Elizabeth; and brought away some pieces of heavy black stone, from which the refiners of London extracted a certain proportion of gold. In the ensuing spring he undertook a second voyage, at the head of a small squadron, equipped at the expence of the public; entered the straits a second time; discovered upon an island a gold and silver mine; bestowed names upon different bays, islands, and headlands; and brought away a lading of ore, together with two natives, a male and a female, whom the English kidnapped.

Such was the success of this voyage, that another armament was fitted out under the auspices of Admiral Frobisher, consisting of fifteen sail, including a considerable number of soldiers, miners, smelters, carpenters, and bakers, to remain all the winter near the mines in a wooden fort, the different pieces of which they carried out in the transports. They met with boisterous weather, impenetrable fogs, and violent currents, upon the coast of Greenland, which retarded their operations until the season was far advanced. Part of their wooden fort was lost at sea; and they had neither provision nor fuel sufficient for the winter. The admiral therefore determined to return with as much ore as he could procure: of this they obtained

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large quantities out of a new mine, to which they gave the name of the Countess of Sussex. They likewise built an house of stone and lime, provided with ovens; and here, with a view to conciliate the affection of the natives, they left a quantity of small morrice-bells, knives, beads, looking-glasses, leaden pictures, and other toys, together with several loaves of bread. They buried the timber of the fort where it could be easily found next year; and sowed corn, pease, and other grain, by way of experiment, to know what the country would produce. Having taken these precautions, they sailed from thence in the beginning of September; and, after a month's stormy passage, arrived in England: but this noble design was never prosecuted.

Christian IV. king of Denmark, being desirous of discovering the old Greenland settlement, sent three ships thither, under the command of Captain Godske Lindenow; who is said to have reached the east coast of Greenland, where he traded with the savage inhabitants, such as they are still found in the western district, but saw no signs of a civilized people. Had he actually landed in the eastern division, he must have perceived some remains of the ancient colony, even in the ruins of their convents and villages. Lindenow kidnapped two of the natives, who were conveyed to Copenhagen; and the same cruel fraud was practised by two other ships which sailed into Davis's Straits, where they discovered divers fine harbours, and delightful meadows covered with verdure. In some places they are said to have found a considerable quantity of ore, every hundred pounds of which yielded twenty-six ounces of silver. The same Captain Lindenow made another voyage to the coast of Greenland in the years 1606, directing his course to the westward of Cape Farewell. He coasted along the Straits of Davis; and having made some observations on the face of the country, the harbours and islands, he returned to Denmark, with two more of the natives. Nothing, however, can be more inhuman and repugnant to the dictates of common justice than this practice of tearing away poor creatures from their country, their families, and connections: unless we suppose them altogether destitute of natural affection; and, that this was not the case with those poor Greenlanders, some of whom were brought alive to Copenhagen, appears from the whole tenor of their conduct, upon their first capture, and during their confinement in Denmark. When first captivated, they rent the air with their cries and lamentations: they even leaped into the sea; and, when taken on-board, for some time refused all sustenance. Their eyes were continually turned towards their dear country, and their faces always bathed in tears. Even the countenance of his Danish majesty, and the caresses of the court and people, could not alleviate their grief. One of them was perceived to shed tears always when he saw an infant in the mother's arms; a circumstance from whence it was naturally concluded, that he had left his wife with a young child in Greenland. Two of them went to sea in their little canoes in hope of reaching Greenland; but one of them was retaken. Two others made the same attempt; but were driven by a storm on the coast of Schonen, where they were apprehended by the peasants, and re-conveyed to Copenhagen. One of them afterwards died of a fever, caught in fishing pearl, during the winter, for the governor of Kolding. The rest lived some years in Denmark; but at length, seeing no prospect

of

of being able to revisit their native country, they sunk into a kind of melancholy disorder, and expired. Carsten Richards, being detached with two ships on the same discovery, descried the high land on the eastern side of Greenland; but was hindered by the ice from approaching the shore.

Other expeditions of the same nature have been planned and executed with the same bad success, under the auspices of a Danish company of merchants. Two ships returned from the western part of Greenland loaded with a kind of yellow sand, supposed to contain a large proportion of gold. This, being assayed by the goldsmiths of Copenhagen, was condemned as useless, and thrown overboard: but from a small quantity of this sand, which was reserved as a curiosity, an expert chemist afterwards extracted a quantity of pure gold. The captain, who brought home this adventure, was so chagrined at his disappointment, that he died of grief, without having left any directions concerning the place where the sand had been discovered. In the year 1654, Henry Moller, a rich Dane, equipped a vessel under the command of David de Nelles, who sailed to the west coast of Greenland, from which he carried off three women of the country. Others efforts have been made, under the encouragement of the Danish king, for the discovery and recovery of the old Iceland colony in Greenland: but all of them miscarried, and people began to look upon such expeditions as wild and chimerical. At length the Greenland company at Bergen in Norway transported a colony to the western coast, about the 64th degree of latitude; and these Norwegians sailed in the year 1712, accompanied by the Reverend Hans Egede, to whose care, ability, and precision, we owe the best and most authentic account of modern Greenland. This gentleman endeavoured to reach the eastern district, by coasting southwards, and advanced as far as the States Promontory: but the season of the year, and continual storms, obliged him to return; and, as he could not even find the Strait of Frobisher, he concluded that no such place ever existed. In the year 1724, a ship, being equipped by the company, sailed on this discovery, with a view to land on the east side opposite to Iceland; but the vast shoals of ice, which barricadoed that part of the coast, rendered this scheme impracticable. His Danish majesty, in the year 1728, caused horses to be be transported to Greenland, in hope that the settlers might by their means travel over-land to the eastern district; but the ice mountains were found impassable. Finally, lieutenant Richards, in a ship which had wintered near the new Danish colony, attempted, in his return to Denmark, to land on the eastern shore; but all his endeavours proved abortive.

Mr. Egede is of opinion, that the only practicable method of reaching that part of the country, will be to coast north-about in small vessels, between the great flakes of ice and the shore; as the Greenlanders have declared, that the currents continually rushing from the bays and inlets, and running south-westwards along the shore, hinder the ice from adhering to the land; so that there is always a channel open, through which vessels of small burden might pass, especially if lodges were built at convenient distances on the shore, for the convenience and direction of the adventurers.

That part of the country which is now visited and settled by the Danes and Norwegians lies between the 64th and 68th degrees of

north latitude; and thus far it is said the climate is temperate. In the summer, which continues from the end of May to the middle of September, the weather is warm and comfortable, while the wind blows easterly; though even at this time storms frequently happen, which rage with incredible violence; and the sea-coasts are infested with fogs that are equally disagreeable and unhealthy. Near the shore, and in the bays and inlets, the low land is clothed with the most charming verdure: but the inland mountains are perpetually covered with ice and snow. To the northward of the 68th degree of latitude the cold is prodigiously intense; and towards the end of August all the coast is covered with ice, which never thaws till April or May, and sometimes not till the latter end of June. Nothing can exhibit a more dreadful, and at the same time a more dazzling, appearance, than those prodigious masses of ice that surround the whole coast in various forms, reflecting a multitude of colours from the sun-beams, and calling to mind the enchanted scenes of romance. Such prospects they yield in calm weather; but when the wind begins to blow, and the waves to rise in vast billows, the violent shocks of those pieces of ice dashing against one another fill the mind with horror.—Greenland is seldom visited with thunder and lightning, but the aurora borealis is very frequent and bright. At the time of new and full moon, the tide rises and falls upon this coast about three fathoms; and it is remarkable, that the springs and fountains on-shore rise and fall with the flux and reflux of the ocean.

The soil of Greenland varies like that of all other mountainous countries. The hills are very barren, being indeed frozen throughout the whole year; but the valleys and low grounds, especially near the sea, are rich and fruitful. The ancient Norwegian chronicles inform us, that Greenland formerly produced a great number of cattle; and that considerable quantities of butter and cheese were exported to Norway; and, on account of their peculiar excellency, set apart for the king's use. The same histories inform us, that some parts of the country yielded excellent wheat; and that large oaks were found here, which carried acorns as big as apples. Some of these oaks still remain in the southern parts, and in many places the marks of ploughed land are easily perceived. At present, however, the country is destitute of corn and cattle, though in many places it produces excellent pasture; and, if properly cultivated, would probably yield grain also. Mr. Egede sowed some barley in a bay adjoining to the Danish colony. It sprang up so fast, that by the latter end of July it was in the full ear; but, being nipped by a night-frost, it never arrived at maturity. This seed was brought from Bergen, where the summer is of greater heat and duration than in Greenland; but in all probability the corn which grows in the northern parts of Norway would also thrive here. Turnips and coleworts of an excellent taste and flavour are also produced here. The sides of the mountains near the bays are clothed with wild thyme, which diffuses its fragrance to a great distance. The herb tormentil is very common in this country, and likewise many others not described by the botanists. Among the fruits of Greenland we number juniper-berries, blue-berries, bil-berries, and bramble-berries.

Greenland is thought to contain many mines of metal, though none of them are wrought. To the southward of the Danish colony are some appearances of a mine of copper. Mr. Egede once received

ceived a lump of ore from one of the natives; and here he found calamine of a yellow colour. He once sent a considerable quantity of sand of a yellow colour, intermixed with streaks of vermillion, to the Bergen company. They probably found their account in this present; for they desired him by a letter to procure as much of that sand as possible: but he was never able to find the place where he saw the first specimen. It was one of the smallest among a great number of islands; and the mark he had set up was blown down by a violent storm. Possibly this might be the same mineral of which Captain Frobisher brought so much to England. This country produces rock-crystals both red and white, and whole mountains of the asbestos or incombustible flax. Around the colony, which is known by the name of Good Hope, they find a kind of bastard marble of various colours, which the natives form into bowls, lamps, pots, &c. All that has been said of the fertility of Greenland, however, must be understood only of that part which lies between the 60th and 65th degrees of latitude. The most northern parts are totally destitute of herbs and plants. The wretched inhabitants cannot find grass in sufficent quantities to stuff into their shoes to keep their feet warm, but are obliged to buy it from those who inhabit the more southern parts.

The animals which abound most in Greenland are, rein-deer, foxes, hares, dogs, and white bears. The hares are of a white colour, and very fat; the foxes are of different colours, white, greyish, and bluish; and smaller than those of Denmark and Norway. The natives keep a great number of dogs, which are large, white, or speckled, and rough, with ears standing upright, as is the case with all the dogs peculiar to cold climates. They are timorous and stupid; and neither bay nor bark, but sometimes howl dismally. In the northern parts the natives yoke them in sledges; which, though heavy laden, they will draw on the ice at the rate of seventy miles in a short winter's day. These poor animals are very ill rewarded for their service; being left to provide for themselves, except when their masters happen to catch a great number of seals. On these occasions the dogs are regaled with the blood and entrails; at other times they subsist, like wild beasts, upon muscles and berries. Here also are found great numbers of ravens, eagles of a prodigious size, falcons, and other birds of prey; and likewise a kind of linnet, which warbles very melodiously. Whales, sword-fish, porpoises, &c. abound on the coasts; also holybut, turbot, cod, haddocks, &c. The more dubious animals also, called mermaids, sea-serpents, and krakens, said to be found on the coast of Norway, are also reported to dwell in these seas. Mr. Egede assures us, that, in the year 1734, the sea-serpent was seen off the new Danish colony, and raised its head mast-high above the surface of the water.

The people who now inhabit the western coast of Greenland, and who, without doubt, are the descendants of the ancient Schrellings, who exterminated the first Iceland colony, bear a near resemblance to the Samoiedes and Laplanders in their persons, complexions, and way of life. They are short, brawny, and inclined to corpulency; with broad faces, flat noses, thick lips, black hair and eyes, and a yellowish tawny complexion. They are for the most part vigorous and healthy, but remarkably short-lived; few of them reaching the grand climacteric; and many dying in their infancy, and in the prime of youth. They are subject to a weakness in the eyes, occasioned by

the piercing winds and the glare of the ſnow in the winter time. The leproſy is known among them, but is not contagious. Thoſe that dwell in the northern parts are miſerably tormented with dyſenteries, rheums, and pulmonary diſorders, biles, and epilepſy. The ſmall-pox being imported among them from Copenhagen in the year 1734, made terrible havock among theſe poor people, who are utterly deſtitute of any knowledge of the medicinal art, and depend entirely for aſſiſtance upon their angekuts or conjurers. In their diſpoſitions the Greenlanders are cold, phlegmatic, indolent, and ſlow of apprehenſion; but very quiet, orderly, and good-natured. They live peaceably together; and have every thing in common, without ſtriſe, envying, or animoſity. They are civil and hoſpitable, but ſlovenly to a degree beyond the Hottentots themſelves. They never waſh themſelves with water; but lick their paws like the cat, and then rub their faces with them. They eat after their dogs without waſhing their diſhes; devour the lice which devour them; and even lick the ſweat, which they ſcrape off from their faces with their knives. The women waſh themſelves with their own urine, which they imagine makes their hair grow; and in the winter-time go out immediately after, to let the liquor freeze upon their ſkin. They will often eat their victuals off the dirty ground, without any veſſel to hold them in; and devour rotten fleſh with the greateſt avidity. In times of ſcarcity they will ſubſiſt on pieces of old ſkin, reeds, ſea-weed, and a root called tugloronet, dreſſed with train-oil and fat. The dung of rein-deer taken from the inteſtines, the entrails of partridges, and all ſorts of offals, are counted dainties among theſe ſavages; and of the ſcrapings of ſeal-ſkins they make delicate pancakes. At firſt they could not taſte the Daniſh proviſions without abhorrence; but now they are become extremely fond of bread and butter, though they ſtill retain an averſion to tobacco and ſpirituous liquors; in which particular they differ from almoſt all ſavages on the face of the earth.

The Greenlanders commonly content themſelves with one wife; who is condemned, as among other ſavage nations, to do all the drudgery, and may be corrected, or even divorced, by the huſband at pleaſure. Heroes, however, and extraordinary perſonages, are indulged with a plurality of wives. Their young women are generally chaſte and baſhful; but at ſome of their feaſts, in the midſt of their jollity, a man retires with his neighbour's wife behind a curtain made of ſkins; and all the gueſts, thus coupled, retire in their turns. The women think themſelves happy if an angekut or prophet will thus honour them with his careſſes. Theſe people never marry within the prohibited degrees of conſanguinity, nor is it counted decent in a couple to marry who have been educated in the ſame family.—They have a number of ridiculous and ſuperſtitious cuſtoms; among which the two following are the moſt remarkable. While a woman is in labour, the goſſips hold a chamber-pot over her head, as a charm to haſten the delivery. When the child is a year old, the mother licks and ſlabbers it all over, to render it, as ſhe imagines, more ſtrong and hardy.

All the Greenlanders hitherto known ſpeak the ſame language, though different dialects prevail in different parts of the country. It abounds with double conſonants; and is ſo guttural, that the pronunciation of many words is not to be learned except by thoſe who

have

have been accustomed to it from their infancy. The letters C, D, F, Q, and X, are not known in their alphabet. Like the North Americans, and inhabitants of Kamschatka, they have a great number of long polysyllables. Their words, nouns as well as verbs, are inflected at the end by varying the terminations without the help of articles; but, their language being found defective, they have adopted a good many words from the Norwegian dialect. Notwithstanding the endeavours of the Danish missionaries, they have no great reason to boast of the proselytes they have made of the natives of Greenland. These savages pay great deference and respect to the Danes, whom indeed they obey as their masters, and hear the truths of the Christian religion expounded without doubting the veracity of their teachers; but at the same time they listen with the most mortifying indifference, without being in the least influenced by what they have heard. They believe in the immortality of the soul, and the existence of a spirit whom they call Torngarsuk; but of whom they have formed the most ridiculous notions. The angekuts, who are supposed to be his immediate ministers, differ concerning the principles of his existence; some affirming that he is without form or shape; others, that he has the shape of a bear; others, that he has a large human body with only one arm; while others affirm that he is no larger than a man's finger; with many other absurdities of a similar kind. They have also a peculiar kind of mythology, by which they believe all the elements to be full of spirits, from among which every one of their prophets is supplied with a familiar which they name Torngock, and who is always ready when summoned to his assistance.

The Greenlanders are employed all the year round either in fishing or hunting. At sea they pursue the whales, morses, seals, fish for eating, and sea-fowl. On-shore they hunt the rein-deer in different parts of the country. They drive these animals, which feed in large herds, into a narrow circle or defile, where they are easily slain with arrows. Their bow is made of fir-tree, wound about with the twisted sinews of animals: the string is composed of the same fluff, or of seal-skin: the arrow is a good fathom in length, pointed with a bearded iron, or a sharp bone; but those with which they kill birds are blunt, that they may not tear the flesh. Sea-fowls they kill with lances, which they throw to a great distance with surprising dexterity. Their manner of catching whales is quite different from that practised by the Europeans. About fifty persons, men and women, set out in one long boat, which is called a kone-boat, from kone "a woman," because it is rowed by females only. When they find a whale, they strike him with harpoons, to which are fastened with long lines some seal-skins blown up like bladders. These, by floating on the surface, not only discover the back of the whale, but hinder him from diving under water for any length of time. They continue to pursue him until he loses his strength, when they pierce him with spears and lances till he expires. On this occasion they are clad in their spring coats consisting of one piece, with gloves, boots, and caps, made of seal-skin so closely laced and sewed that they keep out water. Thus accoutred, they leap into the sea; and begin to slice off the fat, even under water, before the whale is dead.—They have many different ways of killing seals; namely, by striking them with a small harpoon equipped also with an air-bag; by watching them

when they come to breathe at the air-holes in the ice, and striking them with spears; by approaching them in the disguise of their own species, that is, covered with a seal-skin, creeping upon the ice, and moving the head from side to side as the seals are accustomed to do. By this stratagem the Greenlander moves towards the unsuspecting seal, and kills him with a spear. The Greenlanders angle with lines made of whale-bone cut very small, by means of which they succeed wonderfully. The Greenland canoe, like that used in Nova Zembla and Hudson's Bay, is about three fathoms in length, pointed at both ends, and three quarters of a yard in breadth. It is composed of thin rafts fastened together with the sinews of animals. It is covered with dressed seal-skins both below and above, in such a manner that only a circular hole is left in the middle, large enough to admit the body of one man. Into this the Greenlander thrusts himself up to the waist, and fastens the skin so tight about him that no water can enter. Thus secured, and armed with a paddle broad at both ends, he will venture out to sea in the most stormy weather to catch seals and sea-fowl; and, if he is overset, he can easily raise himself by means of his paddle. A Greenlander in one of these canoes, which was brought with him to Copenhagen, outstripped a pinnace of sixty oars, manned with choice mariners.—The kone-boat is made of the same materials, but more durable; and so large, that it will contain fifty persons, with all their tackle, baggage, and provisions. She is fitted with a mast, which carries a triangular sail made of the membranes and entrails of seals, and is managed without the help of braces and bowlines. These kones are flat-bottomed, and sometimes sixty feet in length. The men think it beneath them to take charge of them; and therefore they are left to the conduct of the women, who indeed are obliged to do all the drudgery, including even the building and repairing their houses, while the men employ themselves wholly in preparing their hunting implements and fishing tackle.

This country is but thinly inhabited. In the winter-time the people dwell in huts built of stone or turf: on the one side are the windows, covered with the skins of seals or rein-deer. Several families live in one of these houses, possessing each a separate apartment, before which is a hearth with a great lamp placed on a trevit, over which hangs their kettle: above is a rack or shelf on which their wet clothes are dried. They burn train-oil in their lamps; and, instead of wick, they use a kind of moss, which fully answers the purpose. These fires are not only sufficient to boil their victuals, but likewise produce such a heat, that the whole house is like a bagnio. The door is very low, that as little cold air as possible may be admitted. The house within is lined with old skins, and surrounded with benches for the conveniency of strangers. In the summer-time they dwell in tents made of long poles fixed in a conical form, covered in the inside with deers skins, and on the outside with seals skins, dressed so that the rain cannot pierce them.

East Greenland was for a long time considered as a part of the continent of West Greenland, but is now discovered to be an assemblage of islands lying between 76° 46′ and 80° 30′ of north latitude, and between 9° and 20° of east longitude. It was discovered by Sir Hugh Willoughby in the year 1553, who called it Groenland; supposing it to be a part of the western continent. In 1595, it was again visited

visited by William Barentz and John Cornelius, two Dutchmen, who pretended to be the original discoverers, and called the country Spitzbergen, or Sharp Mountains, from the many sharp-pointed and rocky mountains with which it abounds. They alledged that the coast discovered by Sir Hugh Willoughby was some other country; which accordingly the Hollanders delineated on their maps and charts by the name of Willoughby Land; whereas in fact no such land ever existed; and, long before the voyage of these Dutchmen, Stephen Barrows, an English ship-master, had coasted along a desolate country from N. Lat. 78° to 80° 11′, which was undoubtedly Spitzbergen. The sea in the neighbourhood of the islands of Spitzbergen abounds very much with whales, and is the common resort of the whale-fishing ships from different countries, and the country itself is frequently visited by these ships; but till the late voyage of the Hon. Captain Phipps, by order of his majesty, the situation of it was erroneously laid down. It was imagined that the land stretched to the northward as far as 82° of north latitude; but Captain Phipps found the most northerly point of land, called Seven Islands, not to exceed 80° 30′ of latitude. Towards the east he saw other lands lying at a distance, so that Spitzbergen plainly appeared to be surrounded by water on that side, and not joined to the continent of Asia, as former navigators had supposed. The north and west coasts also he explored, but was prevented by the ice from sailing so far to the northward as he wished. The coast appeared neither habitable nor accessible. It is formed of high, barren, black, rocks, without the least marks of vegetation; in many places bare and pointed; in others covered with snow, appearing even above the clouds. The valleys between the high cliffs were filled with snow and ice. "This prospect," says Captain Phipps, "would have suggested the idea of perpetual winter, had not the mildness of the weather, the smooth water, bright sun-shine, and constant day-light, given a cheerfulness and novelty to the whole of this romantic scene." The current ran along this coast half a knot an hour, north. The height of one mountain seen here was found by geometrical mensuration to be at one time 1503½ feet, at another 1503 8-10 feet. By a barometer constructed after De Luc's method, the height was found to be 1588½ feet. On this occasion Captain Phipps has the following remarks: "I cannot account for the great difference between the geometrical measure and the barometrical according to M. de Luc's calculation, which amounts to 84.7 feet. I have no reason to doubt the accuracy of Dr. Irving's observations, which were made with great care. As to the geometrical measure, the agreement of so many triangles, each of which must have discovered even the smallest error, is the most satisfactory proof of its correctness. Since my return I have tried both the theodolite and barometer, to discover whether there was any fault in either; and find them, upon trial, as I had always done before, very accurate."

There is good anchorage in Schmeerenburgh harbour, lying in N. Lat. 74° 44′, E. Long. 9° 50′ 45″, in thirteen fathom, sandy bottom, not far from the shore, and well sheltered from all winds. Close to this harbour is an island called Amsterdam Island, where the Dutch used formerly to boil their whale-oil; and the remains of some conveniency erected by them for that purpose are still visible. The Dutch ships still resort to this place for the latter season of the whale-fishery.

fishery.—The stone about this place is chiefly a kind of marble, which dissolves easily in the marine acid. There were no appearances of minerals of any kind, nor any signs of ancient or modern volcanoes. No insects, or any species of reptiles, were seen, not even the common earth-worm. There were no springs or rivers; but great plenty of water was produced from the snow which melted on the mountains.

The most remarkable views which these dreary regions present are those called icebergs. They are large bodies of ice filling the valleys between the high mountains. Their face towards the sea is nearly perpendicular, and of a very lively light-green colour. One was about three hundred feet high, with a cascade of water issuing from it. The black mountains on each side, the white snow, and greenish-coloured ice, composed a very beautiful and romantic picture. Large pieces frequently broke off from the icebergs, and fell with great noise into the water. One piece was observed to have floated out into the bay, and grounded in twenty-four fathoms; it was fifty feet high above the surface of the water, and of the same beautiful colour with the iceberg from which it had separated.

These islands are totally uninhabited, though it doth not appear but that human creatures could subsist on them, notwithstanding their vicinity to the pole. Eight English sailors, who were accidentally left here by a whale-fishing ship, survived the winter, and were brought home next season. The Dutch then attempted to settle a colony on Amsterdam Island above-mentioned; but all the people perished, not through the severity of the climate, but of the scurvy, owing to the want of those remedies which are now happily discovered, and which are found to be so effectual in preventing and curing that dreadful disease.—The late account also of six Russian sailors who staid four years in this inhospitable country, affords a decisive proof, that a colony might be settled on East Greenland, provided the doing so could answer any good purpose.

DESCRIPTION OF THE KRAKEN.

THE Kraken, in zoology, is a most amazing large sea-animal, said to be seemingly of a crab-like form; the credit of whose existence rests upon the evidence produced by bishop Pontoppidan, in his Natural History of Norway.

As a full grown kraken has never been seen in all its parts and dimensions, an accurate survey of which must employ some time, and not a little motion, it is impossible to give a complete description of one. Nevertheless, we shall submit the probability of its existence on the best information our author could collect, which seems to have fixed his own belief of it; though at the same time he acknowledges the account is very defective, and supposes a farther information concerning the creature may be reserved for posterity.

Our fishermen, says the author, unanimously and invariably affirm, that when they are several miles from the land, particularly in the hot summer-days, and by their distance, and the bearings of some points of land, expect from eighty to a hundred fathoms depth, and do not find but from twenty to thirty; and more especially if they find a more than usual plenty of cod and ling; they judge that the

kraken

kraken is at the bottom; but, if they find by their lines that the water in the same place still shallows on them, they know he is rising to the surface, and row off with the greatest expedition till they come into the usual soundings of the place; when, lying on their oars, in a few minutes the monster emerges, and shews himself sufficiently, though his whole body does not appear. Its back or upper part, which seems an English mile and a half in circumference (some have affirmed more), looks at first like a number of small islands, surrounded with something that floats like sea-weeds; at last several bright points of horns appear, which grow thicker the higher they emerge, and sometimes stand up as high and large as the masts of middle-sized vessels. In a short time it slowly sinks, which is thought as dangerous as its rising; as it causes such a swell and whirlpool as draws every thing down with it, like that of Malestrom. The bishop justly regrets the omission of probably the only opportunity that ever has or may be presented, of surveying it alive, or seeing it entire when dead. This, he informs us, once did occur, on the credit of the reverend Mr. Friis, minister at Nordland, and vicar of the college for promoting Christian knowledge; who informed him that in 1680, a kraken (perhaps a young and careless one, as they generally keep several leagues from land) came into the waters that run between the rocks and cliffs near Alstahoug; where, in turning about, some of its long horns caught hold of the adjoining trees, which it might easily have torn up, but that it was also entangled in some clifts of the rocks, whence it could not extricate itself, but putrefied on the spot. Our author has heard of no person destroyed by this monster, but relates a report of the danger of two fishermen who came upon a part of the water full of the creature's thick slimy excrements (which he voids for some months, as he feeds for some other); they immediately strove to row off, but were not quick enough in turning to save the boat from one of the kraken's horns, which so crushed the head of it that it was with difficulty they saved their lives on the wreck, though the weather was perfectly calm; the monster never appearing at other times. His excrement is said to be attractive of other fish on which he feeds; which expedient was probably necessary, on account of his slow unwieldy motion to his subsistence; as this slow motion again may be necessary to the security of ships of the greatest force and burden, which must be overwhelmed on encountering such an immense animal, if his velocity were equal to his weight; the Norwegians supposing, that if his arms, on which he moves, and with which he takes his food, were to lay hold of the largest man of war, they would pull it down to the bottom.

In confirmation of the reality of this animal, our learned author cites Debes's description of Faroe, for the existence of certain islands which suddenly appear and as suddenly vanish. Many seafaring people, he adds, give accounts of such, particularly in the north sea; which their superstition has either attributed to the delusion of the devil, or considered as inhabited by evil spirits. But our honest historian, who is not for wronging the devil himself, supposes such mistaken islands to be nothing but the kraken, called by some the *soe trolden*, or *sea-mischief*; in which opinion he was greatly confirmed by the following quotation of Dr. Hierne, a learned Swede, from baron Grippenhielm; and which is certainly a very remarkable

 passage,

passage, viz. "Among the rocks about Stockholm, there is sometimes seen a tract of land, which at other times disappears, and is seen again in another place." Buræus has placed it as an island in his map. The peasants, who call it *gummars ore*, say, that it is not always seen, and that it lies out in the open sea; but I could never find it. One Sunday, when I was out amongst the rocks sounding the coast, it happened, that in one place I saw something like three points of land in the sea, which surprised me a little, and I thought I had inadvertently passed them over before. Upon this I called to a peasant, to enquire for *gummars ore*; but, when he came, we could see nothing of it: upon which the peasant said all was well, and that this prognosticated a storm or a great quantity of fish." To which our author subjoins, "Who cannot discover that this *gummars ore*, with its points and prognostications of fish, was the kraken, mistaken by Buræus for an island, who may keep himself about that spot where he rises?" He takes the kraken, doubtless, from his numerous tentaculi, which serve him as feet, to be of the polype kind; and the contemplation of its enormous bulk led him to adapt a passage from Ecclesiasticus, xliii. 31, 32. to it. Whether by it may he intended the dragon that is in the sea, mentioned Isaiah xxvii. 1. we refer to the conjecture of the reader. After paying but a just respect to the moral character, the reverend function, and diligent investigation, of our author, we must admit the possibility of its existence, as it implies no contradiction; though it seems to encounter a general prepossession of the whale's being the largest animal on or in our globe; and the eradication of any long prepossession is attended with something irksome to us. But were we to suppose a salmon or a sturgeon the largest fish any number of persons had seen or heard of, and the whale had discovered himself as seldom, and but in part, as the kraken, it is easy to conceive that the existence of the whale had been as indigestible to such persons then as that of the kraken may be to others now. Some may incline to think such an extensive monster would encroach on the symmetry of nature, and be over proportionate to the size of the globe itself; as a little retrospection will inform us, that the breadth of what is seen of him, supposing him nearly round, must be full 2600 feet (if more oval, or crab-like, full 2000), and his thickness, which may rather be called altitude, at least three hundred; our author declaring he has chosen the least circumference mentioned of this animal for the greater certainty. These immense dimensions, nevertheless, we apprehend will not argue conclusively against the existence of the animal, though considerably against a numerous increase or propagation of it. In fact, the great scarcity of the kraken, his confinement to the north sea, and perhaps to equal latitudes in the south; the small number propagated by the whale, who is viviparous; and by the largest land-animals, of whom the elephant is said to go near two years with young; all induce us to conclude from analogy, that this creature is not numerous; which coincides with a passage in a manuscript ascribed to Svere king of Norway, as it is cited by Ol. Wormius, in his Museum, p. 280, in Latin, which we shall exactly translate: "There remains one kind, which they call *hasguefe*, whose magnitude is unknown, as it is seldom seen. Those who affirm they have seen its body, declare, it is more like an island than a beast, and that its carcase was never found; whence some imagine there

there are but two of the kind in nature." Whether the vanishing island Lemair, of which Captain Rodney went in search, was a kraken, we submit to the fancy of our readers. In fine, if the existence of the creature is admitted, it will seem a fair inference, that he is the scarcest as well as largest in our world; and that, if there are larger in the universe, they probably inhabit some sphere or planet more extended than our own. Such we have no pretence to limit; and that fiction can devise a much greater than this is evident, from the cock of Mahomet, and the whale in the Bava Bathra of the Talmud, which were intended to be credited; and to either of which the kraken is a very shrimp in dimensions.

We shall close this article with an account of another monster supposed to inhabit the same seas, and whose existence is more generally believed. It is extracted from a paper, in the 60th vol. of the Phil. Transf. which was transmitted to the Royal Society in 1769: "With regard to the Stoor-Worms (which I have oftener heard called Sea-Worms by the Norwegians,) those who totally discredited the existence of the krakens told me, they believed them really to exist: and a few days before I left the North Cape, the Danish missionary of Forfanger district did me the favour closely to interrogate the master of a Norwegian vessel, who appeared to me to be by much the most knowing man in his station I had met with in Lapland, as to those stupendous worms, as they are called. He said, that about six years before, he had seen three of them at once off Bergen, floating upon the surface of the sea, twelve parts of the back of the largest appearing above water; each part being in length about six feet, with the intervals of the same length, so that upon the whole he judged the animal could not be less than twenty-five fathoms long, and about one in thickness. He did not pretend to ascertain the dimensions of the other two, further than their being smaller than the one thus imperfectly described; and added, that four years before he saw those last, he had (near the same coast) seen a large one, but could say nothing particular as to its size. What degree of credit is due to this man's account, I submit to the judgment of the learned society."

SINGULAR PROPAGATION OF THE CUCKOW.

THIS bird appears in our country early in the spring, and makes the shortest stay with us of any bird of passage. It is compelled here, as Mr. Stillingfleet observes, by that constitution of the air which causes the fig-tree to put forth its fruit; though it has been supposed that some of these birds do not quit this island during the winter; but that they seek shelter in hollow trees, and lie torpid, unless animated by unusually-warm weather. Mr. Pennant gives two instances of their being heard in February; one in 1771, in the end of that month; the other in 1769, on the 4th day; but after that they were heard no more, being probably chilled again into torpidity. There is a remarkable coincidence between the song of these birds and the mackarels continuing in full roe; that is, from about the middle of April to the latter end of June. The cuckow is silent for some time after his arrival; his note is a call to love, and used only by the male, who sits perched generally on some dead tree or bare

 bough,

bough, and repeats his ſong, which he loſes as ſoon as the amorous ſeaſon is over. His note is ſo uniform, that his name in all languages ſeem to have been derived from it; and in all countries it is uſed in the ſame reproachful ſenſe:

The plain-ſong cuckow grey,
Whoſe note full many a man doth mark,
And dares not anſwer nay. SHAKESPEARE.

The reproach ſeems to raiſe from the cuckow's making uſe of the bed or neſt of another to depoſite its eggs in, leaving the care of its young to an improper parent; but Juvenal with more juſtice gives infamy to the bird in whoſe neſt the ſuppoſitious eggs were laid:

Tu tibi nunc corruca *places.*

On the natural hiſtory of this ſingular bird, we have a very curious paper by Mr. Jenner, publiſhed in the Philoſophical Tranſactions for 1788. The firſt appearance of cuckows in this country, as already obſerved, is about the middle of April; (the 17th, according to Mr. Jenner, whoſe obſervations were made in Glouceſterſhire.) The ſong of the male, which is well known, ſoon proclaims its arrival. The ſong of the female (if the peculiar notes of which it is compoſed may be ſo called) is widely different, and has been ſo little attended to, that perhaps few are acquainted with it: the cry of the dab-chick bears ſome reſemblance to it. Unlike the generality of birds, they do not pair. When a female appears on the wing, ſhe is often attended by two or three males, who ſeem to be earneſtly contending for her favours. From the time of her appearance till after the middle of ſummer, the neſts of the birds ſelected to receive her egg are to be found in great abundance; but, like the other migrating birds, ſhe does not begin to lay till ſome weeks after her arrival. It is on all hands allowed, that the cuckow does not hatch its own eggs. The hedge-ſparrow, the water-wagtail, the titlark, the red-breaſt, the yellow-hammer, the green-linnet, or the winchat, is generally the nurſe of the young cuckow. It may be ſuppoſed, that the female cuckow lays her egg in the abſence of the bird in whoſe neſt ſhe intends to depoſit it; as it has been known, that, on ſight of one of theſe, a red-breaſt and its mate jointly attacked her on approaching the neſt, putting her to flight; and ſo effectually drove her away, that ſhe did not dare to return. Among the birds above-mentioned, it generality ſelects the three firſt, but ſhews a much greater partiality to the hedge-ſparrow. This laſt commonly takes up four or five days in laying her eggs. During this time (generally after ſhe has laid one or two) the cuckow contrives to depoſit her egg among the reſt, leaving the future care of it entirely to the hedge-ſparrow. When the hedge-ſparrow has ſat her uſual time, and diſengaged the young cuckow and ſome of her own offſpring from the ſhell, her own young ones, and any of her eggs that remain unhatched, are ſoon turned out, the young cuckow remaining poſſeſſor of the neſt, and ſole object of her future care. The young birds are not previouſly killed, nor are the eggs demoliſhed; but all are left to periſh together, either entangled about the buſh which contains the neſt, or lying on the ground under it. The early fate of the young hedge-ſparrows (ſays Mr. Jenner, who made theſe experiments) is a circumſtance that has been noticed by others, but attributed to wrong cauſes; but the true cauſe we ſhall preſently explain.

plain. A variety of conjectures have been formed upon it. A cuckow laid her egg in a water-wagtail's neſt in the thatch of an old cottage. The wagtail ſat her uſual time, and then hatched all the eggs but one; which, with all the young ones except the cuckow, was turned out of the neſt. The young birds, conſiſting of five, were found upon the rafter that projected from under the thatch, and with them was an egg not in the leaſt injured. The cuckow was reared by the wagtails till it was nearly capable of flying, when it was killed by an accident.

An hedge-ſparrow built her neſt in a hawthorn-buſh in a timber-yard. After ſhe had laid two eggs, a cuckow dropped in a third. The ſparrow continued laying as if nothing had happened, till ſhe had laid five, her uſual number, and then ſat. On inſpecting the neſt, June 20, 1786, (ſays Mr. Jenner,) I found that the bird had hatched this morning, and that every thing but the young cuckow was thrown out. Under the neſt I found one of the young hedge-ſparrows dead, and one egg by the ſide of the neſt entangled with the coarſe woody materials that formed its outſide-covering. On examining the egg, I found one end of the ſhell a little cracked, and could ſee that the ſparrow it contained was yet alive. It was then reſtored to the neſt, but in a few minutes was thrown out. The egg, being again ſuſpended by the outſide of the neſt, was ſaved a ſecond time from breaking. To ſee what would happen if the cuckow was removed, I took out the cuckow, and placed the egg containing the hedge-ſparrow in the neſt in its ſtead. The old birds, during this time, flew about the ſpot, ſhewing ſigns of great anxiety; but, when I withdrew, they quickly came to the neſt again. On looking into it in a quarter of an hour afterwards, I found the young one completely hatched, warm, and lively. The hedge-ſparrows were ſuffered to remain undiſturbed with their new charge for three hours (during which time they paid every attention to it), when the cuckow was again put into the neſt; and, on examining it again in a few minutes, I found the young ſparrow was tumbled out. It was a ſecond time reſtored, but again experienced the ſame fate. From theſe experiments, and ſuppoſing, from the feeble appearance of the young cuckow juſt diſengaged from the ſhell, that it was utterly incapable of diſplacing either the egg or the young ſparrows, I was induced to believe that the old ſparrows were the only agents in this ſeeming unnatural buſineſs. But I afterwards clearly perceived the cauſe of this ſtrange phenomenon, by diſcovering the young cuckow in the act of diſplacing its fellow-neſtlings, as the following relation will fully evince: June 18, 1787, I examined the neſt of a hedge-ſparrow, which then contained a cuckow's and three hedge-ſparrow's eggs. On inſpecting it the day following, I found the bird had hatched, but that the neſt now contained only a young cuckow and one young hedge-ſparrow. The neſt was placed ſo near the extremity of a hedge, that I could diſtinctly ſee what was going forward in it; and, to my aſtoniſhment, ſaw the young cuckow, though ſo newly hatched, in the act of turning out the young hedge-ſparrow. The mode of accompliſhing this was very curious. The little animal, with the aſſiſtance of its rump and wings, contrived to get the bird upon its back; and, making a lodgement for the burden by elevating its elbows, clambered backward with it up the ſide of the neſt, till it reached the top; where, reſting for a moment, it threw off its load

with

with a jerk, and quite disengaged it from the nest. It remained in this situation a short time, feeling about with the extremities of its wings, as if to be convinced whether the business was properly executed, and then dropped into the nest again. With these (the extremities of its wings) I have often seen it examine, as it were, an egg and nestling before it began its operations; and the nice sensibility which these parts appeared to possess, seemed sufficiently to compensate the want of sight, which as yet it was destitute of. I afterwards put in an egg; and this, by a similar process, was conveyed to the edge of the nest and thrown out. These experiments I have since repeated several times in different nests, and have always found the young cuckow disposed to act in the same manner. In climbing up the nest, it sometimes drops its burden, and thus is foiled in its endeavours; but, after a little respite, the work is resumed, and goes on almost incessantly till it is effected. It is wonderful to see the extraordinary exertions of the young cuckow, when it is two or three days old, if a bird be put into the nest with it that is too weighty for it to lift out. In this state it seems ever restless and uneasy. The singularity of its shape is well adapted to these purposes; for, different from other newly-hatched birds, its back, from the scapulæ downward, is very broad, with a considerable depression in the middle. This depression seems formed by nature for the design of giving a more secure lodgement to the egg of the hedge-sparrow, or its young one, when the young cuckow is employed in removing either of them from the nest. When it is about twelve days old, this cavity is quite filled up, and then the back assumes the shape of nestling birds in general. It appears a little extraordinary, that two cuckows eggs should ever be deposited in the same nest, as the young one produced from one of them must inevitably perish; yet two instances of this kind fell under our author's observation, one of which he thus relates: Two cuckows and a hedge-sparrow were hatched in the same nest this morning, (June 27, 1787;) one hedge-sparrow's egg remained unhatched. In a few hours after, a contest began between the cuckows for the possession of the nest, which continued undetermined till the next afternoon, when one of them, which was somewhat superior in size, turned out the other, together with the young hedge-sparrow and the unhatched egg. This contest was very remarkable. The combatants alternately appeared to have the advantage, as each carried the other several times nearly to the top of the nest, and then sunk down again, oppressed by the weight of its burden; till at length, after various efforts, the strongest prevailed, and was afterwards brought up by the hedge-sparrows.

But the principal circumstance that has agitated the mind of the naturalist respecting the cuckow is, why, like other birds, it should not build a nest, incubate its eggs, and rear its own young?

There is no apparent reason, Mr. Jenner thinks, why this bird, in common with others, should not perform all these several offices; for it is in every respect perfectly formed for collecting materials and building a nest. Neither its external shape nor internal structure prevent it from incubation; nor is it by any means incapacitated from bringing food to its young. It would be needless to enumerate the various opinions of authors on this subject from Aristotle to the present time. Those of the ancients appear to be either visionary or erroneous; and the attemps of the moderns towards its investigation

vestigation have been confined within very narrow limits: for they have gone but little further in their researches than to examine the constitution and structure of the bird; and, having found it possessed of a capacious stomach with a thin external covering, concluded that the pressure upon this part, in a sitting posture, prevented incubation. They have not considered that many of the birds which incubate have stomachs analogous to those of cuckows. The stomach of the owl, for example, is proportionably capacious, and is almost as thinly covered with external integuments. Nor have they considered, that the stomachs of nestlings are always much distended with food; and that this very part, during the whole time of their confinement to the nest, supports in a great degree the weight of the whole body: whereas, in a sitting-bird, it is not nearly so much pressed upon, for the breast in that case fills up chiefly the cavity of the nest; for which purpose, from its natural convexity, it is admirably well fitted.

These observations may be sufficient to shew, that the cuckow is not rendered incapable of sitting through any peculiarity either in the situation or formation of the stomach; yet, as a proof still more decisive, our observer adduces the following fact.

"In the summer of the year 1786, I saw, in the nest of a hedge-sparrow, a cuckow, which, from its size and plumage, appeared to be nearly a fortnight old. On lifting it up in the nest, I observed two hedge-sparrow's eggs under it. At first I supposed them part of the number which had been sat upon by the hedge-sparrow with the cuckow's egg, and that they had become addle, as birds frequently suffer such eggs to remain in their nests with their young: but on breaking one of them I found it contained a living fœtus; so that of course these eggs must have been laid several days after the cuckow was hatched; as the latter now completely filled up the nest, and was by this peculiar incident performing the part of a sitting-bird. At this time I was unacquainted with the fact, that the young cuckow turned out the eggs of the hedge-sparrow; but it is reasonable to conclude, that it had lost the disposition for doing this when these eggs were deposited in the nest.

"Having under my inspection, in another hedge-sparrow's nest, a young cuckow about the same size as the former, I procured two wagtail's eggs which had been sat upon a few days, and had them immediately conveyed to the spot, and placed under the cuckow. On the ninth day after the eggs had been in this situation, the person appointed to superintend the nest (as it was some distance from the place of my residence) came to inform me that the wagtails were hatched. On going to the place, and examining the nest, I found nothing in it but the cuckow and the shells of the wagtail's eggs. The fact, therefore, of the birds being hatched, I do not give you as coming immediately under my own eye; but the testimony of the person appointed to watch the nest was corroborated by that of another witness."

In considering to what causes may be attributed the singularities of the cuckow, Mr. Jenner suggests the following as the most probable: "The short residence this bird is allowed to make in the country where it is destined to propagate its species; and the call that nature has upon it, during that short residence, to produce a numerous progeny.—The cuckow's first appearance here is about the middle of April,

April, commonly on the 17th. Its egg is not ready for incubation till some weeks after its arrival, seldom before the middle of May. A fortnight is taken up by the sitting-bird in hatching the egg. The young bird generally continues three weeks in the nest before it flies, and the foster-parents feed it more than five weeks after this period; so that, if a cuckow should be ready with an egg much sooner than the time pointed out, not a single nestling, even one of the earliest, would be fit to provide for itself before its parent would be instinctively directed to seek a new residence, and be thus compelled to abandon its young one; for old cuckows take their final leave of this country the first week in July.

"Had nature allowed the cuckow to have staid here as long as some other migrating birds, which produce a single set of young ones, (as the swift or nightingale, for example,) and had allowed her to have reared as large a number as any bird is capable of bringing up at one time, these might not have been sufficient to have answered her purpose; but, by sending the cuckow from one nest to another, she is reduced to the same state as the bird whose nest we daily rob of an egg, in which case the stimulus for incubation is suspended. Of this we have a familiar example in the common domestic fowl. That the cuckow actually lays a great number of eggs, dissection seems to prove very decisively. Upon a comparison I had an opportunity of making between the ovarium, or racemus vitellorum, of a female cuckow, killed just as she had begun to lay, and of a pullet killed in the same state, no essential difference appeared. The uterus of each contained an egg perfectly formed, and ready for exclusion; and the ovarium exhibited a large cluster of eggs, gradually advanced from a very diminutive size to the greatest the yolk acquires before it is received into the oviduct. The appearance of one killed on the third of July was very different. In this I could distinctly trace a great number of the membranes which had discharged yolks into the oviduct; and one of them appeared as if it had parted with a yolk the preceding day. The ovarium still exhibited a cluster of enlarged eggs, but the most forward of them was scarcely larger than a mustard-seed.

"I would not be understood to advance, that every egg which swells in the ovarium at the approach or commencement of the propagating season is brought to perfection; but it appears clearly, that a bird, in obedience to the dictates of her own will, or to some hidden cause in the animal economy, can either retard or bring forward her eggs. Besides the example of the common fowl above alluded to, many others occur. If we destroy the nest of a blackbird, a robin, or almost any small bird, in the spring, when she has laid her usual number of eggs, it is well known, to every one who has paid any attention to inquiries of this kind, in how short a space of time she will produce a fresh set. Now, had the bird been suffered to have proceeded without interruption in her natural course, the eggs would have been hatched, and the young ones brought to a state capable of providing for themselves, before she would have been induced to make another nest, and excited to produce another set of eggs from the ovarium. If the bird had been destroyed at the time she was sitting on her first laying of eggs, dissection would have shewn the ovarium containing a great number in an enlarged state, and advancing in the usual progressive order. Hence it plainly appears, that

that birds can keep back or bring forward (under certain limitations) their eggs at any time during the ſeaſon appointed for them to lay; but the cuckow, not being ſubject to the common interruptions, goes on laying from the time ſhe begins till the eve of her departure from this country: for although old cuckows in general take their leave the firſt week in July (and I never could ſee one after the 5th day of that month, though I conceive it poſſible that here and there a ſtragling cuckow may be ſeen after this time); yet I have known an inſtance of an egg's being hatched in the neſt of an hedge-ſparrow ſo late as the 15th. And a farther proof of their continuing to lay till the time of their leaving us may, I think, be fairly deduced from the appearances on diſſection of the female cuckow above-mentioned, killed on the 3d of July.

Among the many peculiarities of the young cuckow, there is one that ſhews itſelf very early. Long before it leaves the neſt, it frequently, when irritated, aſſumes the manner of a bird of prey, looks ferocious, throws itſelf back, and pecks at any thing preſented to it with great vehemence, often at the ſame time making a chuckling noiſe like a young hawk. Hence probably the vulgar opinion, that this bird changes into a hawk, and devours its nurſe on quitting its neſt; whence the French proverb, *Ingrat comme un coucou*. Sometimes, when diſturbed in a ſmaller degree, it makes a kind of hiſſing noiſe, accompanied with a heaving motion of the whole body.

The growth of the young cuckow is uncommonly rapid. Its chirp is plaintive, like that of the hedge-ſparrow; but the ſound is not acquired from the foſter-parent, as it is the ſame whether it be reared by the hedge-ſparrow or any other bird. It never acquires the adult note during its ſtay in this country.

The ſtomachs of young cuckows contain a great variety of food. On diſſecting one that was brought up by wagtails, and fed by them at the time it was ſhot (though it was nearly of the ſize and fulneſs of plumage of the parent-bird), Mr. Jenner found in its ſtomach the following ſubſtances: flies and beetles of various kinds; ſmall ſnails with their ſhells unbroken; graſshoppers; caterpillars; part of a horſe-bean; a vegetable ſubſtance, reſembling bits of tough-graſs, rolled into a ball; and the ſeeds of a vegetable that reſembled thoſe of the gooſe-graſs. In the ſtomach of one fed by hedge-ſparrows, the contents were almoſt entirely vegetable; ſuch as wheat, ſmall vetches, &c. "But this (ſays our author) was the only inſtance of the kind I had ever ſeen, as theſe birds in general feed the young cuckow with ſcarcely any thing but animal food. However, it ſerved to clear up a point which before had ſomewhat puzzled me; for, having found the cuckow's egg in the neſt of a green-linnet, which begins very early to feed its young with vegetable food, I was apprehenſive, till I ſaw this fact, that this bird would have been an unfit foſter-parent for the young cuckow. The titlark, I obſerve, feeds it principally with graſshoppers.

"But the moſt ſingular ſubſtance, ſo often met with in the ſtomachs of young cuckows, is a ball of hair curiouſly wound up. I have found it of various ſizes, from that of a pea to that of a ſmall nutmeg. It ſeems to be compoſed chiefly of horſe-hairs; and from the reſemblance it bears to the inſide covering of the neſt, I conceive the bird ſwallows it while a neſtling. In the ſtomachs of old cuckows are often ſeen maſſes of hair; but theſe had evidently once

 formed

formed a part of the hairy caterpillar, which the cuckow often takes for its food."

There ſeems to be no preciſe time fixed for the departure of young cuckows. Mr. Jenner believes they go off in ſucceſſion, probably as ſoon as they are capable of taking care of themſelves; for, although they ſtay here till they become nearly equal in ſize and growth of plumage to the old cuckow, yet in this very ſtate the foſtering care of the hedge-ſparrow is not withdrawn from them: "I have frequently (ſays he) ſeen the young cuckow of ſuch a ſize that the hedge-ſparrow has perched on its back, or half-expanded wing, in order to gain ſufficient elevation to put the food into its mouth. At this advanced ſtage, I believe that young cuckows procure ſome food for themſelves; like the young rook, for inſtance, which in part feeds itſelf, and is partly fed by the old ones, till the approach of the pairing ſeaſon. If they did not go off in ſucceſſion, it is probable we ſhould ſee them in large numbers by the middle of Auguſt; for, as they are to be found in great plenty when in a neſtling ſtate, they muſt now appear very numerous, ſince all of them muſt have quitted the neſt before this time. But this is not the caſe; for they are not more numerous at any ſeaſon than the parent-birds are in the months of May and June."

From what has been ſaid it becomes evident that the ſame inſtinctive impulſe, which directs the cuckow to depoſite her eggs in the neſts of other birds, directs her young one to throw out the eggs and young of the owner of the neſt. The ſcheme of nature would be incomplete without it: for it would be extremely difficult, if not impoſſible, for the little birds deſtined to find ſuccour for the cuckow to find it alſo for their own young ones after a certain period; nor would there be room for them to inhabit the neſt.

It is ſuppoſed, that there are more male cuckows than females; ſince two are often ſeen in diſpute where a third has been in ſight, which, no doubt, was of the oppoſite ſex. Mr. Pennant obſerved, that five male birds were caught in a trap in one ſeaſon; and Mr. Latham ſays, "Out of at leaſt half a dozen that I have attended to, my chance has never directed me to a female; and it is to be wiſhed, that future obſervers may determine whether our obſervations have riſe only in chance, or are founded on the general circumſtance." He believes that the male birds are more liable to be ſhot, their note directing the gunner where to take aim, while the female is ſecured by her ſilence.

Cuckows may be, and often are, brought up tame, ſo as to become familiar. They will eat in this ſtate bread and milk, fruits, inſects, eggs, and fleſh either cooked or raw; but in a ſtate of nature they chiefly live on caterpillars. When fat, they are ſaid to be as good eating as a land-rail. The French and Italians eat them to this day. The ancient Romans admired them greatly as food: Pliny ſays that there is no bird which can be compared to them for delicacy. In migrating, the major part of theſe birds are ſuppoſed to go into Africa, ſince they are obſerved to viſit the iſland of Malta twice a year, in their paſſage backwards and forwards, as is ſuppoſed, to that part of the world.

CURIOUS

CURIOUS OBSERVATIONS ON HUNGER AND THIRST.

IT is found by experience, that life may be long protracted, by only a moderate allowance of water; for the acrimony and putrefaction of the humours are obviated by such dilution, the small vessels are kept permeable, and the lungs are furnished with that moisture which is essential to the performance of their functions. Fontanus, a writer of respectable authority in the estimation of Morgagni, relates the history of a woman who obstinately refused to take any sustenance, except, twice, during the space of fifty days, at the end of which period she died. But he adds, that she used water by way of drink, though in small quantity. Redi, who made many experiments (cruel and unjustifiable in our opinion) to ascertain the effects of fasting on fowls, observed, that none were able to support life beyond the ninth day to whom drink was denied; whereas one indulged with water lived more than twenty days.

Hippocrates has observed, that children are more affected by abstinence than young persons, these more than the middle-aged, and the middle-aged more than old men. The power to endure famine, however, must depend no less upon the state of health and strength than on the age of the sufferer. There are also particular constitutions which do not suffer much pain from the calls of hunger. Dr. Percival was informed by a young physician from Geneva, that, when he was a student at Montpelier, he fasted three nights and four days, with no other refreshment than a pint of water daily. His hunger was keen, but never painful, during the first and second days of his abstinence; and the two following days, he perceived only a faintness when he attempted either bodily or mental exertion: —A sense of coldness was diffused over his whole frame, but more particularly affected the extremities. His mind was in a very unusual state of pusillanimity; and he experienced a great tendency to tears whenever he recollected the circumstance which had been the occasion of his fasting. During the whole period, the alvine excretions were suppressed, but not those by the kidneys: and at the close of it, his skin became tinged with a shade of yellow. The first food he took was veal-broth; which had something of an intoxicating effect, producing a glow of warmth, and raising his spirits, so as to render him ashamed of his despondency. Perhaps in the case of Sextius Baculus, as recorded in the commentaries of Cæsar, the extraordinary courage and prowess which he suddenly exerted might be aided by the exhilerating effect of sustenance, which, under such circumstances, it is probable he would no longer decline. The fact, however, evinces, that neither his sickness nor the sensations of hunger had been so violent as much to impair his strength of body or vigour of mind. Pomponius Atticus, the celebrated friend of Cicero, who put a voluntary end to his life in the 77th year of his age by refusing all food, appears to have experienced ease from his disorder, rather than any acute sufferings by famine: "Sic cum biduò cibo se abstinuisset, subito febris decessit, leviorque morbus esse cæpit: tamen propositum nihilo secius perigit. Itaque die quinto, postquam id consilium inierat, decessit." From the former circumstance it has been conjectured, that he did not wholly deny himself the use of water, or of some other diluent. But, though a few

examples of this kind may be adduced, we have the evidence of numerous melancholy facts to shew, that the pressure of want is agonizing to the human frame: "I have talked, (says an ingenious writer), with the captain of a ship, who was one of six that endured it in its extremity, and who was the only person that had not lost his senses when they received accidental relief. He assured me his pains at first were so great, as to be often tempted to eat a part of one of the men who died, and which the rest of his crew actually for some time lived upon.—He said, that during the continuance of this paroxysm, he found his pains almost insupportable, and was desirous at one time of anticipating that death which he thought inevitable: but his pains, he said, gradually decreased after the sixth day (for they had water in the ship, which kept them alive so long), and then he was in a state rather of languor than desire; nor did he much wish for food, except when he saw others eating; and that for a while revived his appetite, though with diminished importunity. The latter part of the time, when his health was almost destroyed, a thousand strange images rose upon his mind; and every one of his senses began to bring him wrong information. The most fragrant perfumes appeared to him to have a fetid smell; and every thing he looked at took a greenish hue, and sometimes a yellow. When he was presented with food by the ship's company that took him and his men up, four of whom died shortly after, he could not help looking upon it with loathing instead of desire; and it was not till after four days that his stomach was brought to its natural tone, when the violence of his appetite returned with a sort of canine eagerness."

To those who by their occupations are exposed to such dreadful calamities, it is of serious importance to be instructed in the means of alleviating them. The American Indians are said to use a composition of the juice of tobacco, and the shells of snails, cockles, and oysters calcined, whenever they undertake a long journey, and are likely to be destitute of provisions. It is probable the shells are not burnt into quicklime, but only so as to destroy their tenacity, and to render them fit for levigation. The mass is dried, and formed into pills, of a proper size to be held between the gum and lip, which, being gradually dissolved and swallowed, obtund the sensations both of hunger and of thirst. Tobacco, by its narcotic quality, seems well adapted to counteract the uneasy impressions which the gastric juice makes on the nerves of the stomach when it is empty; and the combination of testaceous powders with it may tend to correct the secretion that is supposed to be the chief agent in digestion, and which, if not acid, is always united with acidity. Certain at least it is, that their operation is both grateful and salutary; for we find the luxurious inhabitants of the East-Indies mix them with the betel-nut, to the chewing of which they are universally and immoderately addicted. Perhaps such absorbents may be usefully applied, both to divide the doses and to moderate the virulence of the tobacco. For, in the internal exhibition of this plant, much caution is required, as it produces sickness, vertigo, cold clammy sweats, and a train of other formidable symptons, when taken in too large a quantity. During the time of war, the impressed sailors frequently bring on these maladies, that they may be admitted into the hospitals, and released from servitude. It would be an easy and safe experiment to ascertain the efficacy, and to adjust the ingredients, of the

Indian

Indian compoſition mentioned. And there is reaſon to believe, that the trial would be in ſome degree ſucceſsful; for it is known that ſmoking tobacco gives relief in thoſe habitual pains of the ſtomach which appear to ariſe from the irritation of the gaſtric ſecretions. The like effect is ſometimes produced by increaſing the flow of ſaliva, and ſwallowing what is thus diſcharged. And Dr. Percival has related the caſe of a gentleman, who uſed to maſticate, many hours daily, a piece of lead, which being neither hard, friable, nor offenſive to the palate, ſuited his purpoſe, as he thought, better than any other ſubſtance. He continued the cuſtom many years, deriving great eaſe from it, and ſuffering no ſenſible injury from the poiſonous quality of the metal. On mentioning this fact to a navy-ſurgeon, the doctor was told, that the ſailors, when in hot climates, are wont to mitigate thirſt by rolling a bullet in their mouths. A more innocent mean, the doctor obſerves, might be deviſed; but the efficacy of this evinces, that the ſalivary glands are for a while capable of furniſhing a ſubſtitute for drink. When a ſcarcity of water occurs at ſea, Dr. Franklin has adviſed, that the mariners ſhould bathe themſelves in tubs of ſalt-water: for, in purſuing the amuſement of ſwimming, he obſerved, that, however thirſty he was before immerſion, he never continued ſo afterwards; and that, though he ſoaked himſelf ſeveral hours in the day, and ſeveral days ſucceſſively, in ſalt-water, he perceived not, in conſequence of it, the leaſt taſte of ſaltneſs in his mouth. He alſo further ſuggeſts, that the ſame good effect might perhaps be derived from dipping the ſailor's apparel in the ſea; and expreſſes a confidence that no danger of catching cold would enſue.

To prevent the calamity of famine at ſea, it has been propoſed by Dr. Lind, that the powder of ſalep ſhould conſtitute part of the proviſions of every ſhip's company. This powder and portable ſoup, diſſolved in boiling water, form a rich thick jelly; and an ounce of each of theſe articles furniſhes one day's ſubſiſtence to a healthy full-grown man. Indeed, from Dr. Percival's experiments it appears, that ſalep contains more nutritious matter, in proportion to its bulk, than any other vegetable production now uſed as food. It has the property alſo of concealing the nauſeous taſte of ſalt-water; and conſequently may be of great advantage at ſea, when the ſtock of freſh-water is ſo far conſumed, that the mariners are put upon ſhort allowance. By the ſame mucilaginous quality, it covers the offenſiveneſs, and even, in ſome meaſure, corrects the acrimony, of ſalted and putreſcent meats. But, as a preſervative againſt hunger, ſalep would be moſt efficacious combined with an equal weight of beef-ſuet. By ſwallowing little balls of this lubricating compound at proper intervals, the coats of the ſtomach would be defended from irritation: and as oils and mucilages are highly nutritive, of ſlow digeſtion, and indiſpoſed to paſs off by perſpiration, they are peculiarly well adapted to ſupport life in ſmall quantities. This compoſition is ſuperior in ſimplicity, and perhaps equal in efficacy, to the following one, ſo much extolled by Avicenna the celebrated Arabian phyſician; to whom we are indebted for the introduction of rhubarb, caſſia, tamarinds, and ſenna, into the materia medica: "Take ſweet almonds and beef-ſuet, of each one pound; of the oil of violets two ounces; and of the roots of marſh-mallows one ounce: bray theſe ingredients together in a mortar, and form the

the mass into boluses, about the size of a common nut." Animal fat is singularly powerful in assuaging the most acute sensations of thirst, as appears from the narrative of the sufferings experienced by those who were confined in the black hole at Calcutta. A hundred and forty-six persons, exhausted by fatigue and military duty, were there thrust together into a chamber of eighteen cubic feet, having only two windows, strongly barred with iron, from which, in a close sultry night, and in such a climate as that of Bengal, little or no circulation of fresh air could be enjoyed. In a few minutes, the unhappy wretches fell into so profuse a perspiration, that an idea can hardly be formed of it; and this was succeeded by a raging thirst, which increased in proportion as the body was drained of its moisture. Water! water! became the universal cry; and an old soldier on the outside, through pity, furnished them with a few skinfuls of it. But these scanty supplies, like sprinklings on the fire, served only to feed and increase the flame. From this experience of its effects, Mr. Holwell, their chief, determined to drink no more; and kept his mouth moist by sucking the perspiration out of his shirt-sleeves, and catching the drops as they fell from his head and face. "You cannot imagine (says he) how unhappy I was if any of them escaped me." He came into the prison without his coat, the season being too hot to bear it: and one of his miserable companions, observing the expedient he had hit upon of allaying his thirst, robbed him from time to time of a considerable part of his store. This plunderer, whom he found to be a young gentleman in the service of the East-India Company, afterwards acknowledged, that he owed his life to the many comfortable draughts which he derived from him. Before Mr. Holwell adopted this mode of relief, he had attempted, in an ungovernable fit of thirst, to drink his own urine: but it was so intensely bitter, that a second taste could not be endured; whereas, he assures us, no Bristol water could be more soft and pleasant than his perspiration. And this, we may presume, consisted chiefly of animal fat, melted by excessive heat, and exuding from the cellular membrane through the pores of the skin.

Persons who have been accustomed to animal food are soon reduced when supplied only with the farinacea. Several years ago, to determine the comparative nutritive powers of different substances, an ingenious young physician, as Dr. Percival informs us, made a variety of experiments on himself, to which he unfortunately fell a sacrifice. He lived a month upon bread and water; and under this regimen of diet he every day diminished much in his weight. But in 1784, a student of physic at Edinburgh confined himself for a longer space of time to a pint of milk and half a pound of white bread daily: and he passed through the usual labours of study and exercise without feeling any decay of health or strength, and without any sensible loss of bulk. The cutaneous, urinary, and alvine, excretions, were very scanty during the whole period; and the discharge of fæces occured only once in a week. In this case the oily and coagulable parts of the milk probably furnished a larger proportion of aliment, and at the same time contributed to check the waste by perspiration and other discharges; for oleaginous substances are retained long in the body by their viscidity. Dr. Russel, in his Natural History of Aleppo, relates, that in those seasons when oil abounds, the inhabitants, by indulgence in it, are disposed to fever,

and

and affected with infarctions of the lungs; maladies which indicate both retention and obstruction. Milk has been suspected by some of producing similar effects, though in a slighter degree; and the free use of it has been on this account forbidden to asthmatics.

Gum-arabic might be a good substitute for salep in the composition already recommended; and, as it will give such firmness to the mass as to require manducation, the saliva, by this means separated and carried into the stomach, would further contribute to assuage the sensations both of hunger and of thirst. This gum, combined with sugar and the whites of eggs, has been lately extolled in France, under the name of *patigumo*, as a remedy for catarrhal defluxions. Dr. Percival has seen cakes made of these ingredients, and thinks they might very well be applied to the purpose of obviating hunger. They are not perishable in the hottest climates, may be carried about the person with convenience, and though very tough are pleasant to the taste. In the formula by which they are made, the proportion of sugar is too large, and that of gum-arabic too small, if the mass be intended to assuage the cravings of appetite. According to our author's information, the receipt is as follows: "Take of fine sugar four ounces, and of gum-arabic one ounce: levigate them well together; and add half an ounce of rose-water, and of the white of eggs a sufficient quantity."

In our attempts to recover those who have suffered under the calamities of famine, great circumspection is required. Warmth, cordials, and food, are the means to be employed; and it is evident that these may prove too powerful in their operation, if not administered with caution and judgment. For the body, by long fasting, is reduced to a state of more than infantile debility; the minuter vessels of the brain, and of the other organs, collapse for want of fluids to distend them; the stomach and intestines shrink in their capacity; and the heart languidly vibrates, having scarcely sufficient energy to propel the scanty current of blood. Under such circumstances, a proper application of heat seems an essential measure, and may be effected by placing on each side a healthy man in contact with the patient. Pediluvia or fomentations may also be used with advantage. The temperature of these should be lower than that of the human body, and gradually increased according to the effects of their stimulus. New milk, weak broth, or water-gruel, ought to be employed both for the one and the other; as nutriment may be conveyed into the system this way, by passages probably the most pervious in a state of fasting, if not too long protracted. "A lad at Newmarket, a few years ago, having been almost starved in order that he might be reduced to a proper weight for riding a match, was weighed at nine o'clock in the morning, and again at ten; and he was found to have gained near thirty ounces in weight in the course of an hour, though he had only drunk half a glass of wine in the interval. The wine probably stimulated the action of the nervous system, and incited nature, exhausted the abstinence, to open the absorbent pores of the whole body, in order to suck in some nourishment from the air." But no such absorption as this can be expected in a state of extreme weakness and emaciation gradually induced; because the lymphatics must partake of the general want of tone and energy. And notwithstanding the salutary effects of wine in the case of the

jockey, who, it is likely, had been reduced by sweating as well as by abstinence, such a stimulant might prove dangerous, and even fatal, in other cases. The yolk of one egg was, to Cornaro, sufficient for a meal; and the narrative of this noble Venetian, in whom a fever was excited by the addition of only two ounces of food to his daily allowance, shews, that the return to a full diet should be conducted with great caution, and by very slow gradations.

DESCRIPTION OF THE ISLAND OF MADAGASCAR.

MADAGASCAR is the largest of the African islands, is situated between 43° and 51° of E. Long. and between 12° and 26° of S. Lat. extending in length near one thousand miles from north-north-east to south-south-west, and about three hundred in breadth where broadest. It was discovered in 1506 by Laurence Almeyda; but the Persians and the Arabians were acquainted with it from time immemorial under the name of Serandib. Alphonzo Albukerque ordered Ruy Pereira dy Conthinto to visit the interior parts, and that general intrusted Tristan d'Acunha with the survey. The Portuguese called it the island of St. Laurence; the French, who visited it in the reign of Henry IV. named it Isle Dauphine; its proper name is Madegasse. It is now, however, by common consent, called Madagascar.

This large island, according to many learned geographers, is the Cerné of Pliny, and the Menuthiasde of Ptolemy. It is every where watered by large rivers, streams, and rivulets, which have their source at the foot of that long chain of mountains which runs through the whole extent of the island from east to west. The two highest promontories are called Vivagora and Botistmene.

These mountains (according to the Abbé Rochon) inclose within their bosoms a variety of precious minerals and useful fossils. The traveller (who for the first time rambles over savage and mountainous countries, intersected with valleys and with hills, where nature left to herself brings forth the most singular and the most varied productions) is involuntarily surprised and terrified at the sight of precipices, the summits of which are crowned with monstrous trees, that seem coeval with the world. His astonishment is redoubled at the noise of those grand cascades, the approach to which is generally inaccessible. But to those views so sublimely picturesque, rural scenes soon succeed: little hills, gentle rising grounds, and plains, the vegetation of which is never repressed by the intemperance or the vicissitude of the seasons. The eye contemplates with pleasure those vast savannas which nourish numberless herds of bullocks and of sheep. You behold a flourishing agriculture, produced almost solely by the fertilising womb of nature. The fortunate inhabitants of Madagascar do not bedew the earth with their sweat; they scarcely stir the ground with a rake, and even that slight preparation is sufficient. They scrape little holes at a small distance from each other, into which they scatter a few grains of rice, and cover them with their feet; and so great is the fertility of the soil, that the lands sown in this careless manner produce an hundred fold.

The forests present a prodigious variety of the most useful and the most beautiful trees; ebony, wood for dying, bamboos of an enormous

mous thickness, and palm-trees of every kind. The timber employed in ship-building is no less common than those so much prized by the cabinet-maker. We are told by the French governor Flacourt, in his history of this island, that in the year 1650 he sent to France fifty-two thousand weight of aloes of an excellent quality. All of these various trees and shrubs are surrounded by an infinite number of parasitical plants: mushrooms of an infinite diversity of kinds and colours are to be met with every where in the woods; and the inhabitants know well how to distinguish those which are prejudicial to the health. They collect large quantities of useful gums and resins; and out of the milky sap of a tree, denominated by them *finguiore*, the inhabitants, by means of coagulation, make that singular substance known to naturalists by the name of gum-elastic.

Besides the aromatic and medicinal herbs which abound in the forests, the island produces flax and hemp of a length and strength which surpass any in Europe. Sugar-canes, wax, honey of different kinds, tobacco, indigo, white-pepper, gum-lac, ambergris, silk, and cotton, would long since have been objects of commerce which Madagascar would have yielded in profusion, if the Europeans, in visiting the island, had furnished the inhabitants with the necessary information for preparing and improving these several productions.

The sugar-canes (as we are informed by another traveller) are much larger and finer than any in the West Indies; being as thick as a man's wrist, and so full of juice, that a foot of them will weigh two pounds. When the natives travel, they carry a sugar-cane along with them, which will support them for two or three days. Here are also plenty of tamarinds; and such quantities of limes and oranges, that very large casks may be filled with their juices at a trifling expence, as they may be purchased for iron-pots, muskets, powder, ball, &c. During the short time that Admiral Watson's squadron staid here in 1754, Mr. Ives preserved about half a hogshead full of those juices, which proved afterwards of the greatest service to the ships crews. It must be observed, however, that no good water is to be had at St. Augustine's, in the south-west part of the island, where ships usually touch, unless boats are sent for it four or five miles up the river; and, instead of filling their casks at low-water (as is the case in most other rivers), they must begin to fill at about a quarter's flood: the reason assigned for this is, that the river has a communication with the sea at other places besides this of St. Augustine's Bay; and it has been found by experience, that the sea-water brought into the river by the flood-tide is not discharged till a quarter's flood of the next tide in St. Augustine's Bay; and for three miles up the river, the water is always very brackish, if not quite salt.

The abundance and variety of provisions of every kind, which a fine climate and fertile soil can produce, are on no part of the globe, according to M. Rochon, superior to those of Madagascar: game, wild-fowl, poultry, fish, cattle, and fruits, are alike plentiful. The oxen, Mr. Ives also informs us, are large and fat, and have each a protuberance of fat between the shoulders, weighing about twenty pounds. Their flesh is greatly esteemed by all the European nations trading to India, and ships are sent to Madagascar on purpose to kill and salt them on the island. The protuberance of fat above-mentioned is particularly esteemed after it has lain some time in salt; but our author says, that he could not join in the encomiums either

on this piece or the beef in general; as the herbage on which the creatures feed gives their flesh a particular taste, which to him was disagreeable. The sheep differ little from the goats; being equally hairy, only that their heads are somewhat larger: their necks resemble that of a calf, and their tails weigh at least ten pounds. Vast quantities of locusts rise here from the low lands in thick clouds, extending sometimes to an incredible length and breadth. The natives eat these insects, and even prefer them to their finest fish. Their method of dressing them is to strip off their legs and wings, and fry them in oil.

The inhabitants (termed Melagaches or Madecasses), M. Rochon informs us, are in person above the middle size of Europeans. The colour of the skin is different in different tribes: among some it is of a deep black, among others tawney; some of the natives are of a copper colour, but the complexion of by far the greatest number is olive. All those who are black have woolly hair like the negroes of the coast of Africa: those, on the other hand, who resemble Indians and Mulattoes, have their hair equally straight with that of the Europeans; the nose is not broad and flat; the forehead is large and open; in short, all the features are regular and agreeable. Their physiognomy displays the appearance of much frankness and satisfaction: they are desirous only of learning such things as may administer to their necessities; that species of knowledge which demands reflection is indifferent to them; sober, agile, active, they spend the greatest part of their time either in sleep or in amusement. In fine, according to the Abbé, the native of Madagascar, like savages in general, possesses a character equally devoid of vice and virtue; the gratifications of the present moment solely occupy his reflections; he possesses no kind of foresight whatever; and he cannot conceive the idea that there are men in the world who trouble themselves about the evils of futurity.

The population of the island has been estimated at four millions; but this calculation is thought exaggerated by our author, and indeed it appears incredible to us. Every tribe or society inhabits its own canton, and is governed by its own customs. Each of these acknowledges a chief; this chief is sometimes elective, but more usually hereditary. The lands are not divided and portioned out, but belong to those who are at the trouble of cultivating them. These islanders make use of neither locks nor keys; the principal part of their food consists in rice, fish, and flesh; their rice is moistened with a soup which is seasoned with pimento, ginger, saffron, and aromatic herbs. They display wonderful cunning in catching a variety of birds, many of which are unknown in Europe: they have the pheasant, the partridge, the quail, the pintado, the wild-duck, teal of five or six different kinds, the blue-hen, the black-paroquet, and the turtle-dove, in great plenty; and, also a bat of a monstrous size, which is much prized on account of its exquisite flavour. These last are so hideous in their appearance, that they at first terrify the European sailors; but, after they have vanquished their repugnance to them, they prize their flesh infinitely before that of the pullets of their own country. The Melagaches also catch an immense quantity of sea-fish; such as the dorado, the sole, the herring, the mackarel, the turtle, &c. with oysters, crabs, &c. The rivers afford excellent eels, and mullets of an exquisite flavour.

The

The inhabitants near St. Augustine's Bay, Mr. Ives informs us, speak as much broken English as enables them to exchange their provisions for European articles. These, on the part of the Melagaches, are cattle, poultry, milk, fruit, rice, salt, porcelain, potatoes, yams, fish, lances, and shells. From the Europeans they receive muskets, powder, bullets, flints, cloathes, (including handkerchiefs, and linen of all kinds), beads, iron-pots, &c.—Silver, which they call manila, is in great esteem with them, and is made by them into bracelets for their wives.

That part of the island at which the English squadron touched, is in the dominions of the king of Baba, who, by the account of Mr. Ives, seemed greatly to affect to be an Englishman. They had no sooner touched at the island, than they were waited on by one called Robin Hood, and another person, both of whom bore the office of pursers. Along with these were Philibey the general; John Anderson and Frederic Martin, captains. Nor did the king himself and his family disdain to pay them a visit; who, in like manner, were distinguished by English names; the king's eldest son being called the Prince of Wales, and the court not being without a Duke of Cumberland, a Prince Augustus, princesses, &c. as in England. All these grandees came on-board naked, excepting only a slight covering about their loins and on their shoulders, made of a kind of grass growing on the island; which they had adorned with small glass-beads by way of border or fringe. Their hair resembled that of the Indians in being long and black, rather than the woolly heads of the African negroes. "The wives of the Melagaches (according to our author) take great pains with their husbands hair; sometimes putting it in large and regular curls; at other times braiding it in great order, and making it shine with a particular oil which the island produces. The men always carry in their hands a wooden lance headed with iron, which is commonly made very neat; and they are such excellent marksmen, that they will strike with it a very small object at thirty or forty yards distance. They have also commonly a musket, which they get from Europeans in exchange for cattle, and are always sure to keep in excellent order. I am sorry to say (continues Mr. Ives) that the English are frequently guilty of great impositions in this kind of traffic, by disposing of cheap and ill-tempered barrels among the poor inhabitants, who sometimes lose their lives by the bursting of the pieces. Such iniquitous practices as these must in the end prove injurious to the nation; and has indeed already made the name of more than one half of these traders truly infamous among the deluded but hitherto friendly Madagascarians.

"They are a civil and good-natured people, but easily provoked, and apt to shew their resentment on the least provocation, especially when they think themselves injured or slighted. Another characteristic of them is, the very high notions of dignity they entertain of their king; which is carried to such a height, that they are never more sensibly hurt than when they imagine he is treated with incivility or disrespect. This mighty monarch resides in a town built with mud, about twelve miles up the country from St. Augustine's Bay. On the east side of the bay, as you enter, there resided one Prince William, a relation and tributary to the king; but who in most cases acted as an independent prince, and always used his utmost endeavours with the officers to cause them to buy their pro-

visions from him, and not from the king or his subjects. In this prince's territories, not far from the sea, are the remains of a fort built by Avery the Pirate.

"All the women of Madagascar, excepting the very poorest sort, wear a covering over their breasts and shoulders, ornamented with glass-beads, and none go without a cloth about their loins. They commonly walk with a long slender rod or stick. The men are allowed to marry as many women as they can support.

"During our stay at this island (says Mr. Ives), I observed, with great concern, several miserable objects in the last stage of the venereal disease. They had not been able to find any cure; and, as far as I could learn, their doctors are totally ignorant of medicine. The only method they use for curing all distempers, as well external as internal, is the wearing on the arm or neck a particular charm or amulet; or besmearing the part affected with earth moistened with the juice of some plant or tree, and made up into a soft paste.

"I took some pains to learn their religious tenets; and find that they worship one Universal Father; whom, when they speak in English, they call God; and in whom they conceive all kinds of perfection to reside. The sun they look upon as a glorious body; and, I believe, as a spiritual being, but created and dependent. They frequently look up to it with wonder, if not with praise and adoration. They make their supplications to the One Almighty, and offer sacrifices to him in their distresses. I had the curiosity to attend a sacrifice, at the hut of John Anderson, whose father had for a long time been afflicted with sickness. About sun-set an ox was brought into the yard; and the son, who officiated as priest, slew it. An altar was reared nigh, and the post of it was sprinkled with the blood of the victim. The head, after its being severed from the body, was placed, with the horns on, at the foot of the altar: the caul was burned on the fire, and most of the pluck and entrails boiled in a pot. The sick man, who was brought to the door, and placed on the ground so as to face the sacrifice, prayed often, and seemingly with great fervency. His eyes were fixed attentively towards the heavens, and his hands held up in a supplicating posture. The ceremony ended with the son's cutting up the ox into small pieces; the greatest part of which he distributed among the poor slaves belonging to his father and himself; reserving, however, some of the best pieces for his own use. Upon the whole, I saw so many circumstances in this Madagascarian sacrifice, so exactly resembling those described in the Old Testament as offered up by the Jews, that I could not turn my thoughts back to the original, without being sensibly struck by the exactness of the copy."

When the squadron first arrived at Madagascar, the King of Baba, a man of about sixty years of age, was ill of the gout. Having demanded of Admiral Watson some presents, the latter complimented him, among other things, with some brandy. The monarch then asked him if he had any doctor with him, and if he was a great doctor, and a king's doctor? To all which being answered in the affirmative, he desired him to bring some mahomets (medicines) for his sick knee. With this requisition Mr. Ives designed to comply; but, having waited until some officers should be ready to accompany him, his majesty, in the mean time, took such a dose of brandy as quickly sent the gout into his head, and occasioned his death. Mr.

Ives

Ives obſerves, that it happened very luckily for him that the monarch's deceaſe happened without his having taken any of the medicines intended for him, as it would have been impoſſible to avoid the imputation of having poiſoned him, which would certainly have been reſented by his loyal ſubjects.

The king's death occaſioned great confuſion; the grandees being deſirous that it ſhould be concealed for ſome time. This, however, was found impoſſible; on which they ſet off for the mud town about eleven o'clock the ſame evening. All the inhabitants of the village followed their example; leaving only the dogs, who ſet up the moſt hideous howling. Captain Frederic Martin, coming to take leave of the Engliſh, begged with great earneſtneſs for a freſh ſupply of gunpowder; whiſpering that the king was dead, and that they ſhould in all probability go to war about making another. They had been formerly told, that one who had the title of Duke of Baba would certainly ſucceed to the throne; but they afterwards learned, that Philibey the general having eſpouſed the cauſe of Raphani the late king's ſon, and taken him under his tutelage and protection, this youth, who was only about ſixteen years of age, ſucceeded his father as king of Baba.

The following is a deſcription of the ſouthern diviſion of the iſland, from the Abbé Rochon.

"That part of Madagaſcar in which Fort Dauphin is ſituated is very populous. Almoſt all the villages are placed on eminences, and ſurrounded with two rows of ſtrong palliſades, ſomewhat in the manner of ſuch of our fences as are compoſed of hurdles and turf. Within, is a parapet of ſolid earth about four feet in height; large pointed bamboos placed at the diſtance of five feet from each other, and ſunk in a pit, form a kind of loop-holes, which contribute towards the defence of theſe villages, ſome of which are beſides fortified with a ditch ten feet in breadth and ſix in depth. The dwelling of the chief is called a *donac*. When the chiefs go abroad, they are always provided with a muſket and a ſtick armed with iron, and adorned at the extremity with a little tuft of cow's hair. They wear a bonnet of red wool. It is chiefly by the colour of their bonnet that they are diſtinguiſhed from their ſubjects. Their authority is extremely limited: however, in the province of Carcanoſſi, the lands by cuſtom belong to their chiefs, who diſtribute them among their ſubjects for the purpoſes of cultivation; they exact a trifling quit-rent in return, which in their language is called *faenſa*.—The people of Carcanoſſi are not altogther ignorant of the art of writing; they even poſſeſs ſome hiſtorical works in the Madagaſcar tongue: but their learned men, whom they term *Ombiaſſes*, make uſe of the Arabic characters alone. They have treatiſes on medicine, geomancy, and judicial aſtrology; the moſt renowned live in the province of Matatane: it is in that diſtrict that magic ſtill remains in all its glory; the Matatanes are actually dreaded by the other Madecaſſes on account of their excellence in this art. The Ombiaſſes have public ſchools in which they teach geomancy and aſtrology. The natives have undoubtedly learned the art of writing from the Arabians, who made a conqueſt of this iſland about three hundred years ſince.

"The people of the province of Anoſſi, near Fort Dauphin, are lively, gay, ſenſible, and grateful; they are paſſionately fond of women;

women; are never melancholy in their company; and their principal occupation is to please the sex: indeed, whenever they meet their wives, they begin to sing and dance. The women, from being happy, are always in good humour. Their lively and cheerful character is extremely pleasing to the Europeans. I have often been present at their assemblies, where affairs of importance have been agitated; I have observed their dances, their sports, and their amusements, and I have found them free from those excesses which are but too common among polished nations. Indeed I was too young at this time for my observations to be of much weight: but, if my experience be insufficient to inspire confidence, I beg the reader will rather consider the nature of things, than the relations given by men without principles or intelligence, who fancy that they have a right to tyrannize over the inhabitants of every country which they can subdue. If the people of Madagascar have sometimes availed themselves of treachery, they have been forced to it by the tyranny of the Europeans. The weak have no other arms against the strong. Could they defend themselves by any other means from our artillery and bayonets? They are uninformed and helpless; and we avail ourselves of their weakness, in order to make them submit to our covetousness and caprice. They receive the most cruel and oppressive treatment, in return for the hospitality which they generously bestow on us; and we call them traitors and cowards, when we force them to break the yoke with which we have been pleased to load them."

In the second volume of Count Benyowsky's Memoirs and Travels we have the following account of the religion, government, &c. of the people of this island.

"The Madagascar nation believe in a Supreme Being, whom they call *Zanhare*, which denotes creator of all things. They honour and revere this Being; but have dedicated no temple to him, and much less have they substituted idols. They make sacrifices, by killing oxen and sheep, and they address all these libations to God. It has been asserted, that this nation likewise makes offerings to the devil: but in this there is a deception; for the piece of the sacrificed beast which is usually thrown into the fire is not intended in honour of the devil, as is usually pretended. This custom is very ancient, and no one can tell the true reason of it. With regard to the immortality of the soul, the Madagascar people are persuaded, that, after their death, their spirit will return again to the region in which the Zanhare dwells; but they by no means admit that the spirit of man, after his death, can suffer any evil. As to the distinction of evil or good, they are persuaded that the good and upright man shall be recompensed, in this life, by a good state of health, the constancy of his friends, the increase of his fortune, the obedience of his children, and the happiness of beholding the prosperity of his family: and they believe that the wicked man's fate shall be the contrary to this. The Madagascar people, upon this conviction, when they make oaths, add benedictions in favour of those who keep them, and curses against those who break them. In this manner it is that they appeal to the judgment of Zanhare, in making agreements; and it has never been known, or heard of, that a native of Madagascar has broken his oath, provided it was made in the usual manner, which they say was prescribed by their forefathers.

"As

"As to their kings and form of government, &c. the Madagascar people have always acknowledged the line of Ramini, as that to which the rights of Ampansacabe or sovereign belongs. They have considered this line as extinct since the death of Dian Ramini Larizon, which happened sixty-six years ago, and whose body was buried upon a mountain, out of which the river Manangourou springs; but, having acknowledged the heir of this line on the female side, they re-established this title in the year 1776. The right of the Ampansacabe consists in nominating the Rohandrians to assist in the cabars, at which all those who are cited are bound to appear, and the judgment of the Ampansacabe in his cabar is decisive. Another prerogative of the Ampansacabe is, that each Rohandrian is obliged to leave him by will a certain proportion of his property, which the successors usually purchase by a slight tribute or fine. Thirdly, the Ampansacabe has a right to exact from each Rohandrian one tenth of the produce of his land, and a number of horned cattle and slaves, in proportion to the riches of the country possessed by each Rohandrian.—The second order is composed of the Rohandrians, or princes. Since the loss of the Ampansacabe, three of these Rohandrians have assumed the title of kings, namely the Rohandrian of the province of Mahavelou, named Hiavi; of the province of Voemar, named Lambouin; and a third at Bombetoki, named Cimanounpou. The third order consists of the Voadziri, or lords of a district, composed of several villages. The fourth order consists of the Lohavohits, or chiefs of villages. The fifth order, Ondzatzi, who are freemen, and compose the attendants or followers of the Rohandrians, Voadziri, or Lohavohits. The sixth order consists of Ombiasses, or learned men; and this order forms the warriors, workmen, physicians, and diviners: these last possess no charge. The seventh order consists of Ampurias or slaves.

"Having made inquiries from Bombetoki passing to the northward, and as far as Itapere, the result proved that there are thirty-eight Rohandrians actually reigning, and two hundred and eighty-seven Voadziri. With respect to the Lohavohits, Ondzatzi, and Ombiasses, it was not possible to obtain any accurate determination of their number. These orders preserve a regular gradation, respecting which it would be very difficult to give a detailed account. They live in the manner we read of concerning the ancient patriarchs. Every father of a family is priest and judge in his own house, though he depends upon the Lohavohits, who superintends his conduct. This last is answerable to his Voadziri; and the Voadziri to the Rohandrian.

"The Madagascar people, having no communication with the main land of Æthiopia, have not altered their primitive laws; and the language throughout the whole extent of the island is the same. It would be a rash attempt to determine the origin of this nation; it is certain that it consists of three distinct races, who have for ages past formed intermixtures which vary to infinity. The first race is that of Zafe Ibrahim, or descendants of Abraham; but they have no vestige of Judaism, except circumcision, and some names, such as Isaac, Reuben, Jacob, &c. This race is of a brown colour.—The second race is that of Zaferamini: with respect to this, some books which are still extant among the Ombiasses, affirm, that it is not more than six centuries since their arrival at Madagascar—With respect

respect to the third race of Zafe Canambou, it is of Arabian extraction, and arrived much more lately than the others from the coasts of Æthiopia: hence it possesses neither power nor credit, and fills only the charges of writers, historians, poets, &c.

"In regard to arts and trades, the Madagascar nation are contented with such as are necessary to make their moveables, tools, utensils, and arms for defence; to construct their dwellings, and the boats which are necessary for their navigation; and lastly, to fabricate cloths and stuffs for their clothing. They are desirous only of possessing the necessary supplies of immediate utility and convenience. The principal and most respected business, is the manufacture of iron and steel. The artists in this way call themselves *ampanefa vihe*. They are very expert in fusing the ore, and forging utensils, such as hatchets, hammers, anvils, knives, spades, sagayes, razors, pincers, or tweezers for pulling out the hair, &c. The second class of the goldsmiths *(ompanefa vola mena)*: they cast gold in ingots, and make up bracelets, buckles, ear-rings, drops, rings, &c. The third are called *ompavillanga*, and are potters. The fourth are the *ompanevatta*, or turners in wood, who makes boxes called *vatta*, plates, wooden and horn spoons, bive-hives, coffins, &c. The fifth, *ompan cacafou*, or carpenters. They are very expert in this business, and make use of the rule, the plane, the compasses, &c. The sixth are the *ompaniavi*, or rope-makers. They make their ropes of different kinds of bark of trees, and likewise of hemp. The seventh, *ampan lamba*, or weavers. This business is performed by women only, and it would be reckoned disgraceful in a man to exercise it. The *ombiasses* are the literary men and physicians, who give advice only. The *herauvitz* are comedians and dancers.

"The Madagascar people always live in society; that is to say, in towns and villages. The towns are surrounded by a ditch and pallisades (as already mentioned), at the extremities of which a guard from twelve to twenty armed men is kept. The houses of private people consist of a convenient cottage, surrounded by several small ones: the master of the house dwells in the largest, and his women or slaves lodge in the smaller. These houses are built of wood, covered with leaves of the palm-tree or straw.

"The houses of the great men of the country are very spacious; each house is composed of two walls and four apartments: round about the principal house other smaller habitations are built for the accommodation of the women, and the whole family of the chief; but the slaves cannot pass the night within them. Most of the houses inhabited by the Rohandrians are built with taste and admirable symmetry."

The French attempted to conquer and take possession of the whole island, by order, and for the use of, their Most Christian Majesties, Louis XIII. and XIV. and they maintained a footing on it from the year 1642 to 1657. During this period, by the most cruel treachery, they taught the native princes the barbarous traffic in slaves, by villainously selling to the Dutch governor of Mauritius a number of innocent people, who had been assisting them in forming a settlement at Fort Dauphin.

The Abbé Rochon tells us, that the insalubrity of the air in Madagascar determined his countrymen in 1664 to quit that immense island, in order to establish themselves at so inconsiderable a place as the

the Isle of Bourbon, which is scarcely perceptible in a map of the globe; but it is apparent, from the account of the state of the French affairs on the island of Madagascar in 1661, when Flacourt's narrative was published, that their ill treatment of the natives had raised such a general and formidable opposition to their residence in the country, that the French were obliged to abandon their possessions for other reasons than the unhealthy qualities of the climate. We cannot here detail all the oppressive measures of the French, which the Abbé himself candidly censures in the strongest terms; but shall extract the following narrative, both because it is interesting in itself, and exhibits the causes and the means of their expulsion.

La Case, one of the French officers employed by the governor of Fort Dauphin against the natives, was so successful in all his enterprises, that they called him *Deaan Pous*, the name of a chief who had formerly conquered the whole island. The French governor, jealous of his renown, treated him harshly, and refused to allow him the rank or honours due to his valour. The sovereign of the province of Amboulle, called *Deaan Rascitat*, taking advantage of his discontent, prevailed on him to become his general. Five Frenchmen followed him. Deaan Nong, the daughter of Rascitat, captivated by the person and heroism of La Case, offered him her hand with the consent of her father. The chief, grown old, infirm, and arrived at the last stage of existence, had the satisfaction of securing the happiness of his subjects, by appointing his son-in-law absolute master of the rich province of Amboulle. La Case, in marrying Deaan Nong, refused to take the titles and honours attached to the sovereign power: he would accept of no other character than that of the first subject of his wife, who was declared sovereign at the death of her father. Secure in the affection of this princess, who was not only possessed of personal charms, but of courage and great qualities, he was beloved and respected by her family, and by all the people of Amboulle, who reverenced him as a father; and yet, how much soever he wished it, he was unable to contribute to the prosperity of his countrymen at Fort Dauphin, whom he knew to be in the utmost distress. The governor, regarding him as a traitor, had set a price on his head, and on the heads of the five Frenchmen who had followed him. The neighbouring chiefs, irritated at this treatment of a man whom they so much venerated, unanimously refused to supply the fort with provisions. This occasioned a famine in the place, which, with a contagious fever and other maladies, reduced the French garrison to eighty men.

The establishment at Fort Dauphin, on the point of being totally destroyed, was preserved for a short time from ruin by the arrival of a vessel from France, commanded by Kercadio an officer of Brittany, who, with the assistance of a young advocate who had been kidnapped on-board the vessel, prevailed on the envious and implacable governor Chamargou, to make peace with La Case and his sovereign spouse Deaan Nong. This peace, however, lasted but for a short time; the French, restless and insolent to the neighbouring nations, again drew on them the vengeance of the natives. Even the few friends whom they had been able to acquire by means of La Case, were rendered hostile to them by the tyrannic zeal of the missionaries; who, not contented with being tolerated and allowed to make converts, insisted on Deaan Marang sovereign of Mandrarey, a power-

ful, courageous, and intelligent, chief, well-disposed to the French, to divorce all his wives but one. This prince, not convinced of the necessity of such a measure, assured them that he was unable to change his habits and way of living, which were those of his forefathers. "You would allow me (says he) to have one wife; but, if the possession of one woman is a blessing, why should a numerous seraglio be an evil, while peace and concord reign among those of whom it is composed? Do you see among us any indications of jealousy or hatred? No, all our women are good; all try to make me happy; and I am more their slave than their master." This speech had no effect on Father Stephen, superior of the Madagascar mission. He peremptorily ordered him instantly to repudiate all his wives except one; and threatened, in presence of the women, to have them taken from him by the French soldiers if he hesitated in complying with his commands. It is easy to imagine, says M. Rochon, with what indignation this language must have been heard in the *donac* or palace of this prince. The females assailed the missionary on all sides; loaded him with execration and blows; and, in their fury, would doubtless have afforded him no more quarter than the Thracian women did Orpheus, if Deaan Manang, notwithstanding his own agitation, had not made use of all his authority to save him.

In order to free himself from the persecution of this priest, he removed with his family seventy or eighty miles up into the country; but he was soon followed by Father Stephen and another missionary, with their attendants. The chief, Manang, still received them civilly; but he intreated them no longer to insist on the conversion of him and his people, as it was impossible to oblige them to quit the customs and manners of their ancestors. The only reply which Father Stephen made to this intreaty, was by tearing off the *oli*, and the amulets and charms which the chief wore as sacred badges of his own religion; and, throwing them into the fire, he declared war against him and his nation. This violence instantly cost him and his followers their lives: they were all massacred by order of Manang, who vowed the destruction of all the French in the island; in which intention he proceeded in a manner that has been related by an eye-witness, who was afterwards provincial commissary of artillery, in a narrative published at Lyons in 1722, intitled Voyage de Madagascar. "Our yoke (says the Abbé Rochon) was become odious and insupportable. Historians, for the honour of civilized nations, should bury in oblivion the afflicting narratives of the atrocities exercised on these people, whom we are pleased to call barbarous, treacherous, and deceitful, because they have revolted against European adventurers, whose least crime was that of violating the sacred rites of hospitality."

It was about the year 1672 that the French were totally driven from the island of Madagascar; and no considerable attempts were made to form fresh establishments there till within these few years, by M. de Modave, and by Count Benyowski; neither of which was attended with success.

OF THE TRIAL BY ORDEAL, AS PRACTISED IN DIFFERENT COUNTRIES.

THE Ordeal is a very ancient form of trial, and was many years practised in this country.—It was an appeal to the immediate interposition of divine power, and was peculiarly distinguished by the appellation of *judicium Dei*; and sometimes *vulgaris purgatio*, to distinguish it from the canonical purgation, which was by the oath of the party. There were two sorts of it more common than the rest, at least in Europe, fire-ordeal, and water-ordeal. The former was confined to persons of higher rank; the latter to the common people. Both these might be performed by deputy: but the principal was to answer for the success of the trial; the deputy only ventured some corporal pain, for hire or perhaps for friendship.

That the purgation by ordeal, of some one kind or other, is very ancient, admits not of a doubt; and that it was very universal in the times of superstitious barbarity, is equally certain. It seems even to have been known to the ancient Greeks: for, in the Antigone of Sophocles, a person suspected by Creon of a misdemeanour declares himself ready "to handle hot iron and to walk over fire" in order to manifest his innocence; which the scholiast tells us was then a very usual purgation. And Grotius gives us many instances of water-ordeal in Bithynia, Sardinia, and other places. It seems, however, to be carried to a greater height among the Hindoos, than ever it has been in any nation or among any people however rude or barbarous; for in a paper of the Asiatic Researches, communicated by the celebrated Warren Hastings, Esq. we find the trial by ordeal among them is conducted in nine different ways: first, by the balance; secondly, by fire; thirdly, by water; fourthly, by poison; fifthly, by the cosha, or water in which an idol has been washed; sixthly, by rice; seventhly, by boiling oil; eighthly, by red-hot iron; ninthly, by images.

I. Ordeal by the balance is thus performed. The beam having been previously adjusted, the cord fixed, and both scales made perfectly even, the person accused and a Pandit fast a whole day; then, after the accused has been bathed in sacred water, the *homa*, or oblation, presented to fire, and the deities worshipped, he is carefully weighed; and, when he is taken out of the scale, the Pandits prostrate themselves before it, pronounce a certain *mentra* or incantation, agreeably to the Sastras, and, having written the substance of the accusation on a piece of paper, bind it on his head. Six minutes after, they place him again in the scale; and, if he weigh more than before, he is held guilty; if less, innocent; if exactly the same, he must be weighed a third time; *when, as it is written in the Mitacshera*, there will certainly be a difference in his weight. Should the balance, though well fixed, break down, this would be considered as a proof of his guilt.

II. For the fire-ordeal, an excavation, nine hands long, two spans broad, and one span deep, is made in the ground, and filled with a fire of pippal-wood: into this the person accused must walk barefooted; and, if his feet be unhurt, they hold him blameless; if burned, guilty.—In Europe fire-ordeal was performed either by taking up in the hand, unhurt, a piece of red-hot iron, of one, two,

or three, pounds weight; or else by walking, barefoot, and blindfold, over nine red-hot plough-shares, laid lengthwise at unequal distances: and, if the party escaped being hurt, he was adjudged innocent; but, if it happened otherwise, as without collusion it usually did, he was then condemned as guilty. However, by this latter method Queen Emma, the mother of Edward the Confessor, is mentioned to have cleared her character, when suspected of familiarity with Alwyn Bishop of Winchester. The first account we have of Christians appealing to the fire-ordeal, as a proof of their innocence, is that of Simplicius, Bishop of Autun, who lived in the fourth century. This prelate, as the story is related, before his promotion to the episcopal order, had married a wife, who loved him tenderly, and who, unwilling to quit him after his advancement, continued to sleep in the same chamber with him. The sanctity of Simplicius suffered, at least in the voice of fame, by the constancy of his wife's affection; and it was rumoured about, that the holy man, though a bishop, persisted, in opposition to the ecclesiastical canons, to taste the sweets of matrimony: upon which his wife, in the presence of a great concourse of people, took up a considerable quantity of burning-coals, which she held in her clothes, and applied to her breasts, without the least hurt to her person or her garments, as the legend says; and, her example being followed by her husband with the like success, the silly multitude admired the miracle, and proclaimed the innocence of the loving pair. A similar trick was played by St. Brice, in the fifth century.

III. Water-ordeal is performed by causing the person accused to stand in a sufficient depth of water, either flowing or stagnant, to reach his navel; but care should be taken, that no ravenous animal be in it, and that it be not moved by much air: a brahman is then directed to go into the water, holding a staff in his hand; and a soldier shoots three arrows on dry ground from a bow of cane: a man is next dispatched to bring the arrow which has been shot farthest; and, after he has taken it up, another is ordered to run from the edge of the water; at which instant the person accused is told to grasp the foot or the staff of the brahman, who stands near him in the water, and immediately to dive into it. He must remain under water, till the two men, who went to fetch the arrows, are returned; for, if he raise his head or body above the surface before the arrows are brought back, his guilt is considered as fully proved. In the villages near Benares, it is the practice for the person, who is to be tried by this kind of ordeal, to stand in water up to his navel, and then, holding the foot of a brahman, to dive under it as long as a man can walk fifty paces very gently; if, before the man has walked thus far, the accused rise above the water, he is condemned; if not, acquitted.—A very peculiar species of water-ordeal is said to prevail among the Indians on the Malabar coast. A person accused of an enormous crime is obliged to swim over a large river abounding with crocodiles; and, if he escapes unhurt, he is esteemed innocent.

At Siam, besides the usual methods of fire and water ordeal, both parties are sometimes exposed to the fury of a tiger let loose for that purpose; and, if the beast spares either, that person is accounted innocent; if neither, both are held to be guilty; but, if he spares both, the trial is incomplete, and they proceed to a more certain criterion.

In Europe water-ordeal was performed, either by plunging the bare arm up to the elbow in boiling-water, and escaping unhurt thereby, or by casting the person suspected into a river or pond of cold water; and, if he floated therein without any action of swimming, it was deemed an evidence of his guilt; but if he sunk, he was acquitted. It is easy to trace out the traditional relics of this water-ordeal, in the ignorant barbarity still practised in many countries to discover witches, by casting them into a pool of water, and drowning them to prove their innocence. And in the Eastern empire the fire-ordeal was used for the same purpose by the emperor Theodore Lascaris; who, attributing his sickness to magic, caused all those whom he suspected to handle the hot-iron: thus joining (as has been well remarked) to the most dubious crime in the world the most dubious proof of innocence.

IV. There are two sorts of trial by poison; first, the Pandits having performed their homa, and the person accused his ablution, two rettis and a half, or seven barley-corns, of vishanaga, a poisonous root, or of sanc'hya, that is, white arsenic, are mixed in eight mashas, or sixty-four rettis, of clarified butter, which the accused must eat from the hand of a brahman: if the poison produce no visible effect, he is absolved; otherwise, condemned. Secondly, the hooded snake, called naga, is thrown into a deep earthern pot, into which is dropped a ring, a seal, or a coin: this the person accused is ordered to take out with his hand; and, if the serpent bite him, he is pronounced guilty; if not, innocent.

V. Trial by the cosha is as follows: the accused is made to drink three draughts of the water, in which the images of the sun, of devi, and other deities, have been washed for that purpose; and if, within fourteen days, he has any sickness or indisposition, his crime is considered as proved.

VI. When several persons are suspected of theft, some dry rice is weighed with the sacred stone called salgram, or certain slocas are read over it; after which the suspected persons are severally ordered to chew a quantity of it: as soon as they have chewed it, they are to throw it on some leaves of pippal, or, if none be at hand, on some b'hurja patra, or bark of a tree from Nepal or Cashmir. The man, from whose mouth the rice comes dry or stained with blood, is holden guilty; the rest are acquitted.

VII. The ordeal by hot oil is very simple: when it is heated sufficiently, the accused thrusts his hand into it; and, if he be not burned, is held innocent.—This species of trial by ordeal is thus performed: the ground appointed for the trial is cleared and rubbed with cow-dung; and the next day at sun-rise the Pandit worships Ganésa or the Hindoo Janus, presents his oblations, and pays adoration to other deities, conformably to the Sástra: then having read the incantation prescribed, he places a round pan of gold, silver, copper, iron, or clay, with a diameter of sixteen fingers, and four fingers deep; and throws into it one sér, or eighty sicca weight, of clarified butter or oil of sesamum. After this a ring of gold, or silver, or iron, is cleaned and washed with water, and cast into the oil; which they proceed to heat, and when it is very hot put into it a fresh leaf of pippala, or of bilwa: when the leaf is burned, the oil is known to be sufficiently hot. Then, having pronounced a mentra over the oil, they order the party accused to take the ring out of the

pan; and if he take it out without being burned, or without a blister on his hand, his innocence is considered as proved; if not, his guilt. It is reported, that this custom, with some slight variations, still prevails among the Indians on the coast of Malabar. The process there is said to begin after the accused person has been thoroughly washed in the presence of the prince of the country, the priest, &c.—the pot is filled with boiling lead; and the accused must take the ring out three times successively. On the Malabar coast, this ordeal seems only to be used when the person is accused of a capital crime; for after the process the arm is bound with cloth and sealed; and after several days, being brought out publicly, and the arm inspected, if it is found burnt he is instantly put to death; if not, his accuser undergoes the same trial, and, being burnt, forfeits his life.

VIII. In the same manner, they make an iron ball, or the head of a lance, red-hot, and place it in the hands of the person accused; who, if it burn him not, is judged guiltless.

IX. To perform the ordeal by dharmárch, which is the name of the slóca appropriated to this mode of trial, either an image, named Dharma, or the genius of justice, is made of silver, and another, called Adharma, of clay or iron, both of which are thrown into a large earthen jar; and the accused, having thrust his hand into it, is acquitted if he bring out the silver image, but condemned if he draw forth the iron; or, the figure of a deity is painted on white cloth, and another on black; the first of which they name Dharma, and the second Adharma: these are severally rolled up in cow-dung, and thrown into a large jar without having ever been shewn to the accused; who must put his hand into the jar, and is acquitted or convicted as he draws out the figure on white or on black cloth.

Hence we may perceive, that the superstitious weakness of mankind, when left to themselves, is astonishing. There is indeed nothing so absurd but they may be made most firmly to believe, nor so impious but they will do. Nor can a more notorious instance of the truth of this assertion be possibly given than that of the trial by ordeal. The gross absurdity as well as impiety of pronouncing a man guilty unless he was cleared by a miracle, and of expecting that all the powers of nature should be suspended by an immediate interposition of *Providence to save the innocent, whenever it was presumptuously required*, is self-evident. Yet the origin of it may be traced as well to necessity as to superstition. At the time in which it originated in England, as well as in other countries of Europe, it was no easy matter for an innocent person, when accused of guilt, to get himself cleared by the then established mode of trial. It was therefore natural for superstition to fly to Heaven for those testimonies of innocence which the absurdity of human laws often prevented men from obtaining in the ordinary way; and in this way doubtless did the trial by ordeal commence: and, thus begun by necessitous superstition, it was fostered by impious priestcraft and unjust power. There was during all the processes great room for collusion and deceit; and there can be no question but it was often practised: it could not therefore on any account, or in any case, be a sign of innocence or of guilt.

Besides those particular methods of trial which we have already mentioned, there were some few more common in European countries;

tries; as the judicial combat—the ordeal of the crofs—the ordeal of the corfned.

The judicial combat was well-fuited to the genius and fpirit of fierce and warlike nations, and was, as we may reafonably expect, one of the moft ancient and univerfal modes of trial. We know that it was exceedingly common in Germany in very remote ages. It was alfo ufed in fome countries on the continent at pretty early periods: it is not, however, mentioned in any of the Anglo-Saxon laws; and it does not appear to have been much ufed in England till after the Conqueft. There are, however, two remarkable inftances of it upon record, which we fhall give in the words of Dr. Henry: "Henry de Effex, hereditary ftandard-bearer of England, fled from a battle in Wales, A. D. 1158, threw from him the royal ftandard, and cried out, with others, that the king was flain. Some time after, he was accufed of having done this with a treafonable intention, by Robert de Montfort, another great baron, who offered to prove the truth of his acculation by combat. Henry de Effex denied the charge, and accepted the challenge. When all preliminaries were adjufted, this combat was accordingly fought, in the prefence of Henry II. and all his court. Effex was defeated, and expected to be carried out to immediate execution. But the king, who was no friend to this kind of trial, fpared his life, and contented himfelf with confifcating his eftate, and making him a monk in the abbey of Reading.

"The priory of Tinmouth, in Northumberland, was a cell of the abbey of St. Alban's. One Simon of Tinmouth claimed a right to two corrodies, or the maintenance of two perfons in the priory, which the prior and monks denied. This caufe was brought before the Abbot of St. Alban's, and his court-baron, who appointed it to be tried by combat, on a certain day, before him and his barons. Ralf Gubion, prior of Tinmouth, appeared at the time and place appointed, by his champion one William Pegun, a man of gigantic ftature. The combat was fought, Pegun was defeated, and the prior loft his caufe; at which he was fo much chagrined, that he immediately refigned his office. This judicial combat is the more remarkable, that it was fought in the court of a fpiritual baron, and that one of the parties was a prieft."

We need fcarcely add, that this deteftable form of trial was the foundation of the no lefs deteftable crime of duelling, which fo much difgraces our age and nation; which is defended only by ignorance, falfe honour, and injuftice; which is a relic of barbarous fuperftition; and which was abfolutely unknown to thofe brave and generous nations, the Greeks and Romans, which it is fo much the fafhion to admire, and who in this particular fo well merit our imitation.

It was fo much the cuftom in the middle ages of Chriftianity, to refpect the crofs even to fuperftition, that it would have been indeed wonderful if the fame ignorant bigotry had not converted it into an ordeal: accordingly we find it ufed for this purpofe, in fo many different ways as almoft to preclude defcription. We fhall however tranfcribe, for the fatisfaction of the reader, Dr. Henry's account of it, and of the corfned: "In criminal trials, the judgment of the crofs was commonly thus conducted. When the prifoner had declared his innocence upon oath, and appealed to the judgment of the crofs,

croſs, two ſticks were prepared exactly like one another; the figure of the croſs was cut on one of theſe ſticks, and nothing on the other; each of them was then wrapped up in a quantity of fine white wool, and laid on the altar, or on the relics of the ſaints; after which a ſolemn prayer was put up to God, that he would be pleaſed to diſcover, by evident ſigns, whether the priſoner was innocent or guilty. Theſe ſolemnities being finiſhed, a prieſt approached the altar, and took up one of the ſticks, which was uncovered with much anxiety. If it was the ſtick marked with the croſs, the priſoner was pronounced innocent; if it was the other, he was declared guilty. When the judgment of the croſs was appealed to in civil cauſes, the trial was conducted in this manner: the judges, parties, and all concerned, being aſſembled in a church, each of the parties choſe a prieſt, the youngeſt and ſtouteſt that he could find, to be his repreſentative in the trial. Theſe repreſentatives were then placed one on each ſide of ſome famous crucifix; and, at a ſignal given, they both at once ſtretched their arms at full length, ſo as to form a croſs with their body. In this painful poſture they continued to ſtand while divine ſervice was performing; and the party whoſe repreſentative dropped his arms firſt loſt his cauſe.

"The corſned, or the conſecrated bread and cheeſe, was the ordeal to which the clergy commonly appealed when they were accuſed of any crimes: in which they acted a very prudent part, as it was attended with no danger or inconveniency. This ordeal was performed in this manner:—A piece of barley-bread, and a piece of cheeſe, were laid upon the altar, over which a prieſt pronounced certain conjurations, and prayed with great fervency, that, if the perſon accuſed was guilty, God would ſend his angel Gabriel to ſtop his throat, that he might not be able to ſwallow that bread and cheeſe. Theſe prayers being ended, the culprit approached the altar, took up the bread and cheeſe, and began to eat it. If he ſwallowed freely, he was declared innocent; but, if it ſtuck in his throat, and he could not ſwallow, (which we may preſume ſeldom or never happened,) he was pronounced guilty."

There were beſides theſe a variety of other ordeals practiſed in Chriſtian countries, many of which retain the ſame names as among Pagans, and differ only in the mode of execution. In all nations of Chriſtians where thoſe trials were uſed, we find the clergy engaged in them. Indeed, in England, ſo late as King John's time, we find grants to the biſhops and clergy to uſe the *judicium ferri, aquæ, et ignis.* And, both in England and Sweden, the clergy preſided at this trial, and it was only performed in the churches or in other conſecrated ground: for which Stiernhook gives the reaſon, *Non defuit illis operæ et laboris pretium; ſemper enim ab ejuſmodi judicio aliquid lucri ſacerdotibus obveniebat.* But, to give it its due praiſe, we find the canon-law very early declaring againſt trial by ordeal, or *vulgaris purgatio,* as being the fabric of the devil, *cum ſit contra præceptum Domini, Non tentabis Dominum Deum tuum.* Upon this authority, though the canons themſelves were of no validity in England, it was thought proper (as had been done in Denmark above a century before) to diſuſe and aboliſh this trial entirely in our courts of juſtice, by an act of parliament in 3 Hen. III. according to Sir Edward Coke, or rather by an order of the king in council.

It

It may still perhaps be a postulatum with some of our readers how the effects of these trials were evaded, and how it was possible to appear to do, what we know could not be really done, without material injury to the persons concerned: and here we find the subject so well handled by the learned historian whom we have already quoted, as far as concerns the ordeals in ancient Britain, which mutatis mutandis will answer for others, that we shall finish the article, which has already extended, we fear, to too great a length, in his words: "If we suppose that few or none escaped conviction who exposed themselves to those fiery trials, we shall be very much mistaken. For the histories of those times contain innumerable examples of persons plunging their naked arms into boiling water, handling red-hot balls of iron, and walking upon burning ploughshares, without receiving the least injury. Many learned men have been much puzzled to account for this, and disposed to think that Providence graciously interposed, in a miraculous manner, for the preservation of injured innocence. But, if we examine every circumstance of those fiery ordeals with due attention, we shall see sufficient reason to suspect that the whole was a gross imposition on the credulity of mankind. The accused person was committed wholly to the priest who was to perform the ceremony three days before the trial, in which he had time enough to bargain with him for his deliverance, and give him instructions how to act his part. On the day of trial, no person was permitted to enter the church but the priest and the accused till after the iron was heated, when twelve friends of the accuser, and twelve of the accused, and no more, were admitted, and ranged along the wall on each side of the church, at a respectful distance. After the iron was taken out of the fire, several prayers were said; the accused drank a cup of holy water, and sprinkled his hand with it, which might take a considerable time, if the priest was indulgent. The space of nine feet was measured by the accused himself with his own feet, and he would probably give but scanty measure. He was obliged only to touch one of the marks with the toe of his right foot, and allowed to stretch the other foot as far towards the other mark as he could, so that the conveyance was almost instantaneous. His hand was not immediately examined, but wrapped in a cloth prepared for that purpose three days. May we not then, from all these precautions, suspect that these priests were in possession of some secret that secured the hand from the impressions of such a momentary touch of hot iron, or removed all appearances of these impressions in three days; and that they made use of this secret when they saw reason? and that there are ointments that will have this effect, has been often proved by public exhibitions. What greatly strengthens these suspicions is, that we meet with no example of any champion of the church who suffered the least injury from the touch of hot iron in this ordeal; but when any one was so fool-hardy as to appeal to it, or to that of hot water, with a view to deprive the church of any of her possessions, he never failed to burn his fingers and lose his cause."

NATURAL PROPENSITY TO LOVE AND MARRIAGE.

WHEN man arrives at a certain age, he becomes ſenſible of a peculiar ſympathy and tenderneſs towards the other ſex; the charms of beauty engage his attention, and call forth new and ſofter diſpoſitions than he has yet felt. The many amiable qualities exhibited by a fair outſide, or by the mild allurements of female manners, or which the prejudiced ſpectator without much reaſoning ſuppoſes thoſe to include, with ſeveral other circumſtances both natural and accidental, point his view and affection to a particular object, and of courſe contract that general rambling regard, which was loſt and uſeleſs among the undiſtinguiſhed crowd, into a peculiar and permanent attachment to one woman, which ordinarily terminates in the moſt important, venerable, and delightful, connection in life.

The ſtate of the brute-creation is very different from that of human creatures. The former are clothed and generally armed by their ſtructure, eaſily finding what is neceſſary to their ſubſiſtence, and ſoon attain their vigour and maturity; ſo that they need the care and aid of their parents but for a ſhort while; and therefore we ſee that nature has aſſigned to them vagrant and tranſient amours. The connection being purely natural, and merely for propagating and rearing their offſpring, no ſooner is that end anſwered, than the connection diſſolves of courſe. But the human race are of a more tender and defenceleſs conſtitution; their infancy and non-age continue longer; they advance ſlowly to ſtrength of body and maturity of reaſon; they need conſtant attention, and a long ſeries of cares and labours, to train them up to decency, virtue, and the various arts of life. Nature has, therefore, provided them with the moſt affectionate and anxious tutors, to aid their weakneſs, to ſupply their wants, and to accompliſh them in thoſe neceſſary arts, even their own parents, on whom ſhe has devolved this mighty charge, rendered agreeable by the moſt alluring and powerful of all ties, parental affection. But unleſs both concur in this grateful taſk, and continue their joint labours, till they have reared up and planted out their young colony, it muſt become a prey to every rude invader, and the purpoſe of nature in the original union of the human pair be defeated. Therefore our ſtructure as well as condition is an evident indication, that the human ſexes are deſtined for a more intimate, for a moral and laſting, union. It appears likewiſe, that the principal end of marriage is not to propagate and nurſe up an offſpring, but to educate and form minds for the great duties and extenſive deſtinations of life. Society muſt be ſupplied from this original nurſery with uſeful members, and its faireſt ornaments and ſupports.

When our affections are placed on any of the other ſex, in whom beauty or agreeableneſs of perſon and external gracefulneſs of manners conſpire to expreſs and heighten the moral charm of a tender honeſt heart, and ſweet, ingenuous, modeſt, temper, lighted up by good ſenſe; it generally grows into a ſoft and endearing attachment. When this attachment is improved by a growing acquaintance with the worth of its object, and is conducted by diſcretion, it becomes the ſource of many amiable duties, of a communication of paſſions and intereſts, of the moſt refined decencies, and of a thouſand name-

leſs

less deep-felt joys of reciprocal tenderness and love, flowing from every look, word, and action. Hence friendship acts with double energy, and the natural conspire with the moral charms to strengthen and secure the love of virtue. As the delicate nature of female honour and decorum, and the inexpressible grace of a chaste and modest behaviour, are the surest and indeed the only means of kindling at first, and ever after of keeping alive, this tender and elegant flame, and of accomplishing the excellent ends designed by it; to attempt by fraud to violate one, or, under pretence of passion, to sully and corrupt the other, and, by so doing, to expose the too-often credulous and unguarded object, with a wanton cruelty, to the hatred of her own sex and the scorn of ours, and to the lowest infamy of both, is a conduct not only base and criminal, but inconsistent with that truly rational and refined enjoyment, the spirit and quintessence of which is derived from the bashful and sacred charms of virtue kept untainted, and therefore ever alluring to the lover's heart.

The mind is too apt to be dissipated in its views and acts of friendship and humanity; unless the former be directed to a particular object, and the latter employed in a particular province. When men once indulge in this dissipation, there is no stopping their career; they grow insensible to moral attractions; and, by obstructing or impairing the decent and regular exercise of the tender and generous feelings of the human heart, they in time become unqualified for, or averse to, the forming a moral union of souls, which is the cement of society, and the source of the purest domestic joys. Whereas a rational undepraved love, and its fair companion, marriage, collect a man's views, guide his heart to its proper object, and, by confining his affection to that object, do really enlarge its influence and use. Besides, it is but too evident from the conduct of mankind, that the common ties of humanity are too feeble to engage and interest the passions of the generality in the affairs of society. The connections of neighbourhood, acquaintance, and general intercourse, are too wide a field of action for many, and those of a public or community are so for more; and in which they either care not, or know not how, to exert themselves. Therefore nature, ever wise and benevolent, by implanting that strong sympathy which reigns between the individuals of each sex, and by urging them to form a particular moral connection, the spring of many domestic endearments, has measured out to each pair a particular sphere of action, proportioned to their views, and adapted to their respective capacities. Besides, by interesting them deeply in the concerns of their own little circle, she has connected them more closely with society, which is composed of particular families, and bound them down to their good behaviour in that particular community to which they belong. This moral connection is marriage, and this sphere of action is a family.

Of the conjugal alliance the following are the natural laws. First, mutual fidelity to the marriage-bed. Disloyalty defeats the very end of marriage; dissolves the natural cement of the relation; weakens the moral tie, the chief strength of which lies in the reciprocation of affection; and, by making the offspring uncertain, diminishes the care and attachment necessary to their education.

2. A conspiration of counsels and endeavours to promote the common interest of the family, and to educate their common offspring. But, in order to observe these laws, it is necessary to cultivate,

both before and during the married ſtate, the ſtricteſt decency and chaſtity of manners, and a juſt ſenſe of what becomes their reſpective characters.

3. The union muſt be inviolable, and for life. The nature of friendſhip, and particularly of this ſpecies of it, the education of their offſpring, and the order of ſociety and of ſucceſſions, which would otherwiſe be extremely perplexed, do all ſeem to require it. To preſerve this union, and render the matrimonial ſtate more harmonious and comfortable, a mutual eſteem and tenderneſs, a mutual deference and forbearance, a communication of advice, and aſſiſtance, and authority, are abſolutely neceſſary. If either party keep within their proper departments, there need be no diſputes about power or ſuperiority, and there will be none. They have no oppoſite, no ſeparate, intereſts, and therefore there can be no juſt ground for oppoſition of conduct.

From this detail, and the preſent ſtate of things, in which there is pretty nearly a parity of numbers of both ſexes, it is evident that polygamy is an unnatural ſtate; and though it ſhould be granted to be more fruitful of children, which however it is not found to be, yet it is by no means ſo fit for rearing minds, which ſeems to be as much, if not more, the intention of nature than the propagation of bodies.

SURPRIZING EFFECTS OF LIGHTNING,

With the METHOD of erecting the moſt APPROVED CONDUCTORS.

THE phenomena of lightning are always ſurpriſing, and ſometimes very terrible; neither is there any kind of natural appearance in which there is more diverſity, not two flaſhes being ever obſerved exactly ſimilar to one another. In a ſerene ſky, the lightning, in this country at leaſt, almoſt always hath a kind of indiſtinct appearance without any determinate form, like the ſudden illumination of the atmoſphere occaſioned by firing a quantity of looſe gunpowder; but, when accompanied with thunder, it is well defined, and hath very often a zig-zag form. Sometimes it makes only one angle, like the letter V, ſometimes it hath ſeveral branches, and ſometimes it appears like the arch of a circle. But the moſt formidable and deſtructive form which lightning is ever known to aſſume is that of balls of fire. The motion of theſe is very often eaſily perceptible to the eye; but, wherever they fall, much miſchief is occaſioned by their burſting, which they always do with a ſudden exploſion like that of fire-arms. Sometimes they will quietly run along, or reſt for a little upon any thing, and then break into ſeveral pieces, each of which will explode; or the whole ball will burſt at once, and produce its miſchievous effects only in one place. The next to this in its deſtructive effects is the zig-zag kind; for that which appears like indiſtinct flaſhes, whoſe form cannot be readily obſerved, is ſeldom or never known to do hurt.—The colour of the lightning alſo indicates in ſome meaſure its power to do miſchief; the paleſt and brighteſt flaſhes being moſt deſtructive; ſuch as are red, or of a darker colour, commonly doing leſs damage.

A very ſurpriſing property of lightning, the zig-zag kind eſpecially when near, is its ſeeming omnipreſence. If two perſons are ſtanding

ſtanding in a room looking different ways, and a loud clap of thunder accompanied with zig-zag lightning happens, they will both diſtinctly ſee the flaſh, not only by that indiſtinct illumination of the atmoſphere which is occaſioned by fire of any kind; but the very form of the lightning itſelf, and every angle it makes in its courſe, will be as diſtinctly perceptible, as though they had looked directly at the cloud from whence it proceeded. If a perſon happened at that time to be looking on a book, or other object which he held in his hand, he would diſtinctly ſee the form of the lightning between him and the object at which he looked. This property ſeems peculiar to lightning, and to belong to no other kind of fire whatever.

The effects of lightning are generally confined within a ſmall ſpace; and are ſeldom ſimilar to thoſe which accompany exploſions of gunpowder, or of inflammable air in mines. Inſtances of this kind, however, have ſometimes occurred; and the following is one of the moſt remarkable of which we have any diſtinct account. "Auguſt 2, 1763, about ſix in the evening, there aroſe at Anderlight, about a league from Bruſſels, a conflict of ſeveral winds borne upon a thick fog. This conflict laſted four or five minutes, and was attended with a frightful hiſſing noiſe, which could be compared to nothing but the yellings of an infinite number of wild beaſts. The cloud, then opening, diſcovered a kind of very bright lightning, and in an inſtant the roofs of one ſide of the houſes were carried off and diſperſed at a diſtance; above one thouſand large trees were broke off, ſome near the ground, others near the top, ſome torn up by the roots; and many both of the branches and tops carried to the diſtance of ſixty, an hundred, or an hundred and twenty, paces; whole coppices were laid on one ſide, as corn is by ordinary winds. The glaſs of the windows which were moſt expoſed was ſhivered to pieces. A tent in a gentleman's garden was carried to the diſtance of four thouſand paces; and a branch torn from a large tree ſtruck a girl in the forehead as ſhe was coming into town, at the diſtance of forty paces from the trunk of the tree, and killed her on the ſpot."

Theſe terrible effects ſeem to have been owing to the prodigious agitation in the air, occaſioned by the emiſſion of ſuch a vaſt quantity of lightning at once; or perhaps to the agitation of the electric fluid itſelf, which is ſtill more dangerous than any concuſſion of the atmoſphere; for thunder-ſtorms will ſometimes produce moſt violent whirlwinds, ſuch as are by the beſt philoſophers attributed to electricity, nay, even occaſion an agitation of the waters of the ocean itſelf; and all this too after the thunder and lightning had ceaſed.—Of this we have the following inſtances. "Great Malvern, October 16, 1761. On Wedneſday laſt, we had the moſt violent thunder ever known in the memory of man. At a quarter paſt four in the afternoon I was ſurpriſed with a moſt ſhocking and diſmal noiſe; one hundred forges (the neareſt reſemblance I can think of), were they all at work at once, could ſcarcely equal it. I ran to the fore-door, and, caſting my eye upon the ſide of the hill about four hundred yards to the ſouth-weſt of my houſe, there appeared a prodigious ſmoke, attended with the ſame violent noiſe. I ran back into the houſe, and cried out, a volcano (for ſo I thought) had burſt out of the hill; but I had no ſooner got back again, than I found it had deſcended, and was paſſing on within about one hundred yards of the ſouth end of my houſe. It ſeemed to riſe again in the meadow juſt below it;

and

and continued its progrefs to the eaft, rifing in the fame manner for four different times, attended with the fame difmal noife as at firft; the air being filled with a naufeous and fulphureous fmell. I faw it gradually decreafe till quite extinguifhed in a turnip-field about a quarter of a mile below my houfe. The turnip-leaves, with leaves of trees, dirt, ficks, &c. filled the air, and flew higher than any of thefe hills. The thunder ceafed before this happened, and the air foon afterwards became calm and ferene."—The vaft column of fmoke mentioned in the above letter was fo large, that a phyfician of eminence at Worcefter faw it in its progrefs down the hill, about a mile from Fakenham, which is near twenty miles from Malvern.—Auguft 1763, a moft violent ftorm of thunder, rain, and hail, happened at London, which did damage in the adjacent country, to the amount of 50,000l. Hailftones fell of an immenfe fize, from two to ten inches circumference; but the moft furprifing circumftance was the fudden flux and reflux of the tide in Plymouth-pool, exactly correfponding with the like agitation in the fame places at the time of the great earthquake at Lifbon.

Inftances are alfo to be found, where lightning, by its own proper force, without any affiftance from thofe lefs-common agitations of the atmofphere or electric fluid, hath thrown ftones of immenfe weight to confiderable diftances; torn up trees by the root, and broke them in pieces; fhattered rocks; beat down houfes, and fet them on fire, &c.

A very fingular effect of lightning is mentioned in the 66th volume of the Philofophical Tranfactions, upon a pyed-bullock. It happened in the county of Suffex about the end of Auguft 1774. The bullock was white and red; and the lightning ftripped off the white hair, leaving the red untouched. The following is a particular account of the matter. "In the evening of Sunday, the 28th of Auguft, there was an appearance of a thunder-ftorm, but we heard no report. A gentleman, who was riding near the marfhes not far diftant from Lewes, faw two ftrong flafhes of lightning, feemingly running along the ground of the marfh, at about nine o'clock in the evening. On Monday morning, when the fervants of Mr. Roger, a farmer at Swanborough, in the parifh of Iford, went into the marfh to fetch the oxen to their work, they found one of them, a four-year-old fteer, ftanding up, to appearance much burnt, and fo weak as to be fcarcely able to walk. The animal feemed to have been ftruck by lightning in a very extraordinary manner. He is of a white and red colour; the white in large marks, beginning at the rump-bone, and running in various directions along both the fides; the belly is all white, and the whole head and horns white likewife. The lightning, with which he muft have been undoubtedly ftruck, fell upon the rump-bone, which is white, and diftributed itfelf along the fides in fuch a manner as to take off all the hair from the white marks as low as the bottom of the ribs, but fo as to leave a lift of white hair, about half an inch broad, all round where it joined to the red, and not a fingle hair of the red appears to be touched. The whole belly is unhurt, but the end of the fheath of the penis has the hair taken off; it is alfo taken off from the dewlap: the horns and the curled hair on the forehead are uninjured; but the hair is taken off from the fides of the face, from the flat part of the jaw-bones, and from the front of the face in ftripes. There are a few

few white marks on the ſide and neck, which are ſurrounded with red; and the hair is taken off from them, leaving half an inch of white adjoining to the red. The farmer anointed the ox with oil for a fortnight; the animal purged very much at firſt, and was greatly reduced in fleſh, but finally recovered.

In another account of this accident, the author ſuppoſes that the bullock had been lying down at the time he was ſtruck; which ſhews the reaſon that the under parts were not touched. "The lightning, conducted by the white hair, from the top of the back down the ſides, came to the ground at the place where the white hair was left entire."

The author of this account ſays, that he inquired of a Mr. Tooth, a farrier, whether he ever knew of a ſimilar accident; and that he told him "the circumſtance was not new to him; that he had ſeen a great many pyed-bullocks ſtruck by lightning in the ſame manner as this; that the texture of the ſkin under the white hair was always deſtroyed, though looking fair at firſt; but after a while it became ſore, throwing out a putrid matter in puſtules, like the ſmall-pox with us, which in time falls off, when the hair grows again, and the bullocks receive no farther injury;" which was the caſe with the bullock in queſtion. In a ſubſequent letter, however, the very ſame author informs us, that he had inquired of Mr. Tooth "whether he ever ſaw a ſtroke of lightning actually fall upon a pyed-bullock, ſo as to deſtroy the white hair, and ſhew evident marks of burning, leaving the red hair uninjured? He ſaid he never did; nor did he recollect any one that had. He gave an account, however of a pyed-horſe, belonging to himſelf, which had been ſtruck dead by lightning in the night-time." The exploſion was ſo violent, that Mr. Tooth imagined his houſe had been ſtruck, and therefore immediately got up. On going into the ſtable he found the horſe almoſt dead to appearance, though it kept on its legs near half an hour before it expired. The horſe was pyed white on the ſhoulder and greateſt part of the head; viz. the forehead and noſe, where the greateſt force of the ſtroke came. "The hair was not burnt nor diſcoloured, only ſo looſened at the root, that it came off with the leaſt touch. And this is the caſe, according to Mr. Tooth's obſervation, with all that he has ſeen or heard of; viz. the hair is never burnt, but the ſkin always affected as above-mentioned. In the horſe, all the blood in the veins under the white parts of the head was quite ſtagnated, though he could perceive it to flow in other parts as uſual; and the ſkin, together with one ſide of the tongue, was parched and dried up to a greater degree than he had ever ſeen before."

Another inſtance is mentioned of this extraordinary effect of lightning upon a bullock, in which even the ſmall red ſpots on the ſides were unaffected; and in this, as well as the former, the white hair on the under part of the belly, and on the legs, was left untouched.

All theſe, however, are to be conſidered as the more unuſual phenomena of lightning; its common mode of action being entirely ſimilar to that of a charged Leyden vial, where the electric matter diſcharges itſelf from a ſubſtance poſitively electrified to one that is negatively ſo. The indentity of electric matter and lightning ſeems now, indeed, ſo well eſtabliſhed, that there is not the leaſt founda-

tion for seeking any other solution of the phenomena of lightning, than what may be obtained by comparing them with those of our electrical experiments. The different forms of the flashes are all exemplified in those of electrical sparks. Where the quantity of electricity is small, and consequently incapable of striking at any considerable distance, the spark appears straight, without any curvature or angular appearance: but where the electricity is very strong, and of consequence capable of striking an object at a pretty considerable distance, it assumes a crooked or zig-zag form. This is always the case with Mr. Nairn's very powerful machines, the conductors of which are six feet in length and one foot in diameter. Sparks may be taken from them at the distance of sixteen, seventeen, and even twenty, inches; and all of these put on the angular ziz-zag form of lightning. The reason of this appearance, both in these sparks and in the lightning, is, that the more fluid electric matter hath to pass through the denser and less fluid atmosphere with great rapidity; and in fact, this is the way in which all the more fluid substances pass through those that are less so, at least when their velocity becomes considerable. If bubbles of air or steam pass very gently up through water, their course from the bottom to the top of the vessel will differ very little, if at all, from a straight line: but when they are impelled by a considerable force, as in air blown from a bellows, or the bubbles of steam which arise in boiling-water, their course is then marked by waved and crooked lines, and the deflection of the bubbles to the right or left will be precisely in proportion to their ascending velocity, and to the weight of the water by which they are resisted.

In the case of air blown through water, however, or steam ascending from the bottom of a vessel of boiling-water, though the course of the bubbles is waved and crooked, we never observe it to be angular as in lightning. The reason of this is, that there is no proportion between the capacity of the air for yielding to the impetus of lightning, and the velocity with which the latter is moved. From Mr. Robinson's experiments in gunnery, it appears, that the air cannot yield with a velocity much greater than one thousand two hundred feet in a second, and that all projectiles, moving with a greater degree of velocity meet with a violent resistance. But if we suppose lightning to move only with one half the velocity of light, that is, near one hundred thousand miles in a second, or even with that of one thousand miles in a minute, which most probably is the case, its motion in the fluid atmosphere will meet with a resistance very little inferior to what air would meet with in passing through the most solid bodies. The smallest difference of the resistance of the atmosphere on either side, must determine the lightning to that side; and, in its passage to that new place where the resistance is least, it must pass on in a straight line, making an angle with its former course, because the atmosphere is altogether incapable of yielding with such rapidity as the electric matter requires, and therefore resists like a solid rock. The case is otherwise in the former examples: for though a small difference in the resistance forces the bubbles of air, or steam to deviate from side to side, yet there is always to a considerable proportion between the capacity of water for yielding, and that force by which the bubbles urge it to yield; so that, though it it does make a resistance sufficient to prevent the bubbles from moving in

in a straight line, yet it also perceptibly yields at all times, and therefore the tract of the bubbles is formed by a number of curves and not angles.

Hence we may understand the reason why the zig-zag kind of lightning is so dangerous, namely, because it must overcome a very violent resistance of the atmosphere; and, wherever that resistance is in the smallest degree lessened, there it will undoubtedly strike, and at a very considerable distance too. It is otherwise with that kind which appears in flashes of no determinate form. The electric matter of which these are composed, is evidently dissipated in the air by some conducting substances which are present there; and of consequence, though a man, or other conducting body, happened to be very near such a flash, he would not be struck or materially injured by it, though a zig-zag flash, in such circumstances, would have probably discharged its whole force upon him.

The most destructive kind of lightning, however, as we have already observed, is that which assumes the form of balls. These are produced by an exceeding great power of electricity gradually accumulated till the resistance of the atmosphere is no longer able to confine it. In general, the lightning breaks out from the electrified cloud by means of the approach of some conducting substance; either a cloud, or some terrestrial substance: but the fire-balls seem to be formed, not because there is any substance at hand to attract the electric matter from the cloud, but because the electricity is accumulated in such quantity that the cloud itself can no longer contain it. Hence such balls fly off slowly, and have no particular destination. Their appearance indicates a prodigious commotion and accumulation of electricity in the atmosphere, without a proportionable disposition in the earth to receive it. This disposition, however, we know, is perpetually altered by a thousand circumstances, and the place which first becomes most capable of admitting electricity will certainly receive a fire-ball. Hence this kind of lightning has been known to move slowly backwards and forwards in the air for a considerable space of time, and then suddenly to fall on one or more houses, according to their being more or less affected with an electricity opposite to that of the ball at the time. It will also run along the ground, break into several parts, and produce several explosions at the same time.

It is very difficult to imitate lightning of this kind in our electrical experiments. The only cases in which it hath been done in any degree are those in which Dr. Priestley made the explosion of a battery pass for a considerable way over the surface of raw flesh, water, &c. and in Mr. Arden's experiment, when a fire-ball ascended to the top of an electrified jar, and burst it with a violent explosion. In these cases, if, while the electric flash passed over the surface of the flesh, it had been possible to interrupt the metallic circuit by taking away the chain, the electric matter discharged from the battery would have been precisely in the situation of one of the fire-balls above-mentioned; i. e. it would have been at a loss for a conductor. The negative side of the battery was the place of its destination; but to that it would not have easily got, because of the great quantity of atmosphere which lay in its way, and the incapacity of the neighbouring bodies to receive it. But, while the electric matter was thus stationary for want of a conductor, if any person standing near, or touch-

ing the negative side of the battery, presented a finger to that seemingly inoffensive luminous body, he would instantly be struck very violently; because, a free communication being now made by means of his body, the powers by which the electric fluid is impelled from one place to another would instantly urge it upon him. But if we suppose a person, who hath no communication with the battery, to present his finger to the same body, he may perhaps receive a slight spark from it; but not a shock of any consequence, because there is not a perfect communication by means of his body with the place to which the electric fire is destined.

Hence we may account for the seemingly capricious nature of lightning of all kinds, but especially of that kind which appears in the form of balls. Sometimes it will strike trees, high houses, steeples, and towers, without touching cottages, men, or other animals, who are in the neighbourhood. In such cases, people would be apt to say that the neighbourhood of these higher objects preserved the others from the stroke; but with little reason, since low houses, men walking in the fields, cattle, nay the surface of the earth itself, have all been struck, while high trees and steeples in the neighbourhood have not been touched. In like manner, fire-balls have passed very near certain persons without hurting them, while they have, as it were, gone considerably out of their way to kill others. The reason of all this is, that in thunder-storms there is constantly a certain zone of earth considerably under the surface, which the lightning desires (if we may use the expression) to strike, because it hath an electricity opposite to that of the lightning itself. Those objects, therefore, which form the most perfect conductors between the electrified clouds and that zone of earth, will be struck by the lightning, whether they are high or low; and because we know not the conducting quality of the different terrestrial substances, the superstitious are apt to ascribe strokes of lightning to the divine vengeance against particular persons, whereas it is certain that this fluid, as well as others, acts according to invariable rules from which it is never known to depart.

Lightning, in the time of severe thunder-storms, is supposed to proceed from the earth, as well as from the clouds: but this fact hath never been well ascertained, and indeed from the nature of the thing it seems very difficult to be ascertained; for the motion of the electric fluid is so very quick, that it is altogether impossible to determine, by means of our senses, whether it goes from the earth or comes to it. In fact, there are in this country many thunder-storms in which it doth not appear that the lightning touches any part of the earth, and consequently can neither go to it nor come out from it. In these cases, it flashes either from an electrified cloud to one endowed with an opposite electricity, or merely into those parts of the atmosphere which are ready to receive it. But if not only the clouds, but the atmosphere all the way betwixt them and the earth, and likewise for a considerable space above the clouds, are electrified one way, the earth must then be struck. The reason of this will appear from a consideration of the principles of electricity. By this it appears, that the electric fluid is altogether incapable either of accumulation or diminution in quantity in any particular part of space. What we call electricity is only the motion of this fluid made perceptible to our senses. Positive electricity is when the current of electric matter is directed from the electrified body. Negative electricity

electricity is when the current is directed towards it. Let us now suppose, that a positively-electrified cloud is formed over a certain part of the earth's surface. The electric matter flows out from it first into the atmosphere all round; and, while it is doing so, the atmosphere is negatively electrified. In proportion, however, as the electric current pervades greater and greater portions of the atmospherical space, the greater is the resistance to its motion, till at last the air becomes positively electrified as well as the cloud, and then both act together as one body. The surface of the earth then begins to be affected, and it silently receives the electric matter by means of the trees, grass, &c. till at last it becomes positively electrified also, and begins to send off a current of electricity from the surface downwards. The causes which at first produced the electricity of the clouds still continuing to act, the power of the electric current becomes inconceivably great. The danger of the thunder-storm now begins; for as the force of the lightning is directed to some place below the surface of the earth, it will certainly dart towards that place, and shatter every thing to pieces which resists its passage. The benefit of conducting-rods will now also be evident: for we are sure that the electric matter will in all cases take the way where it meets with the least resistance; and this is through the substance, or rather over the surface, of metals. In such a case, therefore, if there happen to be a house furnished with a conductor directly below the cloud, and at the same time a zone of negatively-electrified earth not very far below the foundation of the house, the conductor will almost certainly be struck, but the building will be unhurt. If the house wants a conductor, the lightning will nevertheless strike in the same place, in order to get at the negatively-electrified zone above-mentioned; but the building will now be damaged, because the materials of it cannot readily conduct the electric fluid.

In a late publication on the subject of electricity by Lord Mahon, we find a new kind of lightning made mention of, which he is of opinion may give a fatal stroke, even though the main explosion be at a considerable distance; a mile, for instance, or more. This he calls the electrical returning stroke; and exemplifies it from some experiments made with a very powerful electrical machine, the prime conductor of which (six feet long, by one foot diameter) would generally, when the weather was favourable, strike into a brass ball connected with the earth, to the distance of eighteen inches or more.—A late melancholy accident which happened in Scotland has afforded his lordship an opportunity of bringing additional arguments in favour of his system. An account of this accident is given by Patrick Brydone, Esq. F. R. S. in the 77th volume of the Philosophical Transactions. It happened on the 19th of July 1785, near Coldstream on the Tweed. The morning was fine, with the thermometer at 68°; but about eleven o'clock the sky became obscured with clouds in the south-east: and betwixt twelve and one a storm of thunder and lightning came on. This storm was at a considerable distance from Mr. Brydone's house, the intervals between the flash and crack being from twenty-five to thirty seconds, so that the place of explosion must have been betwixt five and six miles off: but, while our author was observing the progress of the storm, he was suddenly surprised with a loud report, neither preceded not accompanied by any flash of lightning, which resembled the explosion

of a great number of muskets, in such quick succession, that the ear could scarcely discriminate the sounds. On this the thunder and lightning instantly ceased, the clouds began to separate, and the sky soon recovered its serenity. In a little time Mr. Brydone was informed, that a man with two horses had been killed by the thunder; and, on running out to the place, our author found the two horses lying on the spot where they had been first struck, and still yoked to the cart. As the body of the man who was killed had been carried off, Mr. Brydone himself had not an opportunity of examining it; but was informed by Mr. Bell, minister of Coldstream, who saw it, that the skin of the right thigh was much burnt and shrivelled; that there were many marks of the same kind all over the body, but none on the legs: his clothes, particularly his shirt, had a strong smell of burning; and there was a zig-zag line of about an inch and a quarter broad, extending from the chin to the right thigh, and which seemed to have followed the direction of the buttons of his waistcoat. The body was buried in two days without any appearance of putrefaction.

Mr. Brydone was informed by another person, who accompanied him that was killed, of the particular circumstances. They were both driving carts loaded with coals; and James Lauder, the person who was killed, had the charge of the foremost cart, and was sitting on the fore-part of it. They had crossed the Tweed a few minutes before at a deep ford, and had almost gained the highest part of an ascent of about sixty-five or seventy feet above the bed of the river, when he was stunned with the report above-mentioned, and saw his companion with the horses and cart fall down. On running up to him, he found him quite dead, with his face livid, his clothes torn in pieces, and a great smell of burning about him. At the time of the explosion he was but about twenty-four yards distant from Lauder's cart, and had him full in view when he fell, but felt no shock, neither did he perceive any flash or appearance of fire. At the time of the explosion his horses turned themselves round, and broke their harness. The horses had fallen on their left side, and their legs had made a deep impression on the dust; which, on lifting them up, shewed the exact form of each leg, so that every principle of life seemed to have been extinguished at once, without the least struggle or convulsive motion. The hair was singed over the greatest part of their bodies, but was most perceptible on their belly and legs. Their eyes were dull and opaque, as if they had been long dead, though Mr. Brydone saw them in half an hour after the accident happened. The joints were all supple, and he could not observe that any of the bones were broken or dissolved, as is said to be sometimes the case with those who are killed by lightning. The left shaft of the cart was broken, and splinters had been thrown off in many places; particularly where the timber of the cart was connected by nails or cramps of iron. Many pieces of the coal were thrown to a considerable distance; and some of them had the appearance of being some time on a fire. Lauder's hat was torn into innumerable small pieces; and some part of his hair was strongly united to those which had composed the crown of it. About four feet and a half behind each wheel of the cart he observed a circular hole of about twenty inches diameter, the centre of which was exactly in the track of each wheel. The earth was torn up as if by violent blows of a pick-ax; and the small

ſmall ſtones and duſt were ſcattered on each ſide of the road. The tracks of the wheels were ſtrongly marked in the duſt, both before and behind theſe holes, but did not in the ſmalleſt degree appear on the ſpots themſelves for upwards of a foot and a half. There were evident marks of fuſion on the iron rings of the wheels; the ſurface of the iron, the whole breadth of the wheel, and for the length of about three inches, was become bluiſh, had loſt its poliſh and ſmoothneſs, and was formed into drops which projected ſenſibly, and had a roundiſh form; but the wood did not appear any way injured by the heat which the iron muſt have conceived. To determine whether theſe were made by the exploſion which had torn up the ground, the cart was puſhed back on the ſame tracks which it had deſcribed on the road; and the marks of fuſion were found exactly to correſpond with the centres of the holes. They had made almoſt half a revolution after the exploſion; which our author aſcribes to the cart being pulled a little forward by the fall of the horſes. Nothing remarkable was obſerved on the oppoſite part of the wheel. The broken ground had a ſmell ſomething like that of ether; the ſoil itſelf was very dry and gravelly.

The cataſtrophe was likewiſe obſerved by a ſhepherd, at the diſtance of about two hundred or three hundred yards from the ſpot. He ſaid, that he was looking at the two carts going up the bank when he heard the report, and ſaw the foremoſt man and horſes fall down; but obſerved no lightning, nor the leaſt appearance of fire, only he ſaw the duſt riſe about the place. There had been ſeveral flaſhes of lightning before that from the ſouth-eaſt; whereas the accident happened to the north-weſt of the place where he ſtood. He was not ſenſible of any ſhock.

Our author next gives an account of ſeveral phenomena which happened the ſame day, and which were evidently connected with the exploſion. A ſhepherd, tending his flock in the neighbourhood, obſerved a lamb drop down; and ſaid, that he felt at the ſame time as if fire had paſſed over his face, though the lightning and claps of thunder were at a conſiderable diſtance. He ran up to the lamb immediately, but found it quite dead; on which he bled it with his knife, and the blood flowed freely. The earth was not torn up; nor did he obſerve any duſt riſe, though he was only a few yards diſtant. This happened about a quarter of an hour before Lauder was killed, and the place was only about three hundred yards diſtant.

About an hour before the exploſion, two men ſtanding in the middle of the Tweed, fiſhing for ſalmon, were caught in a violent whirlwind, which felt ſultry and hot, and almoſt prevented them from breathing. They could not reach the bank without much difficulty and fatigue; but the whirlwind laſted only a very ſhort time, and was ſucceeded by a perfect calm.

A woman making hay, near the banks of the river, fell ſuddenly to the ground, and called out that ſhe had received a violent blow on the foot, and could not imagine from whence it came; and Mr. Bell, the miniſter above-mentioned, when walking in his garden, a little before the accident happened to Lauder, felt ſeveral times a tremor in the ground.

The concluſion drawn from theſe facts by Brydone is, that at the time of the exploſion the equilibrium between the earth and the atmoſphere ſeems to have been completely reſtored, as no more thun-

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der was heard nor lightning obſerved; the clouds were diſpelled, and the atmoſphere reſumed the moſt perfect tranquillity: "But how this vaſt quantity of electric matter (ſays he) could be diſcharged from the one element to the other, without any appearance of fire, I ſhall not pretend to examine. From the whole it would appear, that the earth had acquired a great ſuperabundance of electrical matter, which was every where endeavouring to fly off into the atmoſphere. Perhaps it might be accounted for from the exceſſive dryneſs of the ground, and for many months the almoſt total want of rain, which is probably the agent that nature employs in preſerving the equilibrium between the two elements."

Lord Mahon, now Earl Stanhope, whoſe obſervations on this accident are publiſhed in the ſame volume, endeavours to eſtabliſh the following poſitions as facts.—That the man and horſes were not killed by any direct main ſtroke or exploſion from a thunder-cloud either poſitively or negatively electrified. They were not killed by any tranſmitted main ſtroke either poſitive or negative. The miſchief was not done by any lateral exploſion. All theſe are evidently true, at leaſt with reſpect to lightning at that time falling from the clouds; for all the lightning which had taken place before was at a great diſtance. They were not ſuffocated by a ſulphureous vapour or ſmell which frequently accompanies electricity. This could not account for the pieces of coal being thrown to a conſiderable diſtance all round the cart, and for the ſplinters of the wood which were thrown off from many parts of the cart. It might be imagined by ſome that they were killed by the violent commotion of the atmoſphere, occaſioned by the vicinity of the electrical exploſion, in a manner ſimilar to the fatal wounds that ſometimes have been known to have been given by the air having been ſuddenly diſplaced by a cannon-ball in its paſſage through the atmoſpherical fluid, though the cannon-ball itſelf had evidently neither ſtruck the perſon wounded nor grazed his clothes. The duſt that roſe at the time of the exploſion might be brought as an argument in favour of the opinion, that a ſudden and violent commotion of the air did occaſion the effects produced. But ſuch an explanation would not account for the marks of fuſion on the iron of the wheels, nor for the hair of the horſes being ſinged, nor for the ſkin of Lauder's body having been burnt in ſeveral places.

From theſe different circumſtances his lordſhip is of opinion, that the effects proceeded from electricity; and that no electrical fire did paſs immediately, either from the clouds into the cart, or from the cart into the clouds. From the circular holes in the ground, of about twenty inches diameter, the reſpective centres of which were exactly in the track of each wheel, and the correſponding marks of fuſion in the iron of the wheels, it is evident that the electrical fire did paſs from the earth to the cart, or from the cart to the earth, through that part of the iron of the wheels which was in contact with the ground. From the ſplinters which had been thrown off in many places, particularly where the timber was connected by nails or cramps of iron, and from various other effects mentioned in Mr. Brydone's account, it is evident, that there muſt have been a great commotion in the electrical fluid in all, or at leaſt in different parts of, the cart, and in the bodies of the man and horſes, although there was no lightning. All theſe phenomena, his lordſhip argues, may

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be explained in a satisfactory manner from the doctrine he has laid down concerning the returning stroke. Before entering upon the subject of the main explosion, however, he takes notice of the other phenomena already mentioned in Mr. Brydone's account.

With regard to the case of the lamb, his lordship is of opinion, that it belongs to the most simple class of returning strokes, viz. that which happens at a place where there is neither thunder nor lightning near; and that it may be produced by the sudden removal of the elastic electrical pressure of the electrical atmosphere of a single main cloud, as well as of an assemblage of clouds. It appears (says he) by Mr. Brydone's account, that the shepherd who saw the lamb fall was near enough to it to feel, in a small degree, the electrical returning stroke at the same time that the lamb dropped down.—The blow which the woman received on the foot was unquestionably the returning stroke. When a person walking, or standing, out of doors, is knocked down or killed by the returning stroke, the electrical fire must rush in, or rush out, as the case may be, through that person's feet, and through them only; which would not be the case were the person to be killed by any main stroke or explosion either positive or negative.

In order to account for the manner in which the man and horses were killed, his lordship premises, that, according to Mr. Brydone's account, the cloud must have been many miles in length; inasmuch as, just before the report, the lightning was at a considerable distance, viz. between five and six miles. The loud report resembled the firing of several muskets so close together, that the ear could scarcely separate the sounds, and was followed by no rumbling noise like the other claps. This indicates, that the explosion was not far distant, and likewise that it was not extremely near: for, if the explosion had been very near, the ear could not at all have separated the sounds.

Let us now suppose a cloud, eight, ten, or twelve, miles in length, to be extended over the earth, and let another cloud be situated betwixt that and the earth; let them also be supposed charged with the same kind of electricity, and both positive. Let us farther suppose the lower cloud to be near the earth, only a little beyond the striking distance; and the man, cart, and horses, to be situated under that part of the cloud which is next the earth, and to be exactly as described by Mr. Brydone, viz. near the summit of an hill, and followed by another a little farther down; and let us suppose the two clouds to be near each other just over the place where the man and horses are: let the remote end of the cloud approach the earth, and discharge its electricity into it. In this case the following effects will take place.

When the upper cloud discharges its electricity into the earth from the remote end, the lower cloud will discharge its electricity into the nearer end of the upper cloud, which is supposed to be directly over the place of the cart and horses, or nearly so. This accounts for the loud report of thunder that was unaccompanied by lightning. The report must be loud from its being near; but no lightning could be perceived, by reason of the thick cloud situated immediately between the spectator and the space betwixt the two clouds where the lightning appears.

As

As the lower cloud gradually approached towards the earth, that part of the latter where the man and horses were must of course become superinduced by the elastic electrical pressure of the electrical atmosphere of the thunder-cloud; which superinduced elastic electrical pressure must gradually have increased as the cloud came closer to the earth, and approached nearer to the limit of the striking distance. Hence, if any conducting body (not having prominent or conducting points) were to be placed upon the surface of the earth, and there electrically insulated; then such conducting body, by the laws of electricity, must, at its upper extremity (namely the part nearest to the positive cloud), become negative; at its lower extremity it must become positive; and, at a certain intermediate point, it will be neither plus nor minus. This insulated conducting body, thus situated, will be in three opposite states at the same time: that is to say, it will be, at the same time, positively electrified, negatively electrified, and not electrified at all. For a demonstration of this proposition, his lordship refers to his Principles of Electricity; but it is a generally known and established fact in electricity.

If this conducting body on the surface of the earth be not insulated, or be but imperfectly insulated, then the whole of such body, from its being immerged in the electrical atmosphere of the positive cloud, will become negative; because part of the electricity of the conducting body will in this case pass into the earth; and the conducting body will become the more negative as it becomes the more deeply immerged into the dense part of the elastic electrical atmosphere of the approaching thunder-cloud.

When the lower cloud comes suddenly to discharge with an explosion its superabundant electricity into the upper one, then the elastic electrical atmosphere of the former will cease to exist; consequently the electrical fluid, which had been gradually expelled into the common stock from the conducting body on the surface of the earth, must, by the sudden removal of the superinduced elastic electrical pressure of the electrical atmosphere of the thunder-cloud, suddenly return from the earth into the said conducting body, producing a violent commotion similar to the pungent shock of a Leyden jar in its sensation and effects.

This, which his lordship calls the electrical returning stroke, he supposes to have been what killed the man and horses in the present case, they having become strongly negative before the explosion. The man, according to Mr. Brydone's account, was sitting when he received the stroke, and his legs were hanging over the fore part of the cart at the time of the explosion. The returning stroke, therefore, could not enter his body through the legs; and this accounts for the skin of his legs not having been at all burnt or shrivelled, as the skin was on many other parts of his body; and it it likewise shews the reason why the zig-zag line, which was terminated by the chin, did not extend lower than the thigh. Mr. Brydone likewise informs us, that the hair of the horses was much singed over the greatest part of their bodies, but was most perceptible on the belly and legs. This is easily accounted for by the returning stroke; for the lower part of the bodies of these animals must of course have been more affected than any other part, as the electrical fire must have rushed suddenly into their bodies through their legs, which had made a deep impression on the dust.

The

The various effects produced on the cart may be explained also from the returning stroke with equal facility. The splinters were thrown off by reason of the interruption of good conductors; the wood being a much less perfect conductor than the iron. It is also evident, that it was the electrical returning fire that produced the marks of fusion on that part of the iron of the wheels which was in contact with the ground; inasmuch as the whole electricity, at the instant of the explosion, did enter at these places.

No person in the least versed in the principles of electricity can hesitate to assent to the proposition, that the electrical returning stroke must exist under circumstances similar to those explained above; but it may be objected, that the quantity of electricity naturally contained in the body of a man, &c. is by far too small to produce such violent effects. For an answer to this objection, his lordship refers to his book: by way of corroboration, however, he makes the following remarks.

No person can reasonably conclude, that the force of a returning stroke must always be weak when produced by the disturbed electrical fluid of a man's body, by reason that a man's body contains but a small quantity of electricity: for it has never been proved that a man's body contains only a small quantity of electrical fluid; neither is there the smallest reason to believe such an hypothesis, which appears, on many accounts, to be completely erroneous; and, if that hypothesis be erroneous, the objection to the strength of an electrical returning stroke remains altogether unsupported by argument. "When a body is said to be plus or positive (says his lordship), it simply means, that the body contains more than its natural share of electricity, but does not say that it is completely saturated with it. In like manner, when a body is said to be minus or negative, it only signifies, that the body contains less than its natural share of electricity; but does not imply that such body is completely exhausted of the electricity which it contains in its natural state. Now the strength of natural electricity is so immense, when compared with the very weak effects of our largest and best-contrived electrical machines, that I conceive we cannot, by means of artificial electricity, expel, from a man's body, a thousandth, or perhaps the ten-thousandth, part of the electrical fluid which it contains when in its natural state."

An hypothesis which easily accounts for any natural phenomenon has a much better claim to our attention than an opposite one, which prevents it from being intelligibly explained. There is no reason to conclude that any electrical machine, of any given size, is capable of rendering a conducting body either completely plus or completely minus; but far otherwise. And it would have been as logical for any person some years ago (when electrical machines were not brought to their present state) to have maintained, that those very imperfect machines were capable of rendering a body completely positive or completely negative, as for us to pretend to do it at this day. We evidently have not, with our machines, even approached the limit of electrical strength, particularly in respect to the returning stroke: for it is remarkable, that, by the laws of electricity, the strength of the electrical returning stroke, near the limit of the striking distance, does increase in a greater ratio than the strength of the main stroke from the charged body producing the elastic-electrical atmosphere superinduced.

superinduced. Thus, let us attempt to produce the returning stroke by means of a metallic conductor of about twenty or twenty-one inches in length and of about two inches in diameter; and by means of another metallic body of equal dimensions placed parallel to the prime conductor, just out of the limit of the striking distance; and let the prime conductor be charged by one of the common glass globes of less than nine inches in diameter; the returning stroke in this case will be so weak, that it can hardly be said to exist: but if the experiment be made by means of a large cylinder, and by means of a metallic prime conductor of about three feet four inches long by nearly four inches and an half diameter, and also by means of another metallic body of equal dimensions with this prime conductor, then there will be no kind of comparison betwixt the strength of the returning stroke obtained out of the striking distance, and the strength of the main stroke received immediately from the prime conductor; the sharpness and pungency of the returning stroke being so much superior. The returning stroke in this case is like the sudden discharge of a weakly-electrified Leyden jar, provided due attention be paid to the rules for obtaining a strong returning stroke.

In the case of a returning stroke, the strength depends, according to his lordship's hypothesis, not so much on the quantity of the electric fluid, as on its velocity; whence also it depends less on the quantity of surface used than on the strength of the electrical pressure of the elastic-electrical atmosphere superinduced upon the body struck previous to the explosion. But the electrical pressure of the elastic-electrical atmosphere of the great thunder-cloud which produced the mischief on the present occasion, must have been immensely greater than that of a metallic prime conductor; and it is not surprising that the effects should be proportioned to the causes.

His lordship next accounts for the returning stroke not being felt by the man who followed Lauder's cart. This, he thinks, may in some degree be accounted for by the latter having been higher up the bank; though it may better be done by supposing the cloud to have been pending nearer the earth over the spot where Lauder was killed than over the place where his companion was; for, in order to receive a dangerous returning stroke, it is necessary that he should be immerged, not merely in the cloud's atmosphere, but in the dense part of the cloud's electrical atmosphere. It may also be accounted for by supposing that the second cart was either better connected with the common stock, or better insulated; for either of these circumstances will weaken a returning stroke prodigiously. Now Mr. Brydone mentions, that there had been an almost total want of rain for many months. He also says, that the ground, at the place where Lauder was killed, was remarkably dry, and of a gravelly soil. This state of the ground was particularly adapted to the production of the electrical returning stroke, when produced upon the large scale of nature, where the elastic-electrical pressure is so powerful. His lordship rather appears to have deceived himself, by mistaking the extent of the electrified surface, for the quantity of charge in every part of it. The surface of the earth in a thunder-storm is exactly similar to that of a charged conductor. According to the extent of electrified surface, the spark will be great or small; and just so it is with lightning, for some kinds of it are much more destructive than others. In all cases, however, the quantity of electricity in a particular

cular spot is very inconsiderable. Lightning strikes bodies, not because they are highly electrified, but because they afford a communication betwixt the atmosphere and some place below the surface of the earth. This stroke is the aggregate of the whole electricity contained in a circle of probably many miles in diameter; but the returning stroke, if bodies are in their natural state, can only be in proportion to the quantity of electricity in each substance contained within that space. It is in fact the lightning itself diffused through the earth which makes the returning stroke; and it is impossible that every substance within two or three miles of the explosion can receive the whole flash, or another equal to it. It is only in cases where the quantity of electricity, diffused through a great space, happens to discharge itself through a human body or other conducting substance of no great bulk, that the effects upon the latter can be any way considerable.

We shall now inquire into the reason of the appearances of sparks in places at such distance from the explosion of the lightning. To understand this, we must always keep in our eye this principle, viz. that there never is, nor can be, a real deficiency of the electric fluid in any substance or in any place. It is to be considered as an absolute plenum, and of consequence it can have no other motion than a circulatory one. At every discharge of lightning therefore from the clouds into the earth, or from one cloud into another, there must invariably be a return of the same quantity to those clouds which have made the discharge; in the vast extent of electrified surface, some part of these returns must undoubtedly be made at great distances from the place where the explosion of lightning happens. As long as matters remain in their natural state, the electric fluid will return by innumerable passages in such small streams, that no perceptible effect upon any single substance can take place. But if a body be so situated, that a large portion of the electric matter must return through it from the earth, then such body will undoubtedly be more affected by every flash than the rest of the substances around it; and, if the communication with the earth be interrupted, a flash of fire will be perceived betwixt the conducting substance and the earth at the time that a flash bursts out from the cloud. The strength of such a flash, however, must by no means be supposed equivalent to that of the main stroke of lightning, unless we could suppose the whole electrical power of the vast circle already mentioned to be discharged through the conductor.

But, though this may explain the reason of the sparks or flashes, we cannot from this principle account for the accident which befel the man and horses. There was indeed at that time a very violent emission of electricity from the earth, but no distant flash of lightning happened at the same moment with it, to expel the electricity from the earth. It appears therefore, that the electricity had in this case been accumulating in the earth itself, in a manner similar to that which produces earthquakes; and which is fully explained in p. 116, under that article. The thunder-storm was the natural means employed to supply that part of the earth with electricity, which was in the state of charging; and the moment that the quantity thus supplied was thrown back, all signs of electricity must cease, as much as when that thrown in upon one side of a Leyden phial is again thrown off. Hence, when the flash burst out of the earth, and killed the man and horses, that portion of earth which absorbed the electricity

till then, required it no longer; and of consequence the thunder-storm occasioned by this absorption naturally ceased.

That this disposition to an earthquake did really prevail in the earth at that time, is evident from the tremor which Mr. Bell felt on the ground when walking in his garden. The stroke which the woman received on the foot, the death of the lamb, and no doubt many similar circumstances, concurred to shew that there was an attempt to restore the equilibrium from the earth, as has been already related. The same disposition to an earthquake, however, was afterwards renewed; and, on the 11th of August that same year, a smart shock of an earthquake did actually take place, as Mr. Brydone informs us in the same paper.

Besides the different kinds of lightning already treated of, it is by no means uncommon to see flashes unattended by any report. These are always of the sheet kind; they happen very frequently in windy weather when the sky is clear; and likewise when the sky is cloudy, immediately before a fall of rain or snow. The general reason of these appears to be, that the electric fluid is the medium by which the vapours are suspended in the atmosphere; and of consequence, every separation of vapour, whether as rain, snow, or hail, must be attended with what is called a discharge of electrical matter. The reason why this kind of lightning is never attended with any report is, that there is no particular object against which the force of the flash is directed; but it dissipates itself among the innumerable conducting bodies with which the atmosphere, always abounds. It is, however, in a manner impossible to explain the various ways in which this subtile fluid acts. We know not, for instance, in what state it is when acting as a medium of connection betwixt the air and vapour, nor in what its discharge into other parts of the atmosphere properly consists. At any rate, we see that a flash of lightning, however limited its extent may appear to us, diffuses its effects over a great space of atmosphere; for after one of these silent flashes, it is no uncommon thing to observe the sky to become obscure, though it had been quite serene before; or, if it had been cloudy, to see rain or snow begin to fall in a very few minutes. It is probable indeed, that there is no change whatever that can take place in the atmosphere but by means of electricity; and there is great reason to believe, that the silent discharges of this fluid from one part of the atmosphere to another, many of which are totally invisible, ultimately occasion the whole of the phenomena of meteorology.

Various parts of Lord Stanhope's Treatise on Electricity, besides those already quoted, tend to prove the utility of high and pointed conductors, in preference to those which terminate in a ball, or rounded end. Towards the end of the performance, he discusses this matter very particularly; and enumerates the necessary requisites and directions for erecting them, which are as follow:

1st, That the rod be made of such substances as are, in their nature, the best conductors of electricity. 2dly, That the rod be uninterrupted, and perfectly continuous.—This is a very material circumstance. One entire piece of metal cannot perhaps be had: but it is not sufficient that the rods, of which the conductor consists, be sensibly in contact; they should be pressed into actual contact by means of nuts and screws, with a thin piece of sheet-lead between the shoulders of the joints. 3dly, That it be of a sufficient thickness.—

neſs.—A copper rod half an inch ſquare, or an iron rod one inch ſquare, or one of lead two inches ſquare, are thought fully ſufficient by the author. 4thly, That it be perfectly connected with the common ſtock.—That is, it ſhould be carried deep into the earth, which is frequently dry near the ſurface; and then continued in a horizontal direction, ſo as to have the farther extremity dipped, ſhould this be practicable, into water, at the diſtance of ten yards or more from the foundation. 5thly, That the upper extremity of the rod be as acutely pointed as poſſible.—This termination ſhould be of copper; or rather a very fine and exceedingly acute needle of gold ſhould be employed, which will not materially add to the expence. 6thly, That it be very finely tapered:—ſo that the upper extremity may be a cone, the diameter of the baſe of which may bear an extremely ſmall proportion to its height; for inſtance, that of one to forty. 7thly, That it be extremely prominent;—that is, eight, ten, or fifteen, feet at leaſt above the higheſt parts of the building. The author lays great ſtreſs on this circumſtance; in conſequence of the law above-mentioned, deduced by him from his experiments, relating to electric atmoſpheres. According to this law, the denſity of an electric atmoſphere (the negative atmoſphere, for inſtance, of the roof of a houſe, &c. while a poſitively-charged cloud hangs over it) diminiſhes in the inverſe ratio of the ſquare of the diſtance from the ſurface of the body to which that atmoſphere belongs. Accordingly, if the rod project twelve feet into this atmoſphere, it will reach to a part of it four times leſs denſe than if the rod projected only to half that diſtance, or ſix feet;—and to a part one hundred and forty-four times rarer than if it projected only one foot. 8thly, That each rod be carried, in the ſhorteſt convenient direction, from the point at its upper end, to the common ſtock. 9thly, That there be neither large nor prominent bodies of metal upon the top of the building propoſed to be ſecured, but ſuch as are connected with the conductor, by ſome proper metallic communication. 10thly, That there be a ſufficient number of high and pointed rods.—On edifices of great importance, eſpecially magazines of gun-powder, the author thinks theſe ought never to be above forty or fifty feet aſunder; and that every part of the rods be very ſubſtantially erected. The author declares that he has never been able to hear of a ſingle inſtance, nor does he believe that any one can be produced, of an high, tapering, and acutely-pointed, metallic conductor, having ever, in any country, been ſtruck by lightning, if it had all the neceſſary requiſites above-mentioned, eſpecially the ſecond and fourth.

On the whole, it ſeems to be pretty certain, that both pointed and knobbed metalline conductors have the power of preſerving any body placed at a ſmall diſtance from them from being ſtruck by lightning. This they do, not becauſe they can attract the lightning far out of its way, but becauſe the reſiſtance to its paſſage is always leaſt on that ſide where they are; and, as pointed conductors diminiſh the reſiſtance more conſiderably than blunt ones, they ſeem in all caſes to be preferable.—It appears, however, that a ſingle conductor, whether blunt or pointed, is not capable of ſecuring all the parts of a large building from ſtrokes of lightning; and therefore ſeveral of them will be required for this purpoſe: but to what diſtance their influence extends, hath not been determined, nor does it ſeem eaſily capable of being aſcertained.

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It now remains to explain some of the more uncommon appearances and effects of lightning. One of these is, that it is frequently observed to kill alternately: that is, supposing a number of people standing in a line; if the first person was killed, the second perhaps would be safe; the third would be killed, and the fourth safe; the fifth killed, &c.—Effects of this kind are generally produced by the most violent kind of lightning; namely, that which appears in the form of balls, and which are frequently seen to divide themselves into several parts before they strike. If one of these parts of a fire-ball strike a man, another will not strike the person who stands immediately close to him; because there is always a repulsion between bodies electrified the same way. Now, as these parts into which the ball breaks have all the same kind of electricity, it is evident that they must for that reason repel one another; and this repulsion is so strong, that a man may be interposed within the stroke of two of them without being hurt by either.

The other effect of lightning is recorded to have been remarkably conspicuous at Jerusalem, where those who attempted to rebuild the temple had the marks of crosses impressed upon their garments and bodies. This may reasonably be thought to arise from the same cause to which the angular appearance of lightning in the air is owing; namely, its violent impetus and velocity, together with the opposition of the atmosphere. A small stroke of lightning, sometimes indeed a very considerable one, cannot always enter the substance of terrestrial bodies, even when it touches them, for reasons already given. In this case it runs along their surface; and, as in its motion it is perpetually resisted by the atmosphere, it undoubtedly has the same angular motion which we often perceive in the atmosphere. If in this situation it happens to touch the human skin, or a garment, especially of linen, as being a conductor, it will undoubtedly leave a mark upon it; and this mark being of a zig-zag form, might, in the above instance, have been either taken for the exact form of a cross by the beholders, or have suggested that idea in relating the story to make it appear more wonderful.

These observations may serve to give some idea of the nature of lightning, and its operations after it appears in its proper form and bursts out from the cloud; but its original formation, and the powers by which the clouds are at first electrified, and their electricity kept up notwithstanding many successive discharges of lightning, and the quantity of electric matter continually carried off by the rain, &c. I shall hereafter illustrate, by an Explanation of the Principles of Electricity and of Thunder.

ART OF HAPPINESS.

As the present condition of human life is wonderfully chequered with good and ill, and as no height of station, no affluence of fortune, can absolutely insure the good, or secure against the ill, it is evident that a great part of the comfort and serenity of life must lie in having our minds duly affected with regard to both, i. e. rightly attempered to the loss of one and the sufferance of the other. For it is certain that outward calamities derive their chief malignity and pressure from the inward dispositions with which we receive them. By managing these right, we may greatly abate that malignity and

preſſure, and conſequently diminiſh the number, and weaken the moment, of the ills of life, if we ſhould not have it in our power to obtain a large ſhare of its goods. There are particularly three virtues which go to the forming this right temper towards ill, and which are of ſingular efficacy, if not totally to remove, yet wonderfully to alleviate, the calamities of life. Theſe are, fortitude or patience, humility, and reſignation.

Fortitude either moderates our fears, and enables us bravely to encounter the proſpect of ill, or renders the mind ſerene and invincible under its immediate preſſure. It lies equally diſtant from raſhneſs and cowardice; and, though it does not hinder us from feeling, yet prevents our complaining or ſhrinking under, the ſtroke. It always includes a generous contempt of, or at leaſt a noble ſuperiority to, thoſe precarious goods of which we can inſure neither the poſſeſſion nor continuance. The man therefore who poſſeſſes this virtue in this ample ſenſe of it, ſtands upon an eminence, and ſees human things below him; the tempeſt indeed may reach him, but he ſtands ſecure and collected againſt it upon the baſis of conſcious virtue, which the ſevereſt ſtorms can ſeldom ſhake, and never overthrow.

Humility is another virtue of high rank and dignity, though often miſtaken by proud mortals for meanneſs and puſillanimity. It is oppoſed to pride, which commonly includes in it a falſe or over-rated eſtimation of our own merit, an aſcription of it to ourſelves as its only and original cauſe, an undue compariſon of ourſelves with others, and, in conſequence of that ſuppoſed ſuperiority, an arrogant preference of ourſelves, and a ſupercilious contempt of them. Humility, on the other hand, ſeems to denote that modeſt and ingenuous temper of mind, which ariſes from a juſt and equal eſtimate of our own advantages compared with thoſe of others, and from a ſenſe of our deriving all originally from the Author of our being. Its ordinary attendants are mildneſs, a gentle forbearance, and an eaſy unaſſuming humanity with regard to the imperfections and faults of others; virtues rare indeed, but of the faireſt complexion, the proper offſpring of ſo lovely a parent, and the beſt ornaments of ſuch imperfect creatures as we are.

Reſignation is that mild and heroic temper of mind which ariſes from a ſenſe of an infinitely wiſe and good Providence, and enables one to acquieſce with a cordial affection in its juſt appointments. This virtue has ſomething very particular in its nature and ſublime in its efficacy. For it teaches us to bear ill, not only with patience, and as being unavoidable, but it transforms, as it were, ill into good, by leading us to conſider it, and every event that has the leaſt appearance of ill, as a divine diſpenſation, a wiſe and benevolent temperament of things, ſubſervient to univerſal good, and of courſe including that of every individual, eſpecially of ſuch as calmly ſtoop to it. In this light the adminiſtration itſelf, nay every act of it, becomes an object of affection, the evil diſappears, or is converted into a balm which both heals and nouriſhes the mind. For, though the firſt unexpected acceſs of ill may ſurpriſe the ſoul into grief, yet that grief, when the mind calmly reviews its object, changes into contentment, and is by degrees exalted into veneration and a divine compoſure. Our private will is loſt in that of the Almighty, and our ſecurity againſt every real ill reſts on the ſame bottom as the throne of him who lives and reigns for ever.

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It is evident that the happinefs of fuch a progreffive creature as man can never be at a ftand, or continue a fixed invariable thing. His finite nature, let it rife ever fo high, admits ftill higher degrees of improvement and perfection; and his progreffion in improvement or virtue always makes way for a progreffion in happinefs: fo that no poffible point can be affigned in any period of his exiftence in which he is perfectly happy, that is, fo happy as to exclude higher degrees of happinefs. All his perfection is only comparative. It appears that many things muft confpire to complete the happinefs of fo various a creature as man, fubject to fo many wants, and fufceptible of fuch different pleafures. As his capacities of pleafure cannot be all gratified at the fame time, and muft often interfere with each other in fuch a precarious and fleeting ftate as human life, or be frequently difappointed, perfect happinefs, i. e. the undifturbed enjoyment of the feveral pleafures of which we are capable, is unattainable in our prefent ftate. That ftate is moft to be fought after, in which the feweft competitions and difappointments can happen, which leaft of all impairs any fenfe of pleafure, and opens an inexhaufted fource of the moft refined and lafting enjoyments. That ftate which is attended with all thofe advantages, is a ftate or courfe of virtue. Therefore, a ftate of virtue, in which the moral goods of the mind are attained, is the happieft ftate.

OF FASHIONABLE COMPANY.

THE love of company and of focial pleafures is natural, and attended with fome of the fweeteft fatisfactions of human life; but, like every other love, when it proceeds beyond the limits of moderation, it ceafes to produce its natural effect, and terminates in difguftful fatiety. The foundation-ftone and the pillar on which we build the fabric of our felicity muft be laid in our own hearts. Amufement, mirth, agreeable variety, and even improvement, may be fometimes fought in the gaiety of mixed company, and in the ufual diverfions of the world; but, if we found our general happinefs on thefe, we fhall do little more than raife caftles in the air, or build houfes on the fand.

As the human mind cannot always be on the ftretch, nor the hands always employed in labour, recreation becomes both agreeable and neceffary. Of all recreations, that of the company of a few chofen companions muft be allowed to be the moft manly and moft improveing: but as in thofe hours of recreation we are moft in danger of being mifled, being generally at fuch feafons more off our guard than ufual, the greateft care fhould be taken in making choice of whom to affociate with; for according to our choice of them, both our character and difpofition will receive a tincture, as waters paffing through minerals partake of their tafte and efficacy. This is a truth fo univerfally received, that it is become a proverb both in the natural and moral world, That a man is known by his company. As by chemiftry we learn, that difcordant mixtures produce nothing but broil and fermentation till one of them gets the afcendancy of the reft; fo from fcripture we learn, that two cannot walk together except they be agreed. From which we may fee, how impoffible it is for

for any one to be thought a perſon of real goodneſs and integrity, whilſt he chooſeth for his companions the abandoned and licentious.

By herding with ſuch, he will not only loſe his character, but his virtue; for, whatever fallacious diſtinction he may be pleaſed to make between the men and their vices, in the end the firſt generally qualifies the laſt; and by ceaſing to hate them he will ſoon learn both to love and practiſe them. In ſhort, the ſociety of ſenſual men is peculiarly enſnaring. The malignity of their contagion doth not appear all at once. Their frolics firſt appear harmleſs; then, when partaken of, they leave a longing reliſh behind them; and one appointment makes way for another, one expence leads on to a ſecond; and ſo time and fortune are waſted away to very bad purpoſe.

To derive the proper pleaſure and improvement from company, it ought to be ſelect, and to conſiſt of perſons of character, reſpectable both for their morals and underſtandings. Mixed and undiſtinguiſhed ſociety tends only to diſſipate our ideas and induce a laxity of principles and practice. The pleaſure it affords is of a coarſe, mixed, noiſy, and rude, kind. Indeed, it commonly ends in wearineſs and diſguſt, as even they are ready to confeſs who yet conſtantly purſue it as if their chief good conſiſted in living in a crowd.

Among thoſe, indeed, who are exempted by their circumſtances from profeſſional and official employments, and who profeſſedly devote themſelves to a life of pleaſure, little elſe ſeems to conſtitute the idea of it, but an unceaſing ſucceſſion of company, public or private. The dreſs, and other circumſtances preparatory to the enjoyment of this pleaſure, ſcarcely leave a moment for reflection. Day after day is ſpent in the ſame toilſome round, till a habit is formed, which renders diſſipation neceſſary to exiſtence. One week without it would probably induce a lowneſs of ſpirits, which might terminate in deſpair and ſuicide. When the mind has no anchor, it will ſuffer a kind of ſhipwreck; it will ſink in whirlpools and be daſhed on rocks. What, indeed, is life or its enjoyments without ſettled principles, laudable purpoſes, mental exertions, and internal comfort? It is merely a vapour; or, to drop the language of figure on ſo ſerious a ſubject, it is a ſtate worſe than non-entity, ſince it poſſeſſes a reſtleſs power of action, productive of nothing but miſery.

It is recommended, therefore, to all who wiſh to enjoy their exiſtence, that they ſhould acquire a power not only of bearing, but of taking a pleaſure in, temporary ſolitude. Every one muſt, indeed, ſometimes be alone. Let him not repine when he is alone, but learn to ſet a value on the golden moments. It is then that he is enabled to ſtudy himſelf and the world around him. It is then that he has an opportunity of ſeeing things as they are, and of removing the deceitful veil which almoſt every thing aſſumes in the buſy ſcene of worldly employments. The ſoul is enabled to retire into herſelf, and to exert thoſe energies which are always attended with ſublime pleaſure. She is enabled to ſee the dependent, frail, and wretched, ſtate of man as the child of nature; and, incited by her diſcovery, to implore grace and protection from the Supreme Governor of the univerſe.

There is no doubt but man is made for action, and that his duties and pleaſures are often moſt numerous and moſt important amidſt the buſy hum of men. Many vices and many corrupt diſpoſitions have

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been fostered in a solitary life. Monkery is not favourable to human nature or human happiness; neither is unlimited dissipation.

In short, let there be a sweet interchange of retirement and association, of repose and activity. A few hours spent every day by the votaries of pleasure in serious meditation, would render their pleasure pure, and more unmixed with misery. It would give them knowledge, so that they would see how far they might advance in their pursuit without danger; and resolution, so that they might retreat when danger approached. It would teach them how to live, a knowledge which indeed they think they possess already; and it would also teach them what they are often too little solicitous to learn—how to die.

THOUGHTS ON TRAVELLING.

IT is constantly observed, that Englishmen, at their return from travelling, generally deride and contemn the manners of their native country; but this arises principally from their being really unacquainted with every thing they ought to know before they begin to travel. Thus, they receive their first impressions in foreign countries, having neither observed, nor even seen, any thing in their own.

Those who have travelled into France (which, before the late disturbances was generally the first place a young man of quality thought of visiting) behave as if they had been entirely educated there. If, on the other hand, Holland has been the principal object of the journey, they return with all the manners of a Dutchman, and deride the customs of the French. In a word, one hates all that is not French; another can bear nothing that is not Dutch; a third despises every thing but what comes from Italy:—but they all agree in falling out with the manners of their native England.

As a remedy for the above unreasonable prejudices, so palpably founded in ignorance, it would be an excellent regulation to oblige all such as have a mind to travel first to make a complete tour of Britain, to make themselves acquainted with our own nature, customs, wants, and advantages; also to examine such previous to their leaveing the kingdom, and not to suffer them to depart till they had given proof of their being properly qualified to travel.

Thus they would be able to distinguish those things which are good in their own country from those that want improvement. They would learn to know the value of money, the need of economy in travelling, and would at least buy their experience of their fellow-subjects. It would enable them to judge whether foreign compliments are consistent with old British honesty. They would be qualified, instead of weighing all things in a French, German, or Italian, balance, to judge impartially of each nation. An English officer, who would engage himself in foreign service, should first be well acquainted with the state of the army of his own nation; he will otherwise not distinguish what he has to learn abroad from that which is already known at home. Before we enquire into other religions, we should be well instructed in our own. A prudent merchant will not fail to inform himself what commodities are most wanted; of the relative goodness and prices of foreign and home productions; and according to such necessary intelligence he directs his voyages or correspondence.

respondence. A peasant, who goes to market to buy provisions for his family, knew his wants of course before he left home.

Precautions such as these in a traveller would often save him the trouble of making tedious enquiries into things which he might have seen in greater perfection in his own country. It might also not be improper to make the traveller explain himself with regard to the particular science he means to pursue, (a question that most of our modern travellers would find it extremely difficult, if not impossible, to answer;) which would enable us, at his return, to judge how far he had improved his capacity to serve his country; for we should not only become fine gentlemen, but useful members of the community.

These reflections are owing to the consideration, that, as vast sums of money are carried out of the kingdom, and expended in foreign countries by young noblemen and gentlemen who travel, we ought at least to do all in our power to render the golden stream fruitful.

PHILOSOPHICAL DEFINITION OF BEAUTY.

BEAUTY, in its native signification, is appropriated to objects of sight. Objects of the other senses may be agreeable, such as the sounds of musical instruments, the smoothness and softness of some surfaces; but the agreeableness called beauty belongs to objects of sight; which are more complex than that of any other sense: in the simplest, we perceive colour, figure, length, breadth, thickness. A tree is composed of a trunk, branches, and leaves; it has colour, figure, size, and sometimes motion: by means of each of these particulars, separately considered, it appears beautiful; but a complex perception of the whole greatly augments the beauty of the object. The human body is a composition of numberless beauties arising from the parts and qualities of the object, various colours, various motions, figures, size, &c. all united in one complex object, and striking the eye with combined force. Hence it is, that beauty, a quality so remarkable in visible objects, lends its name to every thing that is eminently agreeable. Thus, by a figure of speech, we say, a beautiful sound, a beautiful thought, a beautiful discovery, &c.

Human or Personal Beauty may be considered under these four heads: Colour, Form, Expression, and Grace; the two former being, as it were, the body, the two latter the soul, of beauty.

1. *Colour.*—Although this be the lowest of all the constituent parts of beauty, yet it is vulgarly the most striking, and the most observed. For which there is a very obvious reason to be given: that "every body can see, and very few can judge; the beauties of colour requiring much less of judgment than either of the other three. As to the colour of the body in general, the most beautiful perhaps that ever was imagined was that which Apelles expressed in his famous Venus; and which, though the picture itself be lost, Cicero has in some degree preserved to us in his excellent description of it. It was (as we learn from him) a fine red, beautifully intermixed and incorporated with white; and diffused, in its due proportions, through each part of the body. Such are the descriptions of a most beautiful skin in several of the Roman poets; and such often is the colouring of Titian, and particularly in his sleeping Venus, or whatever other beauty that charming piece was meant to represent. The reason why

thoſe colours pleaſe ſo much, is not only their natural livelineſs, nor the much greater charms they obtain from their being properly blended together, but is alſo owing in ſome degree to the idea they carry with them of good health; without which all beauty grows languid and leſs engaging; and with which it always recovers an additional life and luſtre.

As to the colour of the face in particular, a great deal of beauty is owing (beſide the cauſes already mentioned) to variety; that being deſigned by nature for the greateſt concourſe of different colours of any part in the human body. Colours pleaſe by oppoſition; and it is in the face that they are the moſt diverſified, and the moſt oppoſed. It is an obſervation apparently whimſical, but perhaps not unjuſt, that the ſame thing which makes a fine evening makes a fine face; that is, as to the particular part of beauty now under conſideration. The beauty of an evening ſky, about the ſetting of the ſun, is owing to the variety of colours that are ſcattered along the face of the heavens. It is the fine red clouds, intermixed with white, and ſometimes darker ones, with the azure bottom appearing here and there between them, which makes all that beautiful compoſition that delights the eye ſo much, and gives ſuch a ſerene pleaſure to the heart. In the ſame manner, if you conſider ſome beautiful faces, you may obſerve, that it is much the ſame variety of colours which gives them that pleaſing look; which is ſo apt to attract the eye, and but too often to engage the heart. For all this ſort of beauty is reſolvable into a proper variation of fleſh-colour and red, with the clear bluenes of the veins pleaſingly intermixed about the temples and the going-off of the cheeks, and ſet off by the ſhades of full eye-brows; and of the hair, when it falls in a proper manner round the face.

It is for much the ſame reaſon that the beſt landſcape-painters have been generally obſerved to chooſe the autumnal part of the year for their pieces, rather than the ſpring. They prefer the variety of ſhades and colours, though in their decline, to all their freſhneſs and verdure in their infancy; and think all the charms and livelineſs even of the ſpring more than compenſated by the choice, oppoſition, and richneſs, of colours, that appear almoſt on every tree in the autumn.

Though one's judgment is apt to be guided by particular attachments (and that more perhaps in this part of beauty than any other), yet the general perſuaſion ſeems well founded, that a complete brown beauty is really preferable to a perfect fair one; the bright brown giving a luſtre to all the other colours, a vivacity to the eyes, and a richneſs to the whole look, which one ſeeks in vain in the whiteſt and moſt tranſparent ſkins. Raphael's moſt charming Madona is a brunette beauty; and his earlier Madonas (or thoſe of his middle ſtile) are generally of a lighter and leſs pleaſing complexion. All the beſt artiſts in the nobleſt age of painting, about Leo the tenth's time, uſed this deeper and richer kind of colouring; and perhaps one might add, that the glaring lights introduced by Guido went a great way towards the declenſion of that art; as the enfeebling of the colours by Carlo Marat (or his followers) hath ſince almoſt completed the fall of it in Italy.

Under the idea of colour, it ſeems doubtful whether ſome things ought not to be comprehended which are not perhaps commonly meant by that name: as that appearing ſoftneſs or ſilkineſs of ſome

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skins; that Magdalen-look in some fine faces, after weeping; that brightness, as well as tint, of the hair; that lustre of health that shines forth upon the features; that luminousness that appears in some eyes, and that fluid fire, or glistening, in others: some of which are of a nature so much superior to the common beauties of colour, that they make it doubtful whether they should not have been ranked under a higher class, and reserved for the expression of the passions.

2. *Form.*—This takes in the turn of each part, as well as the symmetry of the whole body, even to the turn of an eye-brow, or the falling of the hair. Perhaps, too, the attitude, while fixed, ought to be reckoned under this article: by which is not only meant the posture of the person, but the *position of each part*; as the turning of the neck, the extending of the hand, the placing of a foot; and so on to the most minute particular. The general cause of beauty in the form or shape in both sexes is a proportion, or an union and harmony, in all parts of the body. The distinguishing character of beauty in the female form, is delicacy and softness; and in the male, either apparent strength or agility. The finest exemplars that can be seen for the former, is the Venus of Medici; and for the two latter, the Hercules Farnese and the Apollo Belvedere.

There is one thing indeed in the last of these figures which exceeds the bounds of our present inquiry; what an Italian artist called *il sovra umano*; and what we may call the transcendent, or celestial. It is something distinct from all human beauty, and of a nature greatly superior to it; something that seems like an air of divinity: which is expressed, or at least is to be traced out, in but very few works of the artists; and of which scarcely any of the poets have caught any ray in their descriptions (or perhaps even in their imagination) except Homer and Virgil, among the ancients, and our Shakespeare and Milton among the moderns. The beauty of the mere human form is much superior to that of colour; and it may be partly for this reason, that, when one is observing the finest works of the artists at Rome (where there is still the noblest collection of any in the world), one feels the mind more struck and more charmed with the capital statues, than with the pictures of the greatest masters.

One of the old Roman poets, in speaking of a very handsome man, who was candidate for the prize in some of the public games, says, that he was much respected and much admired by all the spectators at his first appearance; but that, when he flung off his robes, and discovered the whole beauty of his shape altogether, it was so superior, that it quite extinguished the beauties they had before so much admired in his face. Much the same effect may be felt in viewing the Venus of Medicis. If you observe the face only, it appears extremely beautiful; but if you consider all the other elegancies of her make, the beauty of her face becomes less striking, and is almost lost in such a multiplicity of charms. Whoever would learn what makes the beauty of each part of the human body, may find it laid down pretty much at large by Felibien, who describes it thus: The head should be well rounded; and look rather inclining to small than large. The forehead, white, smooth, and open (not with the hair growing down too deep upon it); neither flat nor prominent, but, like the head, well rounded; and rather small in proportion than large. The hair, either bright black or brown; nothing

thin, but full and waving; and if it falls in moderate curls the better. The black is particularly ſeeful for ſetting off the whiteneſs of the neck and ſkin. The eyes black, cheſnut, or blue; clear, bright, and lively; and rather large in proportion than ſmall. The eye-brows well divided, rather full than thin; ſemicircular, and broader in the middle than at the ends; of a neat turn, but not formal. The cheeks ſhould not be wide; ſhould have a degree of plumpneſs, with the red and white finely blended together; and ſhould look firm and ſoft. The ear ſhould be rather ſmall than large; well folded, and with an agreeable tinge of red. The noſe ſhould be placed ſo as to divide the face into two equal parts; ſhould be of a moderate ſize, ſtrait, and well-ſquared; though ſometimes a little riſing in the noſe, which is but juſt perceivable, may give a very graceful look to it. The mouth ſhould be ſmall; and the lips not of equal thickneſs: they ſhould be well turned, ſmall rather than groſs; ſoft, even to the eye; and with a living red in them. A truſy pretty mouth is like a roſe-bud that is beginning to blow. The teeth ſhould be middle-ſized, white, well-ranged, and even. The chin of moderate ſize; white, ſoft, and agreeably rounded. The neck ſhould be white, ſtraight, and of a ſoft, eaſy, and flexible, make, rather long than ſhort; leſs above, and increaſing gently toward the ſhoulders: the whiteneſs and delicacy of its ſkin ſhould be continued, or rather go on improving, to the boſom. The ſkin in general ſhould be white, properly tinged with red; with an apparent ſoftneſs, and a look of thriving health in it. The ſhoulders ſhould be white, gently ſpread, and with a much ſofter appearance of ſtrength than in thoſe of men. The arm ſhould be white, round, firm, and ſoft; and more particularly ſo from the elbow to the hands. The hand ſhould unite inſenſibly with the arm; juſt as it does in the ſtatue of the Venus of Medicis. They ſhould be long and delicate, and even the joints and nervous parts of them ſhould be without either any hardneſs or dryneſs. The fingers ſhould be fine, long, round, and ſoft; ſmall, and leſſening towards the tips of them: and the nails long, rounded at the ends, and pellucid. The boſom ſhould be white and charming; and the breaſts equal in roundneſs, whiteneſs, and firmneſs; neither too much elevated nor too much depreſſed; riſing gently, and very diſtinctly ſeparated: in one word, juſt like thoſe of the Venus of Medicis. The ſides ſhould be long, and the hips wider than the ſhoulders; and ſhould turn off as they do in the ſame Venus; and go down rounding and leſſening gradually to the knee. The knee ſhould be even, and well rounded; the legs ſtraight, but varied by a proper rounding of the more fleſhy part of them; and the feet finely turned, white, and little. Theſe conſtituent parts of beauty may be ſtudied in the fineſt pictures and ſtatues; for in life we commonly ſee but a ſmall part of the human body, moſt of it being either diſguiſed or altered by what we call dreſs.

In fact we do not only thus, in a great meaſure, hide beauty, but even injure and kill it, by ſome parts of dreſs. A child is no ſooner born into the world, than it is bound up, almoſt as firmly as an old Egyptian mummy, in ſeveral folds of linen. It is in vain for him to give all the ſigns of diſtreſs that nature has put in his power, to ſhew how much he ſuffers whilſt they are thus impriſoning his limbs; or all the ſigns of joy, every time they are ſet at liberty. In a few minutes, the old witch who preſides over his infirmeſt days falls to

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tormenting him afresh, and winds him up again in his destined confinement. When he comes to be dressed like a man, he has ligatures applied to his arms, legs, and middle; *in short, all over him*; to prevent the natural circulation of his blood, and make him less active and healthy: and, if it be a child of the tenderer sex, she must be bound yet more straitly about the waist and stomach, to acquire a disproportion that nature never meant in her shape. The two other constituent parts of beauty are expression and grace; the former of which is common to all persons and faces; and the latter is to be met with in very few.

3. *Expression.*—By this is meant the expression of the passions; the turns and changes of the mind, so far as they are visible to the eye by our looks or gestures. Though the mind appears principally in the face, and attitudes of the head, yet every part almost of the human body, on some occasion or other, may become expressive. Thus the languishing hanging of the arm, or the vehement exertion of it; the pain expressed by the fingers of one of the sons in the famous group of Laocoon, and in the toes of the dying gladiator. But this again is often lost among us by our dress; and indeed is of the less concern, because the expression of the passions passes chiefly in the face, which we (by good luck) have not as yet concealed.

The parts of the face in which the passions most frequently make their appearance, are the eyes and mouth; but from the eyes they diffuse themselves very strongly about the eye-brows; as, in the other case, they appear often in the parts all round the mouth. Philosophers may dispute as much as they please about the seat of the soul; but, wherever it resides, we are sure that it speaks in the eyes. Perhaps it is injuring the eye-brows, to make them only dependents on the eye; for they, especially in lively faces, have, as it were, a language of their own; and are extremely varied, according to the different sentiments and passions of the mind. Degrees of pleasure *may be often discerned in a lady's eye-brow, though she have address* enough not to let it appear in her eyes; and at other times may be discovered so much of her thoughts, in the line just above her eye-brows, that she would probably be amazed how any body could tell what passed in her mind, and (as she thought) undiscovered by her face, so particularly and distinctly. Homer makes the eye-brows the seat of majesty, Virgil of dejection, Horace of modesty, and Juvenal of pride; and it is not certain whether every one of the passions be not assigned, by one or other of the poets, to the same part.

We may say, in general, that all the tender and kind passions add to beauty; and all the cruel and unkind ones add to deformity: and it is on this account that good nature may very justly be said to be "the best feature even in the finest face." Mr. Pope has included the principal passion of each sort in two very pretty lines:

> Love, hope, and joy, fair pleasure's smiling train;
> Hate, fear, and grief, the family of pain.

The former of which naturally give an additional lustre and enlivening to beauty; as the latter are too apt to cast a gloom and cloud over it. Yet in these, and all the other passions, moderation ought perhaps to be considered in a great measure the rule of their beauty, almost as far as moderation in actions is the rule of virtue. Thus an excessive joy may be too boisterous in the face to be pleasing; and a degree

degree of grief in some faces, and on some occasions, may be extremely beautiful. Some degrees of anger, shame, surprise, fear, and concern, are beautiful; but all excess is hurtful, and all excess ugly. Dullness, austerity, impudence, pride, affectation, malice, and envy, are always ugly.

The finest union of passions that can perhaps be observed in any face, consists of a just mixture of modesty, sensibility, and sweetness; each of which when taken singly is very pleasing: but, when they are all blended together in such a manner as either to enliven or correct each other, they give almost as much attraction as the passions are capable of adding to a very pretty face. The prevailing passion in the Venus of Medicis is modesty: it is expressed by each of her hands, in her looks, and in the turn of her head. And, by the way, it may be questioned, whether one of the chief reasons why side-faces please one more than full ones, be not from the former having more of the air of modesty than the latter. This at least is certain, that the best artists usually choose to give a side-face rather than a full one; in which attitude the turn of the neck too has more beauty, and the passions more activity and force. Thus, as to hatred and affection in particular, the look that was formerly supposed to carry an infection with it from malignant eyes was a slanting regard, like that which Milton gives to Satan when he is viewing the happiness of our first parents in Paradise; and the fascination, or stroke of love, is most usually conveyed, at first, in a side-glance. It is owing to the great force of pleasingness which attends all the kinder passions, "that lovers do not only seem, but are really, more beautiful to each other than they are to the rest of the world;" because, when they are together, the most pleasing passions are more frequently exerted in each of their faces than they are in either before the rest of the world. There is then (as a certain French writer very well expresses it) "a soul upon their countenances," which does not appear when they are absent from each other; or even when they are together conversing with other persons, that are indifferent to them, or rather lay a restraint upon their features.

The superiority which the beauty of the passions has over the two parts of beauty first mentioned, will probably be now pretty evident; or, if this should appear still problematical to any one, let him consider a little the following particulars, of which every body must have met with several instances in their life-time. That there is a great deal of difference in the same face, according as a person is in a better or worse humour, or in a greater or less degree of livelinesS: that the best complexion, the finest features, and the exactest shape, without any thing of the mind expressed on the face, are as insipid and unmoving as the waxen figure of the fine Duchess of Richmond in Westminster Abbey: that the finest eyes in the world, with an excess of malice or rage in them, will grow as shocking as they are in that fine face of Medusa on the famous seal in the Strozzi family at Rome: that a face without any good features in it, and with a very indifferent complexion, shall have a very taking air; from the sensibility of the eyes, the general good-humoured turn of the look, and perhaps a little agreeable smile about the mouth. And these three things perhaps would go a great way toward accounting for the *Je ne sçai quoi*, or that inexplicable pleasingness of the face (as they choose to call it), which is so often talked of and so little understood;

as the greater part, and perhaps all the rest of it, would fall under the last article, that of grace.

Thus it appears that the passions can give beauty without the assistance of colour or form; and take it away where they have united the most strongly to give it. And hence the superiority of this part of beauty to the other two. And may help us to account for the justness of what Pliny asserts in speaking of the famous statue of Laocoon and his two sons: he says, it was the finest piece of art in Rome; and to be preferred to all the other statues and pictures, of which they had so noble a collection in his time. It had no beauties of colour to vie with the paintings and other statues there; as the Apollo Belvedere and the Venus of Medicis, in particular, were as finely proportioned as the Laocoon: but this had much greater variety of expression even than those fine ones; and it must be on that account alone that it could have been preferable to them and all the rest.

Before quitting this head, two things before mentioned deserve to be repeated: That the chief rule of the beauty of the passions is moderation; and that the part in which they appear most strongly is the eyes. It is there that love holds all his tendereſt language: it is there that virtue commands, modesty charms, joy enlivens, sorrow engages, and inclination fires, the hearts of the beholders: it is there that even fear, and anger, and confusion, can be charming. But all these, to be charming, must be kept within their due bounds and limits; for too sullen an appearance of virtue, a violent and prostitute swell of passion, a rustic and overwhelming modesty, a deep sadness, or too wild and impetuous a joy, become all either oppressive or disagreeable.

4. The last finishing and noblest part of beauty is grace; which every body is accustomed to speak of as a thing inexplicable; and in a great measure perhaps it is so. We know that the soul is, but we scarcely know what it is: every judge of beauty can point out grace; but no one seems even yet to have fixed upon a definition for it. Grace often depends on some very little incidents in a fine face; and in actions it consists more in the manner of doing things than in the things themselves. It is perpetually varying its appearance, and is therefore much more difficult to be considered than in any thing fixed and steady. While you look upon one, it steals from under the eye of the observer; and is succeeded perhaps by another that flits away as soon and as imperceptibly. It is on this account that grace is better to be studied in Corregio's, Guido's, and Raphael's, pictures, than in real life. But, though one cannot punctually say what grace is, we may point out the parts and things in which it is most apt to appear.

The chief dwelling-place of grace is about the mouth; though at times it may visit every limb or part of the body. But the mouth is the chief seat of grace, as much as the chief seat for the beauty of the passions is in the eyes. Thus, when the French use the expression of *une bouche fort gracieuse*, they mean it properly of grace: but when they say, *des yeux tres gracieux*, it then falls to the share of the passions; and it means kind or favourable. In a very graceful face, by which we do not so much mean a majestic as a soft and pleasing one, there is now and then (for no part of beauty is either so engaging or so uncommon) a certain deliciousness that almost always lives about the mouth, in something not quite enough to be called a smile, but ra-

ther an approach toward one, which varies gently about the different lines there like a little fluttering Cupid, and perhaps sometimes discovers a little dimple, that after just lightening upon you disappears and appears again by fits.

The grace of attitudes may belong to the position of each part, as well as to the carriage or disposition of the whole body: but how much more it belongs to the head than to any other part may be seen in the pieces of the most celebrated painters; and particularly in those of Guido, who has been rather too lavish in bestowing this beauty on almost all his fine women; whereas nature has given it in so high a degree but to very few. The turns of the neck are extremely capable of grace, and are very easy to be observed, though very difficult to be accounted for. How much of this grace may belong to the arms and feet, as well as to the neck and head, may be be seen in dancing. But it is not only in genteel motions that a very pretty woman will be graceful; and Ovid (who was so great a master in all the parts of beauty) had very good reason for saying, That when Venus, to please her gallant, imitated the hobbling gait of her husband, her very lameness had a great deal of prettiness and grace in it. "Every motion of a graceful woman (says another writer of the same age) is full of grace." She designs nothing by it perhaps, and may even not be sensible of it herself: and indeed she should not be so too much; for the moment that any gesture or action appears to be affected, it ceases to be graceful.

Horace and Virgil seem to extend grace so far as to the flowing of the hair, and Tibullus even to the dress of his mistress; but then he assigns it more to her manner of putting on and appearing in whatever she wears than to the dress itself. It is true, there is another wicked poet (Ovid) who has said (with much less decency) "that dress is the better half of the woman:" *Pars minima est ipsa puella sui.*

There are two very distinct (and, as it were, opposite) sorts of grace; the majestic and the familiar. The former belongs chiefly to the very fine woman, and the latter to the very pretty one: that is more commanding, and this the more delightful and engaging. The Grecian painters and sculptors used to express the former most strongly in the looks and attitudes of their Minervas, and the latter in those of Venus. Xenophon, in his Choice of Hercules (or at least the excellent translator of that piece), has made just the same distinction in the personages of wisdom and pleasure; the former of which he describes as moving on to that young hero with the majestic sort of grace; and the latter with the familiar:

> Graceful, yet each with different grace they move;
> This striking sacred awe, that softer winning love.

No poet seems to have understood this part of beauty so well as our own Milton. He speaks of these two sorts of grace very distinctly; and gives the majestic to his Adam, and both the familiar and majestic to Eve; but the latter in a less degree than the former:

> Two of far nobler shape, erect and tall,
> Godlike erect, with native honour clad,—
> For contemplation he, and valour, form'd;
> For softness she, and sweet attractive grace.
>
> MILTON's Par. Lost, B. iv. 298.

Though

Though grace is so difficult to be accounted for in general, yet there are two particular things which seem to hold universally in relation to it. The first is, "That there is no grace without motion;" that is, without some genteel or pleasing motion, either of the whole body or of some limb, or at least of some feature. And it may be hence that Lord Bacon calls grace by the name of decent motion; just as if they were equivalent terms: "In beauty, that of favour is more than that of colour; and that of gracious and decent motion more than that of favour." Virgil in one place points out the majesty of Juno, and in another the graceful air of Apollo, by only saying that they move; and possibly he means no more when he makes the the motion of Venus the principal thing by which Æneas discovers her under all her disguise; though the commentators, as usual, would fain find out a more dark and mysterious meaning for it. All the best statues are represented as in some action or motion; and the most graceful statue in the world (the Apollo Belvedere) is so much so, that when one faces it at a little distance, one is almost apt to imagine that he is actually going to move on toward you. All graceful heads, even in the portraits of the best painters, are in motion; and very strongly in those of Guido in particular; which are all either casting their looks up toward heaven, or down toward the ground, or sideway, as regarding some object. A head that is quite unactive, and flung flat upon the canvas (like the faces on medals after the fall of the Roman empire, or the Gothic heads before the revival of the arts), will be so far from having any grace, that it will not even have any life it it.

The second observation is, "That there can be no grace with impropriety;" or, in other words, that nothing can be graceful that is not adapted to the characters of the person. The graces of a little lively beauty would become ungraceful in a character of majesty; as the majestic airs of an empress would quite destroy the prettiness of the former. The vivacity that adds a grace to beauty in youth would give an additional deformity to old age; and, the very same airs which would be charming on some occasions may be quite shocking when extremely mistimed or extremely misplaced. The inseparable union of propriety and grace seems to have been the general sense of mankind, as we may guess from the language of several nations; in which some words that answer to our proper or becoming, are used indifferently for beautiful. Thus, among the Greeks, the words πρεπον and καλον, and among the Romans *pulchrum* and *decens*, or *decorum*, are used indifferently for one another. It appears wrong, however, to think (as some have done) that grace consists entirely in propriety; because propriety is a thing easy enough to be understood, and grace (after all we can say about it) very difficult. Propriety, therefore, and grace are no more one and the same thing than grace and motion are. It is true, it cannot subsist without either; but then there seems to be something else, which cannot be explained, that goes to the composition, and which possibly may give its greatest force and pleasingness.

Whatever are the causes of it, this is certain, that grace is the chief of all the constituent parts of beauty; and so much so, that it seems to be the only one which is absolutely and universally admired: all the rest are only relative. One likes a brunette beauty better than a fair one; I may love a little woman, and you a large one, best; a

perſon of a mild temper will be fond of the gentler paſſions in the face, and one of a bolder caſt may chooſe to have more vivacity and more vigorous paſſions expreſſed there: but grace is found in few, and is pleaſing to all. Grace, like poetry, muſt be born with a perſon, and is never wholly to be acquired by art. The moſt celebrated of all the ancient painters was Apelles; and the moſt celebrated of all the modern Raphael: and it is remarkable, that the diſtinguiſhing character of each of them was grace. Indeed, that alone could have given them ſo high a pre-eminence over all their other competitors.

Grace has nothing to do with the loweſt part of beauty or colour; very little with ſhape, and very much with the paſſions; for it is ſhe who gives their higheſt zeſt, and the moſt delicious part of their pleaſingneſs to the expreſſions of each of them. All the other parts of beauty are pleaſing in ſome degree, but grace is pleaſingneſs itſelf. And the old Romans in general ſeem to have had this notion of it, as may be inferred from the original import of the names which they uſed for this part of beauty: *gratia* from *gratus* or "pleaſing;" and *decor* from *decens* or "becoming."

The Greeks as well as the Romans muſt have been of this opinion; when, in ſettling their mythology, they made the graces the conſtant attendants of Venus or the cauſe of love. In fact, there is nothing cauſes love ſo generally and ſo irreſiſtibly as grace. It is like the Ceſtus of the ſame goddeſs, which was ſuppoſed to comprehend every thing that was winning and engaging in it; and beſide all, to oblige the heart to love by a ſecret and inexplicable force like that of ſome magic charm.

Although people in general are more capable of judging right of beauty, at leaſt in ſome parts of it, than they are of moſt other things; yet there are a great many cauſes apt to miſlead the generality in their judgments of beauty. Thus, if the affection is entirely engaged by any one object, a man is apt to allow all perfections to that perſon, and very little in compariſon to any body elſe; or, if they ever commend others highly, it is for ſome circumſtance in which they bear ſome reſemblance to their favourite object. Again, people are very often miſled in their judgments, by a ſimilitude either of their own temper or perſonage in others. It is hence that a perſon of a mild temper is more apt to be pleaſed with the gentler paſſions in the face of his miſtreſs; and one of a very lively turn would chooſe more of ſpirit and vivacity in his; that little people are inclined to prefer pretty women, and larger people majeſtic ones; and ſo on in a great variety of inſtances. This may be called falling in love with ourſelves at ſecond hand; and ſelf-love (whatever other love may be) is ſometimes ſo falſe-ſighted, that it may make the moſt plain and even the moſt diſagreeable things ſeem beautiful and pleaſing.

It was from the moſt common ſhape of his countrywomen, that Rubens, in his pictures, delights ſo much in plumpneſs; not to give it a worſe name. Whenever he was to repreſent the moſt beautiful women, he is ſure to give them a good ſhare of corpulence. It ſeems as if nobody could be a beauty with him under two hundred weight. His very graces are all fat.

But this may go much farther than mere bulk; it will reach even to very great deformities; which ſometimes grow into beauties, where

where they are habitual and general. One of our own countrymen (who was a particularly handsome man) in his travelling over the Alps, was detained by a fever in one of those villages, where every grown person has that sort of swellings in the neck which they call *goitres*; and of which some are very near as big as their heads. The first Sunday that he was able, he went to their church (for he was a Roman catholic) to return thanks to heaven for his recovery. A man of so good a figure, and so well dress, had probably never before been within the walls of that chapel. Every body's eyes were fixed upon him: and, as they went out, they cried out loud enough for him to hear them, "O how completely handsome would that man be, if he had but a *goitre!*

In some of the most military nations of Africa, no man is reckoned handsome that has not five or six scars in his face. This custom might possibly at first be introduced among them to make them less afraid of wounds in that part in battle: but however that was, it grew at last so great a share in their idea of beauty, that they now cut and slash the faces of their poor little infants, in order to give them those graces, when they are grown up, which are so necessary to win the hearts of their mistresses; and which, with the assistance of some jewels or ingots of gold in their noses, ears, and lips, must certainly be irresistible to the ladies of that country.

The covering each cheek all over with a burning sort of red colour, has long been looked upon in this country to be as necessary to render a fine lady's face completely beautiful as these scars are for the beaux in Africa. The natural complexion of the Italian ladies is of a higher glow than ours usually are; and, yet Mr. Addison is very just, in making a Numidian call the ladies of the same country pale unripened beauties.

> The glowing dames of Zama's royal court
> Have faces flusht with more exalted charms:
> The sun, that rolls his chariot o'er their heads,
> Works up more fire and colour in their cheeks:
> Were you with these, my prince, you'd soon forget
> The pale unripen'd beauties of the north!
>
> Syphax to Juba; in CATO, Act i. Scene 4.

The Prince of Anamaboo, who had been so long and latterly so much used to the European complexion, yet said of a certain lady a little before he left London, "That she would be the most charming woman in the world if she was but a negro." And, in an account of some of the farthest travels that any of our people have made up the river Gambia, we are informed, that, when they came to some villages where probably no Europeans had ever been before, the women ran frightened and screaming from them, taking them to be devils, merely on account of the whiteness of their complexion.

We cannot avoid observing, however, that heaven is very good and merciful to mankind, even in making us capable of all this variety of mistakes. If every person judged exactly right of beauty, every man that was in love in such a district would be in love with the same woman. The superior beauty of each hamlet would be the object of the hate and malice of all the rest of her own sex in it, and the cause of dissension and murders among all of the other. If this would hold in one town, it would hold for the same reasons in every other

other town or diſtrict; and of courſe there would be nothing more wanting than this univerſal right judgment of beauty to render the whole world one continued ſcene of blood and miſery. But now that fancy has perhaps more to do with beauty than judgment, there is an infinity of taſtes, and conſequently an infinity of beauty; for to the mind of the lover, ſuppoſed beauty is full as good as real. Every body may now chooſe out what happens to hit his own turn and caſt. This increaſes the extent of beauty vaſtly, and makes it in a manner univerſal: for there are but few people in compariſon that are truly beautiful; but every body may be beautiful in the imagination of ſome one or other. Some may delight themſelves in a black ſkin, and others in a white; ſome in a gentle natural roſineſs of complexion, others in a highly exalted artificial red; ſome nations in waiſts diſproportionably large, and another in waiſts as diſproportionably ſmall. In ſhort, the moſt oppoſite things imaginable may each be looked upon as beautiful in whole different countries, or by different people in the ſame country.

We ſhould perhaps make a diſtinction here again, as to the two former parts of beauty and the two latter. Fancy has much more to do in the articles of form and colour than in thoſe of the paſſions and grace. The good paſſions, as they are viſible on the face, are apparent goodneſs; and that muſt be generally amiable: and true grace, wherever it appears to any degree, one ſhould think muſt be pleaſing to every human creature; or perhaps this may never appear in the women of any nation where the men are grown ſo ſavage and brutal as to have loſt all taſte for it.

Yet even as to grace itſelf, under the notion of pleaſingneſs, it may become almoſt univerſal, and be as ſubject to the dominion of fancy as any of the leſs ſignificant parts of beauty. A parent can ſee genteelneſs in the moſt aukward child perhaps that ever was born; and a perſon who is truly in love will be pleaſed with every motion and air of the perſon beloved; which is the moſt diſtinguiſhing character that belongs to grace. It is true, this is all a miſtaken grace; but as to that particular perſon, it has all the effects of the true.

True grace naturally indicates mental qualities, ſuch as ſweetneſs, benevolence, elevation, dignity; becauſe of all objects mental qualities affect us the moſt; and the impreſſion made by graceful appearance upon every ſpectator of taſte is too deep for any cauſe purely corporeal. Yet the mental qualities, ſweetneſs, cheerfulneſs, and affability, are not ſeparately ſufficient, nor even in conjunction. Dignity alone, with elegant motion, produce a graceful appearance; but ſtill more graceful with the aid of other qualities, thoſe eſpecially that are the moſt exalted. But this is not all. The moſt exalted virtues may be the lot of a perſon whoſe countenance has little expreſſion: ſuch a perſon cannot be graceful. Therefore to produce this appearance, we muſt add another circumſtance, viz. an expreſſive countenance, diſplaying to every ſpectator of taſte, with life and energy, every thing that paſſes in the mind. Collecting theſe circumſtances together, grace may be defined, "that agreeable appearance which ariſes from elegance of motion and from a countenance expreſſive of dignity." Expreſſions of other mental qualities are not eſſential to that appearance, though they heighten it greatly. We may therefore conclude that, of all external objects, a graceful perſon is the moſt agreeable, and conſequently approaches the neareſt to real beauty.

OF FASHION AND DRESS.

THE first clothes we read of were immediately after the fall, when "Adam and Eve sewed fig-leaves together and made themselves aprons." A poor sort of covering! but when God turned them out of Paradise he provided warmer clothes for them: "Unto Adam and also unto his wife did the Lord God make coats of skin, and clothed them."—After this, garments of knit work, then woven clothes, came into use. At Cæsar's arrival, the Britons in the south part of the isle were attired with skins; but, as civility grew under the Romans, they assumed the Roman habit. The English or Saxons, at their first arrival here, wore long jackets, were shorn all over the head, excepting about the crown, where the hair was permitted to grow. Afterwards they wore loose and large white garments with broad borders of divers colours, as the Lombards. Somewhat before the conquest they were all gallant, with coats to the mid-knee, head shorn, beard shaved, face painted, and arms laden with bracelets. But *totus homo in vultu est*, as the whole man is seen by his face, it will not be amiss to observe, that Edward the Confessor wore very short cropt hair, whiskers and beard exceeding long. William the Conqueror wore short hair, large whiskers, and a short round beard. Robert his eldest son, it is well known, used short hose, and from thence called Courthose, Courtoise, Curtis: on his monument, yet extant at Gloucester, he is pourtrayed with short stockings of mail reaching scarcely up to the place where some garter below knee; no breeches, but a coat, or rather shirt, of mail, instead of them. However, breeches and stockings are new terms, and, in the sense we now understand them, different things, being at first one and the same, all made of one piece of cloth, and then called hose.

William Rufus wore the hair of his head a degree longer than his father; but no beard or whiskers. In 1104 (4 Henry I.) Serlo bishop of Seez, preaching at Carenton before the king against ong hair, caused him and all his courtiers to get their hair cropt as soon as they left the church; and accordingly Henry I. in his broad seal (as appears in Sandford) has no hair, beard, or whiskers. Stephen observed the same fashions. Henry II. brought in the short mantle, and therefore had the name of court-mantle. In his time the use of silk was first brought out of Greece into Sicily and other parts of Christendom. Richard I. in his first and second broad seals, has longish hair, no beard or whiskers. John, in his broad seal, has short hair, large whiskers, and short curled hair. The ladies in the three last-mentioned reigns wore long cloaks from their shoulders to their heels, buttoned round the neck, and then thrown over the shoulders, hanging down behind.

Henry III. wore whiskers, and a short round beard. The same king, returning out of France in 1243, commanded it to be proclaimed all over the kingdom, *ut qualibet civitate vel burgo quatuor cives vel burgenses honorabilioris ei obviam procederent in vestibus pretiosis et desiderabilibus*; his design in which was to obtain presents from them. Edward I. wore short hair, and no whiskers or beard. Edward II. continued this fashion. Edward III. in his first and second broad seals, has long hair, but no beard or whiskers; in his third broad seal, shorter hair,

hair, large whiskers, and a two-pointed beard; and, on his monument in Westminster Abbey, a very long beard. The same king, in our common prints of him, is generally pictured with a sort of hat on; but, as hats are a deal more modern, wherever I see him drawn with a hat on, I conclude that picture to be a counterfeit. And indeed it may be questioned, whether there are any pictures of any of our kings painted before his time now extant. Philippa, consort to this king, according to her monument at Westminster, wore a pretty sort of network cawl over her hair, with a long end of the same hanging down each ear.

In this reign I conceive it was, that history says, "the commons were besotted in excess of apparel, going some in wide surcoats reaching to their loins; some in a garment reaching to their heels, close before, and strutting out on both sides, so that on the back they make men seem women, and this they call by a ridiculous name gown. Their hoods are little, tied under the chin, and buttoned like the womens, but set with gold, silver, and precious stones. Their lerripippes reach to their heels, all jagged.—They have another weed of silk, which they call paltocks, without any breeches. Their girdles are of gold and silver; their shoes and pattens snouted, and piked above a finger long, crooking upwards, and fastened to the knees with chains of gold or silver."

"In 1369 they began to use caps of divers colours, especially red, with costly linings; and in 1372 they first began to wanton it in a new round curtail weed called a cloak, in Latin *armclausa (q. armiclausa)* as only covering the shoulders."

But this cloak, as I take it, was no more than a monk's hood, or cowl. Richard II. in his picture in Westminster Abbey, is drawn with short curling hair and a small curling two-pointed beard. Queen Anne, Richard IId's consort (who first taught the English women to ride on side-saddles, who heretofore rode astride), brought in high head attire, piked with horns, and long-trained gowns. Their high heads had sometimes one point, sometimes two, shaped like sugar-loaves; to which they had a sort of streamers fastened, which wantoned and hung down behind, and, turning up again, were tied to their girdles. Henry IV. wore long hair, whiskers, and a double-pointed beard; in his time the long-pocketed sleeve was much in vogue. Henry V. wore much the same: in this reign the shoes were remarkably broad, which Camden speaking of, says, "Not many years after, it was proclaimed, that no man should have his shoes broader at the toes than six inches." And women trimmed themselves with foxes tails under their garments, and men with absurd short garments. Henry VI. Edward IV. Richard III. and Henry VII. wore their hair moderately long, no whiskers or beard. Henry VIII. had short cropt hair, large whiskers, and a short curled beard, his gown furred, the upper part of his sleeves bowed out with whalebone, and open from his shoulders to his wrists, and there buttoned with diamonds: about his neck and wrists short ruffles. Queen Mary wore a close head-dress, with a broad flat long end or train hanging down behind; strait sleeves down to her wrist; there and on her neck a narrow ruffle.—On the 27th of May, 1555, (2 Queen Mary,) Sir William Cecil, being then at Calais, brought, as appears by his MS. Diary, three hats for his children. These are the first hats I have yet

read

read of, and it ſhould ſeem, at their firſt coming in, they were more worn by children than men, who yet kept to caps.

Queen Elizabeth wore no head-dreſs, but her own or falſe hair in great plenty, extravagantly frizzled and curled; a bob or jewel dropt on her forehead; a huge laced double ruff, long piked ſtays, a hoop-petticoat, extended like a go-cart; her petticoats prodigious full; her ſleeves barrelled and hooped from the ſhoulders to the elbows, and again from the elbows to the wriſts. In one picture of her, ſhe is drawn as above, with five bobs, one on her forehead, one above each ear, and one at each ear. This queen is ſaid to have been the firſt perſon in England who wore ſtockings: before her time both men and women wore hoſe, that is breeches or drawers, and ſtockings, all of one piece of cloth. Sir Philip Sidney, one of her favourites, wore a huge high collar, ſtiffened with whalebone; a very broad ſtiff laced ruff; his doublet (body and ſleeves) bombaſted or barrelled, and pinked and ſlaſhed all over, ſmall oblong buttons, and a looſe long cloak. The cuſtom of men ſitting uncovered in the church, is certainly very decent, but not very ancient. Dr. Cox, biſhop of Ely, died 1581, whoſe funeral proceſſion I have ſeen an admirable drawing of; as likewiſe of the aſſembly ſitting in the choir to hear the funeral ſermon, all covered and having their bonnets on. John Fox the martyrologiſt, who died in 1587, when an old man (as appears by his picture) wore a ſtrait cap, covering his head and ears, and over that a deepiſh-brown ſhallow-brimmed ſlouched hat. This is the firſt hat I have yet obſerved in any picture. Hats being thus come in, men began to ſit uncovered in the church, as I take it: for, as hats look not ſo well on men's heads in places of public worſhip as hoods or bonnets (the former wear), this might probably be the firſt occaſion of their doing ſo.

James I. wore ſhort hair, large whiſkers, and a ſhort beard; alſo a ruff and ruffles. In 1612 (10 Jac. 1.) Mr. Hawley, of Gray's Inn, coming to court one day, Maxwell, a Scotſman led him out of the room by a black ſtring which he wore in his ear, a faſhion then much in uſe; but this had like to have cauſed warm blood, had not the king made up the quarrel. Prince Henry, eldeſt ſon of James the Firſt, wore ſhort hair, filleted and combed upward, ſhort barrelled breeches, and ſilk thiſtles or carnations at the tie of his ſhoes. The young Lord Harrington, this prince's contemporary, is painted in the ſame manner, with the addition of ear-drops, a double ruff, and barrelled doublet.

The great tub-farthingal was much worn in this reign; the famous Counteſs of Eſſex is pictured in a monſtrous hoop of this ſort. In conformity to the ladies of that age, the gentlemen fell into the ridiculous faſhion of trunk-hoſe, an affectation of the ſame kind, and carried to ſo great a height by ſtuffing them out, that they might more properly have been called the farthingal breeches.

Charles I. wore long hair, particularly one lock longer than the reſt, hanging on the left ſide, large whiſkers, a piked beard, a ruff, ſhoe-roſes, and a falling band. His queen wore a ruff ſtanding on each ſide and behind, but her boſom open. Sir Francis Bacon, who died in 1626, in his fine monument at St. Alban's, is repreſented with monſtrous ſhoe-roſes, and great bombaſt paned hoſe, reaching to the knees. About 1641, the forked ſhoes came into faſhion, almoſt as long again as the feet, not leſs an impediment to the action of the foot than

than to reverential devotion, for our boots and shoes were so long snouted, we could hardly kneel. But, as a short foot was soon thought to be more fashionable, full as much art became necessary to give it as short an appearance as possible.—About 1650, both men and women had the whim of bringing down the hair of the heads to cover their foreheads, so as to meet their eye-brows. In 1652, John Owen, dean of Christchurch and vice-chancellor of Oxford, went in querpo, like a young scholar, with powdered hair, his band-strings with very large tassels, a large set of ribbands at his knees, with tags at the ends of them; Spanish leather boots with large lawn tops, and his hat mostly cocked.

After the close-stool-pan sort of hat, which had now been many years in wear, came in the sugar-loaf or high-crowned hat; these, though mightily affected by both sexes, were so very incommodious, as that, every puff of wind blowing them off, they required the almost constant employment of one hand to secure them. Charles II. in 1660, appears to have worn a large thick cravat with tassels, short doublet, large ruffles, short boots with great tops, a very short cloak, and long hair (one lock on the right side longer than ordinary), all pulled forward, and divided like a long wig on each side of his face: soon after he wore a perriwig.

There is no end of the whims, vagaries, and fancies, in dress, which men and women have run into. Whole volumes might be wrote on the subject. However, these rude notes may serve as a sketch of the former times.

Old fables tell us of one Epimenides, who after a sleep of fifty years awaked with amazement, finding a new world every where both of men and fashions. Let this sleep go (as it well may) for a fabulous invention, the effects of it, his amazement, I am sure, might have been credible enough, though the sleep had been shorter by many years. In some countries, if men should but put on those clothes which they left off but four or five years before, and use those fashions which were then in use, they would seem even to themselves ridiculous, and unto many little less than monstrous.

EXTRAORDINARY ESCAPES FROM SHIPWRECK.

IN a dreadful storm which happened on the 30th of October, 1784, the Coureur, Captain Gernic, from Marenne, laden with salt for Dunkirk, then in Calais road, broke her cables, and struck on the Devil's Bank, opposite Fort Rouge. The rudder was carried away, and the ship, after several shocks, sunk, and all the crew perished except the captain, who clung to the main-mast to avoid the unhappy fate of his men.—The Sieur Louis Gavet, an officer of marines, aged twenty years, and Ringard, both of Calais, being witnesses of his dreadful situation, determined with a third sailor, named Morel of Dunkirk, to venture their own lives to save that of the captain. They engaged the captain of an English packet-boat, named Star, to lend them his boat; two English sailors joined them, and, though the sea did not run so high, yet it was so furious between the two jettees, that the success of their enterprise was doubted, and they were looked upon as so many victims to their humanity. And indeed, the boat was hardly got half the length of the jettees before it filled with

water;

water; they saw the impossibility of gaining the mouth of the port, and getting over the breakers, that were rising to an incredible height. The Sieur Gavet then engaged his brave companions to run the boat against the jettee on the west; by dint of labour he climbed up the jettee, and, descending on the other side, set it afloat, when they perceived the unfortunate captain up to his chin in water, struggling with death, holding the mast with one hand, and with the other making signs for assistance. At that moment the Boat sunk, the Sieur Gavet, whom the most imminent danger did not discourage, threw himself among the rocks, flung a rope to the captain, who missed it twice, but caught it the third time, and fastened it about his neck. The Sieur Gavet, sensible that he could make no use of it without strangling the man he wanted to save, threw himself in the water and swam to the captain, seized him by the collar with one hand, and, swimming with the other, snatched from inevitable death a man of twice his strength. His companions joined him, and they carried the captain to the boat, which they had cleared of the water. It filled again, and again they emptied it; in short, after a thousand dangers, in sight of an immense croud, they had the pleasing satisfaction of conducting Captain Gernic to a public-house, where he was taken proper care of; he lost his all, and had hardly a breath of life remaining.

The following particulars of the loss of the Commerce, Captain Bell, of Lancaster, have been given us by Mr. J. Garnett, of Manchester, who was a passenger on-board the unfortunate vessel:

The ship struck about six o'clock in the morning of the 30th of April last, (1794,) on the coast of Newfoundland, about a hundred yards from an iron-bound shore; the boats were staved, and there was little prospect of escape for the people, twenty-two in number. However, with the usual intrepidity of British seamen, they constructed a small raft, by which a few of them got on-shore, carrying ropes to fasten to the rocks; up these they scrambled with great difficulty, and the rest of the unfortunate crew were afterwards singly hoisted up by them.—They found themselves on a barren and inhospitable country, without seeing the trace of human foot for seven days. Whilst they were on the rocks, totally destitute of provision, the tide brought a hog from the vessel, just alive, which they killed, and ate a part of it raw, such was their hunger.—They had no fire, nor the means of making one, having tried wood by friction, till, happily, a power-horn was thrown a-shore, and also some cotton. They put the latter to their bodies, and by that method dried it; they sprinkled some powder on it, and one of them happening to have a flint, and another a steel, they made a fire and dressed their hog, by broiling it upon stones. This being carefully divided, a few ounces to each man, with some sea-weed, made a refreshing repast, and enabled them to proceed on their search for farther relief.

One of the crew, more provident as he thought than the rest, had secured some sea-biscuit in the breast of his jacket, and left his companions behind. On their travelling forward, they found him, not long after, expiring under a tree; he told them, that about two miles farther they would see a boat at the mouth of a river. They proceeded, and found the boat, which they launched, and went round

nearly to the ſituation where they had been wrecked. Their pig was now almoſt conſumed, and no veſſel in view—but they providentially found a caſk of rum, and another of coffee, thrown up. They had kept their fire in by a continued watch of four at a time, the reſt ſleeping covered with branches of trees, as it rained very heavily. During this period they had frequently a number of bears looking on them at a diſtance.—They went about dreſſing their coffee, having found a copper-pan cover, on which they ſpread it, and an iron ſhot with which they pounded it. By heating ſtones, and putting them into water with the coffee, adding ſome rum, they made what was to them an excellent repaſt. In a few days, however, they muſt have periſhed, had they not ſeen a fiſhing-boat, which they got on-board, and were taken to Placentia, St. John's, and Halifax, and from thence by a ſhip with two hundred and fifty French priſoners to Jerſey—there meeting with an American veſſel, the captain, mate, and Mr. Garnett, went on-board, and were landed at Falmouth, whence Mr. Garnett tranſmitted the above authentic account.

ACCOUNT OF JOHN O'GROAT'S HOUSE.

[From Sir John Sinclair's "Statiſtical Account of the Pariſh of Caniſbay."]

THIS is the moſt memorable place in the pariſh, which has often been viſited by travellers from diſtant countries, who, it is believed, have rarely been made acquainted with the peculiar circumſtance which firſt gave riſe to its celebrity; its fame having been in general erroneouſly attributed to its mere local ſituation, at the northern extremity of the iſland; whereas it originated in an event not unpleaſing to relate, and which furniſhes a uſeful leſſon of morality.

In the reign of James IV. of Scotland, Malcolm, Gavin, and John de Groat (ſuppoſed to have been brothers, and originally from Holland), arrived at Caithneſs, from the ſouth of Scotland, bringing with them a letter written in Latin by that prince, recommending them to the countenance and protection of his loving ſubjects in the county of Caithneſs. They purchaſed, or got poſſeſſion of, the lands of Warſe and Dunglſbay, lying in the pariſh of Caniſbay, on the ſide of the Pentland Firth; and each of them obtained an equal ſhare of the property they acquired. In proceſs of time, their families increaſed, and there came to be eight different proprietors of the name of Groat, who poſſeſſed theſe lands among them; but whether the three original ſettlers ſplit their property among their children, or whether they purchaſed for them ſmall poſſeſſions from one another, does not appear.

Theſe eight families, having lived peaceably and comfortably in their ſmall poſſeſſions for a number of years, eſtabliſhed an annual meeting, to celebrate the anniverſary of the arrival of their anceſtors on that coaſt. In the courſe of their feſtivity, on one of theſe occaſions, a queſtion aroſe, reſpecting the right of taking the door, and ſitting at the head of the table, and ſuch-like points of precedency (each contending for the ſeniority, and chieftainſhip of the clan), which increaſed to ſuch a height, as would probably have proved fatal in its conſequences to ſome if not all of them, had not John de Groat, who was proprietor of the ferry, interpoſed. He, having acquired

acquired more knowledge of mankind, by his constant intercourse with strangers passing the Pentland Firth, saw the danger of such disputes; and, having had address enough to procure silence, he began with expatiating on the comfort and happiness they had hitherto enjoyed, since their arrival in that remote corner, owing to the harmony which had subsisted among them. He assured them, that, so soon as they appeared to split and quarrel among themselves, their neighbours, who till then had treated them with respect, would fall upon them, and expel them from the country. He therefore conjured them, by the ties of blood and their mutual safety, to return quietly, that night, to their several homes; and he pledged himself, that he would satisfy them all with respect to precedency, and prevent the possibility of such disputes among them, at their future anniversary meetings.

They all acquiesced, and departed in peace.—In the mean time, John de Groat, to fulfil his engagement, built a room, distinct by itself, of an octagon shape, with eight doors and windows in it; and, having placed in the middle a table of oak of the same shape, when the anniversary meeting took place he desired each of them to enter at his own door, and to sit at the head of the table; he taking himself the seat that was left unoccupied. By this ingenious contrivance, any dispute in regard to rank was prevented, as they all found themselves on a footing of equality, and their former harmony and good humour were restored. This building then bore the name John O'Groat's house; and, though the house is totally gone, the place were it stood stills retains the name, and deserves to be remembered as long as good intentions and good sense are estimable in the country.—The particulars above-mentioned, were communicated to John Sutherland, Esq. of Wester, above fifty years ago, by his father, who was then advanced in life, and who had seen the letter written by James IV. in the possession of George Groat of Warse. The remains of the oak table have been seen by many now living, who have inscribed their names on it.

EMBASSY TO CHINA.

WE are happy in being enabled to lay before our readers an account of the principal particulars relating to this mission, received from India by the last ships, and which the public may be assured is perfectly authentic; though some of the circumstances may appear, to European ideas and modes of thinking, almost incredible. Without detaining our readers to inform them of circumstances relating to the early part of the voyage, it will be enough to notice, briefly, that, after passing the Banks of Sunda, they made some unsuccessful attempts to explore the Islands of Banka, and the Straits of Malacca. They stopped at Pulo Condore, and from thence proceeded to Turon Bay, in Cochin-China, were they found a young prince established upon the throne, after a civil war of twenty years continuance, which ended in a revolution; for such events, it would appear, are not peculiar to the western world. A considerable number of missionaries had once been in Cochin-China, but they were all gone, having followed the fates of the royal line expelled by this revolution, and which still retained possession of a small corner of the kingdom. In their voyage they visited Macao and Chusan, the easternmost

easternmost extremity of China; and at last reached the mouth of the river Tienfin, in the bottom of the Ptcheli Gulph, on the 26th of July 1793, where they found the water so shallow, though they had no sight of land, that they cast anchor in six fathoms.

From hence they dispatched a brig to announce their arrival, to request that vessels might be sent to receive the presents intended for the emperor, as the English vessels could proceed no farther for want of water; and also to solicit a supply of fresh provisions. On the first of August a number of small vessels arrived from the shore, having on-board some principal mandarins, with a most magnificent supply of every kind of provisions. Twenty bullocks, upwards of one hundred sheep, as many hogs, a greater number of fowls of various kinds, an immense quantity of the richest and finest fruits of the country; several chests of tea, sugar, china, &c. &c. and a large supply of flour, millet, bread, rice, and other articles in great profusion.

The different presents being put on-board the Chinese junks, Lord Macartney, on the 5th, went in the Clarence brig to Tacao, a few miles up the river, where the goods were obliged to be transferred to still smaller vessels, to convey them to Tang-chu, about ten miles from Pekin.

The embassy left Tacao, where every accommodation was afforded them, on the 8th of August, and arrived at Tienfin on the 11th, where they were splendidly entertained on-shore amidst thousands of people. After the entertainment they got a present of victuals, in name of a dinner, sufficient to last the whole of them for a week—each officer got, besides, two pieces of silk—and even the soldiers, mechanics, &c. had a piece of silk and cotton.

Tienfin is situated at the confluence of three large rivers, and is a place of large and extensive commerce. Its population is not to be counted by thousands, but by millions—the burying-ground only, an immense plain, extends farther than the eye can reach, and appears only bounded by the horizon. The other facts relating to this place, which they left on the 11th, would appear incredible were they recorded here.

They next went to Tong-chu, to which place they were conveyed by water in vessels dragged by men.—They reached it on the 16th. Here the presents and baggage were landed, and deposited in houses erected to receive them.

On the 21st the ambassador and his suite set out for Pekin—Lord Macartney and Sir George Staunton in sedan chairs, the officers, &c. in two-wheeled charriages—the rest in a kind of covered-waggons. They reached Pekin about nine o'clock that morning. The streets are not paved; the longest are about six miles, crossing each other at right angles, as in Philadelphia, and from ninety to one hundred and thirty feet in breadth. The houses are only one story high. The walls of the city are of an immense height, and the principal streets terminate at the gates, which are very magnificent. Sumptuous apartments were provided for the suite, and every necessary of life was furnished to them without purchase.

They remained here till the beginning of September, when Lord Macartney and suite set out for Gehol, the country residence of the emperor. His lordship went in an English coach—the other gentlemen on horseback—the soldiers, &c. in waggons; so that with the baggage train the whole cavalcade was of very great length.

Gehol

Gehol is about one hundred and fifty English miles from Pekin. They were a week in going thither. On the 4th day of their journey they reached the famous wall which forms one of the barriers of this empire, their way lying through a gate called Can-pe-Ricu. There are only four such passes in China. This wall was built upwards of two hundred years before Christ, from which time, for fourteen hundred or fifteen hundred years, it served as a complete defence against every enemy; but, at the end of that period, Gengis Khan invaded the empire, and got possession of the throne. It is about twenty-six feet high, and about fifteen thick at the top, which is well paved, and has a parapet on each side: the base is above twenty feet thick. At every distance of about ninety or one hundred yards, there is a tower upon it about fifteen feet each in height, and forty-five in length. In several places there are other walls within the main one, which take in a sweep of several miles, and then connect again with it, so that, should the outer one be forced, the inner remains as a defence: and these again are covered by other walls within them; but this is only at the four principal passes. The ground over which this immense fabric is carried is in some places very rugged and uneven, more so than the most mountainous parts of Cumberland. This wall is more than two thousand miles in length, without allowing for the bendings over mountains and through valleys. The towers are about forty-five thousand in number.

When they reached Gehol, some misunderstanding respecting the mode of presentation prevented the ceremony from taking place till the 14th. Lord Macartney insisted that the ceremonies required to be performed by him before the emperor should be performed by a Chinese of equal rank before the picture of his majesty. One of the prime ministers, of whom there are five in China, stiled Calaos, having committed some mistake, in reporting that Lord Macartney had agreed to comply with ceremonies to which he had not assented, was degraded some steps in his rank, and forced to wear, in his head-dress, a crow's tail instead of a peacock's, which it seems answer there to our stars, garters, ribbands, and other insignia of nobility. Chintagin, one of these ministers, on finding what hindered the business from going on, very shrewdly remarked, that he thought it strange that an ambassor, who had come such a great distance professedly to compliment the emperor, should commence his business by contending about formalities. It was at last, however, settled, that his lordship should pay the same respects to the emperor that he paid on approaching the King of England.

The suite were received in a large tent. The emperor was carried thither in an open chair, born by sixteen men: as he passed to the tent, the English kneeled on one knee: every one of the Chinese prostrated themselves on the ground. Being all arranged in and round the tent, they had a sumptuous repast, which was followed by music, tumbling, wrestling, and other exercises. The emperor paid great attention to Lord Macartney, and he and all the gentlemen had presents of silk purses, fans, &c. The entertainment being ended, the emperor descended from the throne, and walked to his chair, and was carried away in the same manner in which he came. The croud of mandarins, princes, and other people of rank, which attended this ceremony, was almost innumerable.

Next

Next day (the 15th) the emperor again saw Lord Macartney. He came in the same manner as on the preceding day. He told his lordship, that he was going to a Pagoda at some distance, but that he had given general orders to his ministers to attend upon his lordship, and shew him the palaces and gardens. When the emperor was gone, the suite were conveyed to an island, in an extensive sheet of water, where they found a large building, in almost every apartment of which there was a kind of throne, and also a number of curiosities of English manufacture. On the left of each throne was a large agate, in a batten form, deposited there as an emblem of peace in the empire. From this, they were conveyed by water; and afterwards shewn a number of other buildings, where they were entertained with fruits, sweetmeats, &c.

The 17th, which was the emperor's birth-day, (he is 83 years of age,) they visited the palace before the morning dawn. They waited till day-light in a large apartment, after which Lord Macartney and the high mandarins were admitted to an inner court: the officers of the suite were in the second court, and the mandarins of inferior rank in a third court, outside the other two. The sight of flags, banners, &c. of embroidered silk floating in the air, was grand beyond the power of language to describe. The emperor was not present. All the people kneeled, and bowed nine times, with as much solemnity as if they had been worshiping a deity. This ceremony over, they were conveyed through other parks and lodges, the gardens laid out in much the same manner as in England. They were sumptuously entertained in one of the buildings, and afterwards carried through some magnificent pagodas, or temples. One of them was larger than the building of Somerset-house, but higher, and in the same square form, open within the square, in the center of which was a building of considerable height, covered with solid gold. The inside front of the square is in the form of galleries, one over the other, in four rows, most splendidly decorated, and supported with pillars of gold. In some of the apartments hundreds of priests were employed in singing. The images of deities, &c. in these buildings, are almost innumerable, and many of them of gigantic size, larger than Gog and Magog in Guildhall. They are, however, of the same materials, wood richly gilt and ornamented, numbers of them symbolical representations.—In many of the religious ceremonies a resemblance of the Jewish rites was observable; others were similar to those of the Romanists.

On the 18th, they were admitted to the emperor's theatre. It is a square, open at top—the stage extends along one side of the square, and those who are honoured with admission to see the performances are placed under piazzas in the other three sides. In front of the stage, about fifty feet distant, is the throne from which the emperor views the performance. The rest of the area is ornamented with beautiful flower-pots. Lord Macartney was led to the throne, and received from the emperor's hands a copy of verses made by himself for his Britannic majesty, in a box of great value and antiquity, made of black wood, carved very neatly. The ambassador had also the honour to receive a copy of verses for himself.—Here the suite was heartily tired for several hours with a performance, one word of which they could not understand, and which was accompanied with a con-

fused noise of gongs and bells; after which, as was usual every day, they received presents of silks, fans, china, &c.

The two next days were employed in preparations for their return to Pekin, where they arrived on the 26th. On their journey they were much surprised to find a very great number of men employed in levelling the road, for the accommodation of the emperor on his return from Gehol, which he was to quit in a few days. The whole road, a space of one hundred and fifty miles, was covered with men, about sixty feet asunder, and a cistern of water for each man, for watering the road on the emperor's approach, so that the number of men and of cisterns exceeded thirteen thousand. The road for the emperor is as smooth and level as any walk in the gardens at Kew; no person is allowed to ride or travel upon it, and it is guarded night and day.

On the 30th, the embassy set out for the palace of Yen-Ming-Yuen, whither all the presents had been sent, that the emperor might see them together. They rested that night at Hing-Min-Yuen, and set out next morning to a house about four miles distant, from whence they walked a little way and met the emperor; who, learning from the principal mandarin who attended the embassy, that Lord Macartney was indisposed, desired that his lordship might return to Pekin for the sake of better accommodation. They returned the same day; and indeed it would appear, that the Chinese by this time wished their departure altogether; for Lord Macartney had an interview with the ministers the same day, in the course of which they recommended to him to take the benefit of good weather for his departure, as he would not travel comfortably if he allowed the winter to overtake him; the more especially as he was but poorly in health.

From this time none of the missionaries, of whom there are a number in the country, were allowed to go near our countrymen; and the attendant mandarins, under pretence of friendship, strongly urged them to propose departing, as a change of treatment might not be found quite pleasant. It should be remarked that by this time *all the presents had been delivered.*

On the 3d of September, Lord Macartney presented to the ministers a number of proposals and requisitions respecting the object of his mission. His lordship had intended staying till March, but it was now thought advisable to take the hint that had been given. On the 4th he requested permission to depart. The emperor's permission was with him by next morning, and the second day after was appointed. The Chinese however, were very considerate in one thing—the warning was short, they therefore gave them a great number of men to assist in packing up; and they were so industrious that every thing was in complete readiness by the time fixed. On the day of departure, the ambassador had an interview with the minister, and received an answer to the propositions he had made on the 3d—THEY WERE ALL REFUSED:—And the embassy left Pekin on the 7th of October last, loaded with presents and high compliments, but much mortified by the pointed negative which had been returned to all the propositions they had made, respecting a more direct intercourse between the two empires than had hitherto subsisted.

Having reached their ships, the Lion, of sixty-four guns, the Hindostan, the Clarence brig, and a smaller vessel, they steered southward along the east coast of China, from 39° to 29°, and arrived

at Canton about the 20th of November; great preparations were made for his lordſhip's reception ſome weeks previous to his arrival.

The troops, ſuch as they are, were exerciſing continually; a moſt ſuperb houſe was, by order of the emperor, fitted up for him, in a ſtyle truly elegant; and without the leaſt idea of the expence—the ornaments in the Chineſe and Engliſh faſhion—the rooms all in the Engliſh ſtyle—the grounds in the Chineſe; and ſuch an abundance of proviſions of all kinds collected for the occaſion, that it was impoſſible to conſume them while they remained in Canton.

His lordſhip was attended by all the principal people in the country: the ſhores were lined on all ſides with troops, and the river with their men-of-war boats, who all went through their evolutions on his appearing in ſight. A Chineſe camp was pitched in the way to his houſe, and the whole of the paſſage was covered and lined with ſilks and cloths of different kinds, in the Chineſe manner: and, leſt he ſhould find a difficulty in landing, they erected a bridge out into the river for a hundred yards, and decorated in a grand ſtyle, to prevent any inconvenience.

On the firſt day of his arrival a grand dinner was provided at the expence of the emperor; on the ſecond the viceroy of Canton and all the great officers of ſtate gave him one, and alſo dined with him—they had even been practiſing themſelves, for a week before, in the uſe of knives, forks, and ſpoons, in the Engliſh manner, that matters might be rendered more comfortable to his lordſhip. On the third day the ſecurity-merchants, who are here ſettled in the ſuburbs, and ſuperintend the trade with Europeans, gave him another great dinner, at which however none of them were preſent, his lordſhip having hinted that he would not allow it; and indeed, if he had yet any hopes of retrieving matters, he acted wiſely, for the Chineſe viceroy would have inſtantly formed very contemptible ideas of the *great Engliſh mandarin*, had they ſeen him ſit down to table with traffickers.

On Chriſtmas-day he dined at the company's factory, where moſt of the India company's officers were invited: he was in good health, but did not expreſs himſelf by any means pleaſed with the reſult of his embaſſy: in fact, he has not done any thing material to the intereſts of Great Britain or the company at Pekin: the only object he accompliſhed was, to induce an order from the emperor, that all officers under government ſhould wear woollen cloth three months in the year.

Lord Macartney was expected to remain only a few days in Canton, and then to go to Macao. The Lion was lying higher up than any ſhip of war was ever ſuffered to go before, at Whampoe. The Chineſe were ſo jealous of his lordſhip, at Canton, that they limited the time of his remaining there, and intimated that he muſt then leave it; they fixed his reſidence on the contrary ſide of the water from the city of Canton; apprehenſive leſt he ſhould wiſh to be in the city, which they did not approve; though, had he wiſhed it, they muſt have admitted him, as it was the emperor's orders.

The failure in this buſineſs cannot be eaſily accounted for—perhaps the mandarins who attended the embaſſy were not addreſſed in the feeling manner they expected. Pretty things for the emperor were only ſhows to them, and they might wiſh for ſomething ſubſtantial for themſelves. It is, however, ſuppoſed, that the want of ſucceſs

is

is chiefly to be attributed to ſome evil impreſſion made upon the Chineſe court, by ſome of the native princes of India, telling them to beware how they allowed the Engliſh to obtain a footing among them; and ſtrengthening their admonition, by falſely ſtating, that the ſame people had firſt, as friends, obtained a ſmall ſettlement in India, which they afterwards increaſed by repeated wars, driving many of the original owners from their dominions, and eſtabliſhing upon their ruin an immenſe empire for themſelves.

We are happy, however, to add, that, when the laſt accounts left Canton, ſome arrangement had taken place which indicated a more friendly diſpoſition on the part of the Chineſe; and that ſome hopes had begun to be entertained that it was yet poſſible to obtain the object of the voyage; though not perhaps without conſiderable trouble.

The great point which Lord Macartney was inſtructed to preſs with the Chineſe court was, that inſtead of being obliged to paſs up the river to Canton, the entrance to which is unſafe and the navigation dangerous, the Engliſh ſhould be permitted to poſſeſs ſome port more to the northward; which requeſt, if granted, would not only have much diminiſhed the riſk of the Engliſh ſhips, but have conſiderably added to the company's trade. The jealouſy, however, of the mandarins, who were fearful of our being permitted to eſtabliſh ourſelves in the extenſive, but feeble, empire of China, has unfortunately rendered Lord Macartney's efforts in ſome degree unſucceſsful; at the ſame time his lordſhip has obtained an important point from the Emperor of China for the Eaſt-India company, viz. the removal of the viceroy at Canton, who had always ſhewn an enmity to the Engliſh, and thrown every obſtacle in the way of their commerce.

The Chineſe, by all travellers who have ever viſited that empire, are allowed to be egregious liars in every thing that can gratify the vanity which leads them to conſider themſelves as the principal people upon earth. They denominate their empire Tyen-hya, that is the Under Heaven. They will have it, though they well know the contrary, that the earth is ſquare; and they think they honour the reſt of mankind, whom they conſider as barbarians, by placing them in the corners of this pretended ſquare, and reckoning them among their tributaries. Hence whatever comes from foreign kingdoms, whether letters, preſents, or envoys, all paſs as tribute and a mark of ſubmiſſion. The moment that the kings of Europe ſend envoys, or letters, in their own name to the emperor, their kingdoms are generally entered among the tributaries of the empire. The Ruſſians once had a great ſtruggle to get this term changed in their favour.

The following, which is a literal tranſlation of the Pekin Gazette, gives us a proof of their propenſity to lies;—they make Lord Macartney to have proſtrated himſelf nine times to the ground—a ceremony that he abſolutely refuſed to comply with. It is the cuſtom in China for the provinces and ambaſſadors to ſend annual gifts to the emperor. Some of thoſe preſented by the Engliſh embaſſy are therefore publiſhed in the uſual form, along with the other gifts, in the following Pekin Gazette.—On the eighth day of the ſeventh moon, July, the hoc ſue, a very great mandarin, named Ho Cune, informed the emperor a very great mandarin had arrived at Pekin, at nine o'clock, and that he was at the emperor's palace; that the King of England had ſent him as his ambaſſador to the court of Pekin, and

that his lordſhip wiſhed to be admitted to the emperor's preſence. The emperor immediately ordered all his court and relations to put on their beſt apparel, to be in readineſs to receive his lordſhip, and to wait till the emperor was ready. The emperor ſoon arrived, and, being ſeated in his ſtate-chair, ordered the hoc ſue to deſire the great Engliſh mandarin, Lord Macartney, to walk in. His lordſhip entered, holding forth his credentials to deliver to the emperor. The emperor deſired a very elderly mandarin of his court, named Hockchuneun, to receive the paper of his lordſhip, and to read it. He then read to him that the King of England had ſent nineteen different articles, the manufacture of England, as a preſent to him the Emperor of China. His lordſhip then addreſſed the emperor by proſtrating himſelf nine times with his head to the floor, according to the Chineſe cuſtom, and the emperor ordered him a chair on his left hand, the greateſt honour he could pay him in the court of Pekin, ordered him a cup of tea, and took one with him.—After ſome time the emperor retired to his dinner, and ordered four of his greateſt mandarins to dine with his lordſhip. After dinner the emperor returned. His lordſhip, with the four great mandarins, alſo returned, and his lordſhip returned the emperor thanks for his repaſt: the emperor then begged him to be ſeated as before, and ſpoke to his lordſhip as follows:

"The King of England has ſent you with nineteen different articles as preſents to me; I beg that your lordſhip will ſend them to my palace." He then retired.

The following is the account of preſents received from different countries:

England.—An orrery; one pair of globes; one thermometer; one pair of Merlin chairs; two large braſs guns; one bottle of phoſphorus; a view of Windſor; a carpet made of gold thread; two large handſome woollen-carpets; one pair of gold embroidered ſaddles; one ſummer coach; one winter ditto; ten broad ſwords; one pair of elegant chandeliers; a model of a hundred-gun ſhip, richly ornamented; one bale containing very fine cloths, camlets, &c. &c.

A country called Simlo.—One pair of elephants; one fowl, which eats daily 50lb. of grain; one piece of cloth, which, when dirty and put into the fire, is burnt and cleaned.

Bengal.—Four very ſmall handſome dogs; a bird; three horſes, which can go through water, Arabians; one pair of large looking-glaſſes; twenty very fine Engliſh knives.

Cochin China.—Twelve China joſſes, or the images they worſhip, made of ſandal-wood; a very elegant bedſtead; one pair of very handſome lurrys; a very ſmall elephant, fourteen inches high; two hundred pieces of coarſe cloth.

Small Portugueſes, ſuppoſe Goa.—One very handſome muſical clock; two hundred figures, ſmall, of clock-work; one large marble-ſlab, very handſome; one pair of beautiful birds.

Japan.—Twelve very handſome women, virgins; three very fine horſes; one large coral bead; one piece of branch coral.

Portugal.—One handſome Chineſe belt-buckle; one pair of pearls, not very large; one feather Chineſe jacket; ten large lances.

Foyce

Foyee country.—One man, one woman, dwarfs; one tiger, with wings; one female joſs, or god; one pair of pearls, a box of medicine to cure the blind.

Not only the requiſitions preſented by Lord Macartney on his late miſſion in the name of the Britiſh nation were refuſed, but the gentlemen who accompanied the embaſſy, and who had taken private ventures with them, expecting a ready market and a large profit at Pekin, were not permitted to offer their goods to ſale at the capital. They were told that Canton was the place appointed for carrying on trade with the Europeans, and that there they might diſpoſe of their articles by conforming with the eſtabliſhed cuſtoms.

Their ſtay in the interior of China, we have already ſtated, was but very ſhort. They had, however, an opportunity of obſerving many things relating to the manners of the people, the productions of the country, and the ſplendour of their public works.

Among their birds is one very remarkable for its utility. In the language of the country it name ſignifies the fiſh-catcher, and it ſeems well deſerving of the epithet. A pair of them, properly trained, will maintain a man and his family. They go out to the rivers or lakes, and, with great addreſs and quickneſs, ſeize upon their prey—they are even nice in the choice of it, and will ſeldom trouble themſelves to catch a ſmall fiſh, unleſs large ones cannot be found, and whatever they ſeize upon they carry home to their maſter. If one of them attack a fiſh rather large for it to manage, its companion inſtantly lends aſſiſtance, and both, flying together with as much preciſion as if they were in harneſs, the one having hold of the head and the other of the tail, carry home the booty together. We underſtand, that one of the gentlemen belonging to the ſuite procured a pair of theſe, which are coming home to England, as a preſent to a perſon of rank.

The ſplendour of the emperor, and his court, and the riches of the mandarins, ſurpaſs all that can be ſaid of them. Their ſilks, porcelaine, cabinets, and other furniture, make a moſt glittering appearance. Theſe, however, are only expoſed when they make or receive viſits; for they commonly neglect themſelves at home, the laws againſt private pomp and luxury being very ſevere. The magnificence of the public equipage of the mandarins, according to their rank, is very great; but the Chineſe magnificence never appears with ſo much ſplendour as when the emperor gives audience to ambaſſadors, or receives the homage of the principal lords of his court, and the great mandarins, in their habits of ceremony. No ſpectacle can be more grand than the inconceivable number of mandarins preſent, with all the inſignia of their dignities and different orders, each placed according to his rank. Next to them the miniſters of ſtate, preſidents of the ſupreme courts, regulos and princes of the blood, and on each ſide a great multitude of ſoldiers under arms. The whole conveys a moſt lofty idea of the ſovereign to whom ſuch profound reverence is paid. As every one knows his diſtinct place, the name of each office being engraved on copper-plates, ſet into the marble pavement, there never can be any diſpute about precedency. The ranks are diſtinguiſhed by different-coloured gems which they wear in the top of their cap, commonly one ſtone of a large ſize, and their ſteps of promotion or degradation by feathers. When a mandarin, for any offence, is forced to wear a crow's feather,

ther, it becomes very public—nay, he himself is made the herald of his own disgrace; for in all the official papers which he signs or issues in the province to which he belongs, he is obliged, before his signature, after enumerating his offices, to add, "degraded so many steps, and now wearing the crow's tail," or whatever may be the tail which he has been ordered to wear at the time. Nor is he ever allowed to lay it aside, till the emperor again raises him to some new dignity.

The great mandarins never travel unless in state. If they go by water, as was the case when they carried Lord Macartney from Gehol to see the buildings and gardens in an adjacent island, the bark which carries them is very splendid, and placed at the head of a great number of others, which carry the attendants. If they proceed by land, besides the domestics and soldiers, who either go before or follow them, they have for their own person a litter, a chair drawn by mules, or perhaps by eight men, and several led horses. These vehicles they employ by turns, according to their fancy or the changes of the weather.

China is full of broad canals, which are generally in a straight line. In every province a great river, or, where this is wanting, a large canal, serves for the general mode of travelling; and has causeways on each side, cased with flat stones or marble. That which is called the great canal crosses the whole empire from Canton to Pekin; and certainly nothing can be more commodious than this mode of travelling, which may be executed from Pekin to Makaw, a distance of six hundred leagues, with an intermission of one day only, when they are obliged to disembark for the purpose of crossing the mountain Meylin, which separates the provinces of Kyangsi and Canton. During all that voyage the traveller is as comfortable as if he were in his own house, having a bed and every other accommodation provided.

Such are the conveniencies of this mode of travelling, that the mandarins in going to their provinces, and the messengers sent from court, almost always proceed by water. On these occasions the barks are furnished and equipped by the emperor, and are equal in size to an English third-rate man of war: they are of three different kinds, nor can any thing be neater; for they are painted, gilt, embellished with dragons, and japanned both within and on the outside: their form is square and flat, except that in the forepart they are somewhat rounded. Besides what the master has for himself and his family, namely, a cabin, a kitchen, and two large apartments, one fore and the other aft—there are the following apartments, purposely fitted for the mandarin: an anti-chamber, three other rooms, all elegantly ornamented, and a small retired apartment without ornaments—all of these are on the same deck. They are japanned with beautiful red-and-white varnish, and the sides, as well as the cieling, adorned with carved work, painting, and gilding. The tables and chairs are japanned red or black. The hall has windows on each side, which may be occasionally removed; and, instead of glass, very thin oyster-shells or fine stuffs are employed; the latter are impregnated with fine wax, to increase their transparency, and are embellished with flowers, trees, and a variety of figures. The deck is surrounded with galleries, which enable the sailors to pass backwards and forwards without in the slightest degree incommoding the passengers. Over the principal apartment is placed a platform open on all sides for a band of music, which consists of five or six performers, whose harmony

harmony can ravish nothing but the ear of a Chinese. The sails are made of mats, and consist of several oblong squares, which, folding like a fan, take up but little room. With these they find that they can go nearer the wind than with any other form of sails. Among the barks that follow the great mandarins, there is always one at least, called the hoshechwen, or provision-bark, having a kitchen, eatables, and cooks, on-board. Another is filled with soldiers for the convoy; and a third, which is small and light, may be fitly called the harbinger or advice-boat, because its business is to hasten on before, to give notice of the approach of the mandarin, that every thing may be ready for his reception. These barks, besides their sails, have rowers; and are also, in case of necessity, drawn with a rope along the bank by men furnished by the mandarins of the district. At every league's distance along the canals, a guard is stationed for the purpose of making signals, which is done by day by burning the leaves and branches of pine in three stoves, from each of which the smoke ascends to a considerable height—by night they discharge a small gun. The soldiers of the guard are stationed along the river side, when the mandarin approaches, as a token of respect; and, while one of them displays an ensign, the others present their arms. If the bark carries an envoy, they put four lanterns at the head and stern with these words in large golden characters—*Kin-chay-ta-jin*, that is to say, "the great envoy from the court." These lanterns are accompanied by flags and streamers of several colours.

The canals have been the work of ages, and instead of having their banks exposed, without defence, to the washing of the water, as those in England, are generally lined with hewn stone or marble. The great canals discharge their waters into smaller ones on each side; and the latter form a great number of smaller branches, which are dispersed over the plains, extending to the villages and often to the great cities. From space to space they have bridges over them of three, five, and seven, arches.

In almost every city of China monuments are erected to eternize the memory of their heroes, and those who have rendered essential services to their country. Women participate in this kind of honour. These monuments consist principally in triumphal arches. Many of them are very clumsy, and deserve little notice, but others are worth attention. They in general consist of three gates—the centre one largest: the piers or posts are square, consisting of one stone: the entablature is composed of three or four faces, generally without any projection or moulding. Instead of a cornice, the piers support a roof that makes the top of the gate, and in such an odd form as cannot be described, so as to give to an European any proper idea of its appearance. Every gate consists of the same parts, which differ only in size; and, though of stone, and joined together by tenons and mortises, as if they were made of wood.—The rails or breast-walls of the bridges on the canals are in the same taste, being large square pannels of stone, fixed in grooves cut in the posts to receive them: these triumphal arches, which are seldom above twenty feet high, are ornamented with figures of men, flowers, birds, &c. jutting out beyond the arches, with other ornaments, indifferently well carved. The relievo is so great that many of them seem to be almost separated from the work.

All

All the Chinese towns are surrounded with walls so high, that the houses, which in general are low, cannot be seen from the outside of the city: they are all so broad that horses may be rode upon them: those of Pekin are about forty feet high. As for the city gates, though they are not adorned with figures in basso relievo like other public works, they have a most grand appearance, owing to the prodigious height of the two pavillions, their arches, that in some places are of marble, their thickness, and strength of the work.

OF THE NATURE AND ORIGIN OF MOUNTAINS.

THOSE who have surveyed the earth in general, and studied nature on a grand scale, have constantly been struck with admiration and astonishment at the sight of such majestic eminences, which, extending in different ways, seem to rule over the rest of the globe, and which present to the beholder a spectacle equally magnificent and interesting. In them it has been supposed we must search for a solution of the important problem regarding the creation of the world.

Naturalists reckon several kinds of mountains: we shall find that these elevations of the earth have not all the same origin, nor date their commencement from the same era. Those mountains which form a chain, and which are covered with snow, may be considered as primitive or antediluvian. They are like majestic bulwarks scattered on the surface of the globe, and greatly exceed the other mountains in height. In general, their elevation is very sudden, and their ascent very steep and difficult. Their shape is that of a pyramid crowned with sharp and prominent rocks, on which no verdure is to be seen, but which are dry, naked, and as it were stripped of their soil, which has been washed away by the rains, and which present an awful and horrible aspect, sufficient to impress the coldest imagination with terror. These primitive mountains, which astonish the eye, and where wind only reigns, are condemned by nature to perpetual sterility. At the foot of them we frequently find paths less steep and winding than when we ascend to a greater height. They every where present thundering cascades, frightful precipices, and deep valleys. The depressions and excavations correspond with the quantity of water, the motion of which is accelerated in its fall, and which sometimes produces a total sinking or an inclination of the mountain. The wrecks to be found at the foot of most peaks, shew how much they have suffered from the hand of time. Nothing meets the eye but enormous rocks, heaped in confusion on one another, which prevent the approach of the human race. On the summits of these mountains or high eminences, which are only a series of peaks frequently detached from one another, the prominent rocks are covered with eternal snow and ice, and surrounded with floating clouds which are dispersed into dew. In a word, the rugged cliffs oppose an inaccessible rampart to the intrepidity of man; and nature exhibits a picture of disorder and decay *. No shells or other organized

* It is observed, says the Abbé Palassou, that, at the foot of the Pyrenean mountains, the soil of several countries consists wholly of the mud and rubbish deposited by the rivers which descend from them. According to Herodotus, a great part of Egypt was in like manner formed by the different substances brought thither by the Nile: Aristotle calls it the work of the Nile;

nized marine bodies are to be found in the internal part of these primitive mountains; and though search has been made, by digging, on the tops of the Alps and the Pyrenees, no substances of this nature have yet been discovered except on the sides near the base. Nothing is to be met with but continued rocks, caverns dug by the hand of nature, and abounding in crystallizations of great beauty, with various minerals. The stone of which they consist is an immense mass of quartz, somewhat varied, which penetrates into the bowels of the earth in a direction almost perpendicular to the horizon. We find no calcareous spar but in the fissures or rents which have some extent and an evident direction; and at great depths we find new parts as it were, or, in other words, the primitive state of things. All primitive mountains furnish proofs of these assertions. Of this kind in Europe are the Pyrenees, the Alps, the Apennines, the mountains of Tirol, the mountain of the giants in Silesia, the Carpathian mountains, the mountains of Saxony, those of Norway, &c. In Asia we find the Riphean mountains, Mount Caucasus, Mount Taurus, and Mount Libanus; in Africa, the mountains of the moon; and in America the Apalachian mountains, and the Andes or Cordilleras. Many of the latter have been the seats of volcanoes.

Another kind of mountains are those which are either detached, or surrounded with groups of little hills, the soil of which is heaped up in disorder, the crust gravelly and confusedly arranged together. These are truncated, or have a wide mouth in the shape of a funnel towards the summit, and which are composed of, or surrounded with, heaps of calcined and half-vitrified bodies, lava, &c. This class of mountains appears to have been formed by different strata raised up and discharged into the air, upon occasion of the eruption of some subterraneous fire. The isles of Santorin, Monte-Nuovo Mount Etna, Adam's Peak in the island of Ceylon, the peak of Teneriffe in the Canary Islands, and many others, have been formed in this manner. When very high mountains of this kind are covered with sea-shells, we may consider their summits as having once constituted a part of the bottom of the ocean. A number of these mountains have been formed in the memory of man; and present nothing to the view but disordered ruins, confused masses, parts heaped together in the greatest irregularity, and productions formed by eruptions or by the falling in of the earth. When a mountain of this kind is connected with the land, and advances farther into the sea than the

Nile; and on this account the Ethiopians boasted that Egypt was indebted to them for its origin. The inhabitants of the Pyrenees might say the same thing of almost the whole tract of country situated along the northern chain from the ocean to the Mediterranean, forming that kind of isthmus which separates the two seas. The surface of our globe is thus in a state of perpetual change; the plains are elevated, the mountains are levelled, and water is the principal agent employed by nature in these great revolutions. Time alone is wanting to verify the saying of Louis XIV. to his grandson: posterity will one day be able to say, "The Pyrenees are no more." The period, however, must necessarily be very distant. M. Gensanne, from observations which he thinks well-founded, concludes, that these mountains are lowered about ten inches every century. Supposing them therefore to be fifteen hundred toises above the level of the sea, and always susceptible of being lowered in the same degree, a million of years would elapse before their total destruction.

adjoining country, it is then termed a cape, head, or promontory; such as the Cape of Good Hope at the southern extremity of Africa. Mountains of the second rank are commonly more easy of access. Dr. Haller observes, that the angle formed between their base and their declivity is larger; that they have fewer springs; and that their plants are different from those of the Alps. The peasants in Switzerland, he tells us, are acquainted with the difference betwixt these two kinds of mountains.

Those mountains, whether arranged in a group or not, the earth or stone of which is disposed in strata more or less regular, and consisting of one or more colours and substances, are produced by the substances deposited slowly and gradually by the waters, or by soil gained at the time of great floods. We daily see little hills formed in this manner, which are always of a small height compared with those of the first order, and round in the top, or covered with soil frequently forming a pretty flat and extensive surface. We there find likewise sand and heaps of round pebbles like such as have been worn by the waters. The internal part of these mountains consists of a heap of strata almost horizontal, and containing a prodigious quantity of shells, marine bodies, and fish-bones. Although these mountains formed by strata sometimes degenerate into little hills, and even become almost flat, they always consist of an immense collection of fossils of different kinds, in great preservation, and which are pretty easily detatched from their earthy bed whether harder or softer. These fossils, consisting of marine shells intermixed and confounded with heaps of organised bodies of another species, present a picture of astonishing disorder, and give indubitable indications that some extraordinary and violent current has confounded and accumulated in the greatest disorder and precipitation foreign substances and shells of various kinds. These, removed from their natural and original place, by their union form an elevation and a mountain, which are in fact nothing but a composition of the wrecks of bodies formerly organised. All these phenomena seem to prove, that most of these mountains chiefly owe their origin to the sea, which once covered some parts of our continent, now left dry by its retreat. (According to the principles of this system, Anaxarchus explained the formation of the mountains of Lampsacus.) In these mountains we likewise find wood, prints of plants, strata of clay, marl, and chalk, different beds of stone succeeding one another, such as slate, marble which is often full of sea-shells, lime-stone which appears to be wholly formed from the wreck of shells, plaster-stone, entire strata of ochre, and beds of bitumen, mineral salt, and alum.

The strata of mountains which are lower and of a recent date, or formed by recent accidents, sometimes appear to rest upon, or to take their rise from, the sides of primitive mountains which they surround, and of which they in some measure form the first steps in the ascent; and they end by being insensibly lost in the plains. With respect to the irregularity of some strata in recent mountains, it is owing to violent and sudden inundations, to torrents, and to local revolutions which have produced angles, leaps, and sinkings down, of the strata. It is generally observed, however, that the strata in mountains are exactly parallel to each other throughout all their different windings. M. Desmarest remarks, that in two mountains which

which by their brows form the hollow of a valley, we find ſtrata of earth or ſtone of the ſame kind, and diſpoſed and arranged in the ſame manner. Some ſtrata are only a quarter of an inch thick, others are more than ten feet: in ſome places we find thirty or forty beds ſucceeding each other, in others only three or four. In recent mountains compoſed of ſtrata, M. Lehmanna obſerves, the loweſt ſtratum is always pit-coal; and this reſts on a coarſe and ferruginous gravel or ſand. Above the pit coal we find ſtrata of ſlate, ſchiſtus, &c. and the upper part of the ſtrata is conſtantly occupied by limeſtone and ſalt-ſprings. It is eaſy to perceive the utility of theſe obſervations, when we intend to work for theſe minerals; and, by attending to the diſtinction which has been made of the different mountains of the ſame kind, we may know the nature of thoſe ſubſtances which upon ſearch we may expect to find in them. The ſpecimens which appear without indicate what ſubſtances are concealed within.

In general, it has been obſerved, that when two or more mountains run parallel to each other, the ſalient angles correſpond with the receding ones; and theſe angles are ſharper and more ſtriking in deep and narrow valleys. Dr. Haller obſerves, that there are many places in the Alps and in mountains, where two chains are prolonged contrary to the axis of the valley, and join ſo as only to leave as much ſpace as is neceſſary for the diſcharge of the water. In other places the mountain is continued, for inſtance, to the north, and diſcontinued to the ſouth, where it opens into a valley. In others, the two chains retire and form a bend on each ſide, the concavity of which fronts the axis: hence ariſe valleys almoſt round and completely united.

It is likewiſe worthy of obſervation, that primitive mountains which form vaſt chains are commonly connected together; that they ſucceed one another for a ſpace of ſeveral hundred leagues; and cover with their principal branches, and their various collateral ramifications, the ſurface of continents. Father Kircher and many others have obſerved, that the principal chain generally runs from ſouth to north, and from eaſt to weſt. The Cordilleras in the New world, Dr. Haller obſerves, extend from north to ſouth; the Pyrenees have nearly the ſame direction; the Alps run from eaſt to weſt; and there muſt be a chain of this kind in Africa, for the great rivers in that quarter of the world run to the eaſt on the one ſide and to the weſt on the other. The chain of Thibet appears to be parallel to the Alps; and, from the great length of the road through the ſnows, it may be inferred that the mountains of Thibet have a very great elevation. Thoſe mountains which, ſtrictly ſpeaking, are the principal roots, and the capital point of elevation and diviſion, preſent very conſiderable maſſes, both with regard to their height and their ſize or extent: they commonly occupy and traverſe the centre of continents. Thoſe which have a ſmaller elevation ariſe from theſe principal chains; they gradually diminiſh in proportion to their diſtance from their root, and at length wholly diſappear either on the ſea-coaſt or in the plains. Others are continued along the ſhore of the ſea; their chain is interrupted only to make room for the waters of the ocean, under the bed of which the baſe of theſe mountains extends; and it again occurs in iſlands which prepetuate their continuation till the whole chain re-appears. The higheſt mountains and the greateſt number of iſlands are generally found between

tween or near the tropics, and in the middle of the temperate zones; while the lowest are adjacent to the poles; though this does not always hold good without exception.

In the Journal de Physique for May 1779, we are informed, that Dr. Pallas, who has travelled through Siberia, and almost all the Russian empire in the north of Asia, thinks he has discovered the insufficiency of the principal systems hitherto proposed to account for the formation of mountains. This accurate observer has prosecuted the study of mountains by traversing immense regions, and visiting as it were the secret work-shops of nature in almost the fourth part of our hemisphere. He has not trusted to the vague reports of others, but from observations which he himself had occasion to make for the space of ten years. He has, in a work entitled Observations on Mountains, explained both the direction of the northern chains, and the particular composition of each. He is thence led to make an ingenious conjecture concerning the formation of the principal groupes of mountains, and concerning the irregular distribution and the figure of the old continent. To establish a general system, it would perhaps be necessary to have travelled over the whole earth; and to have studied all the chains of mountains, their direction, and particular composition, for a long series of years. Thus very little attention is required to perceive, in the different systems, the influence of climate and local situation. Burnet, Whiston, and Woodward, who were acquainted only with England, where very few great chains of mountains are to be seen, where they are almost all insulated or detached, and where the soil of extensive plains is formed by horizontal and pretty regular strata, naturally thought that these general and concentric strata were to be found all around the globe, and considered mountains as nothing but the wrecks of these strata, either raised or swallowed up by the violence of the waters. Scheuchzer, who studied among the steep mountains of Switzerland, amid rocks of granite, petrosilex, jasper, and hard stones, and who found nothing on the most elevated plains of the Alps but strata of similar substances, had recourse to the power of the Almighty, who broke in pieces these strata, and elevated their splinters into the form of mountains. Ray, Morro, and Stenon, who saw nothing all around them but burning mountains and traces of volcanic productions—deceived by the constitution of the hills of Italy, which are almost all formed of lava, pozzolana, and basaltic substances, and by the origin of the Monte Nuovo, which rose up almost before their eyes, have considered great mountains as formed by a cause which undoubtedly has a secondary, but to which they have ascribed a primary and principal, influence. M. de Buffon, who delineated nature at the foot of the utmost extremity of the French Alps, and who perceived them gradually attain a greater elevation as they advanced towards the southern parts of France and towards Savoy, concluded from his theory, and in support of the same theory, that the highest mountains were near the equator; that they became lower towards the poles; and that, being produced by the flux and reflux of the sea, they were formed of the substances which it deposited.

M. Buache places the most elevated points of the great chains of mountains under the equatorial line: but, according to other authors, the fullest and most continuous lands, and perhaps likewise the most elevated, are to be found at a distance from the equator, and towards

towards the temperate zones. If, in fact, we survey the globe's surface, we will not be able to perceive that chain of mountains, which running from east to west, and dividing the earth into two portions, ought again to meet. On the contrary, extensive plains seem to accompany the line through almost its whole extent. In Africa, the deserts of Nigritia and those of Upper Ethiopia are on the one side of the line; and on the other are sandy plains of Nicoco, Caffraria, Monoemugi, and Zanguebar. From the eastern shores of Africa to the Sunda islands, is a space of fifteen hundred leagues of sea, with almost no islands, except the Laccadive and Maldive islands; most part of which have little elevation, and which run from north to south. From the Molucca islands and New Guinea, to the western borders of America, the sea occupies a space of three thousand leagues. Though Chimboraco and Pichincha in America, the two highest mountains which have been measured, are near and even under the line, yet from this no conclusion can be drawn; because on one side these mountains run in a direction not parallel to the equator; the Andes or Cordilleras attain a greater elevation as they remove from the equator towards the poles; and a vast plain is found exactly under the line, between the Oroonoko and the river of the Amazons. Besides, the latter river, which takes its rise in the province of Lima about the 11th degree of south latitude, after crossing the whole of South America from west to east, falls into the ocean exactly under the equator. This shews that there is a descent for the space of twelve degrees or three hundred leagues. From the mouth of the river of the Amazons, to the western shores of Africa, the sea forms another plain of more than fifty degrees.

From the few certain facts and accurate observations which we have received from well-informed travellers, we might almost affirm that the most elevated land on our globe is situated without the tropics in the northern and southern hemispheres. By examining the course of the great rivers, we in fact find that they are in general discharged into three great reservoirs, the one under the line, and the other two towards the poles. This, however, we do not mean to lay down as a thing universally true; for it is allowed, that, besides the two elevated belts, the whole surface of the earth is covered with innumerable mountains, either detached from one another or in a continued chain. In America, the Oroonoko and the river of the Amazons run towards the line, while the river St. Lawrence runs towards the 50th degree of north latitude, and the river de la Plata towards the 40th degree of south latitude. We are still too little acquainted with Africa, which is almost all contained within the tropics, to form any accurate conclusions concerning this subject. Europe and Asia, which form only one great mass, appear to be divided by a more elevated belt, which extends from the most westerly shores of France to the most easterly of China, and to the island of Sagaleen or Anga-hata, following pretty nearly the 50th degree of north latitude. In the new continent, therefore, we may consider that chain where the Mississippi, the river St. Lawrence, the Ohio, and the river de los Estrechos, take their rise, as the most elevated situation in North America: whence the Mississippi flows towards the equator, the river St. Lawrence towards the north-east, and the rest towards the north-west. In the old continent, the belt formerly mentioned, and to which we may assign about ten degrees in breadth, may be reckoned

from

from the 45th to the 55th degree of north latitude: for in Europe the Tagus, the Dannbe, the Dnieper, the Don, and the Volga, and in Asia the Indus, the Ganges, the Meran, the Mecon, the Hoang-ho, and the Yantg-tse-Kiang, descending as it were from this elevation, fall into the great reservoir between the tropics; whilst towards the north the Rhine, the Elbe, the Oder, the Vistula, the Obi, the Jenisei, the Lena, and Indigirka, and the Kowyma, are discharged into the northern reservoir.

Judging from those mountains the height of which has been calculated, and from the immense chains with which we are acquainted, we may infer that the highest mountains are to be found in this elevated belt. The Alps of Switzerland and Savoy extend through the 45th, the 46th, and the 47th, degrees. Among them we find St. Gothard, Furca, Brüning, Russ, Whiggis, Scheidek, Gunggels, Galanda, and lastly that branch of the Swiss Alps which reaches Tirol by the name of Arlenberg and Arula. In Savoy, we meet with Mount Blanc, the Peak of Argentiere, Cornero, Great and Little St. Bernard, Great and Little Cenis, Coupeline, Servin, and that branch of the Savoyard Alps which proceeds towards Italy through the duchy of Aost and Montferrat. In this vast heap of elevated peaks, Mount Blanc and St. Gothard are particularly distinguished. The Alps, leaving Switzerland and Savoy, and passing through Tirol and Carniola, traverse Salzbourg, Stiria, and Austria, and extend their branches through Moravia and Bohemia, as far as Poland and Prussia.--Between the 47th and 48th degrees, we meet with Grimming the highest mountain of Stiria, and Priel which is the highest in Austria. Between the 46th and 47th degrees, the der Bacher and the der Reinschnicken form two remarkable chains. The upper one, which traverses the countries of Trencsin, Arrava, Scepus, and the Kreyna, separates Upper Hungary from Silesia, Little Poland, and Red Russia; the inferior one traverses Upper Croatia, Bosnia, Servia, and Transilvania, separates Lower Hungary from Turkey in Europe, and meets the upper chain behind Moldavia, on the confines of Little Tartary. In these mountains are situated the rich mines of Schemnitz.

To form a general idea of the great height of this Alpine belt, it is necessary only to remark, that the greatest depth of the wells at Schemnitz is two hundred toises; and yet it appears, from the barometrical calculations of the learned M. Noda, that the greatest depth of these mines is two hundred and eighty-six toises higher than the city of Vienna. The granito-argillous mountains of Schemnitz, and of the whole of this metallic district, are inferior, however, to the Carpathian mountains. Mount Krivany in the country of Arrava, and the Carpathian mountains between Red Russia and the Kreyna, appear by their great elevation to rule over the whole of the upper Alpine chain. In the inferior chain we likewise meet with mountains of an extraordinary height; among others, Mount Mediednik, which gives its name to a chain extending far into Bosnia; and Mount Hemus, celebrated even among the ancients. In short, this extensive chain reaches into Asia, and is there confounded with another chain no less famous, which, following exactly the 50th degree of latitude, runs through the whole of Asia. This chain of mountains is described by Dr. Pallas in the work above-mentioned; and, we shall now trace its course in company with this intelligent observer.

This

This author places the head of the mountains of Oural, between the sources of the Taik and the Bielaïa, about the 53d degree of latitude, and the 47th of longitude. Here the European Alps, after having traversed Europe, and sent off various branches which we shall afterwards examine, lose their name, which is changed into that of the Ouralic or Uralian mountains, and begin their course in Asia. This lofty chain, which separates Great Bulgaria from the deserts of Ischimska, proceeds through the country of the Eleuths, follows the course of the river Irtis, approaches the lake Teleskaia, and afterwards forms a part of the same system of mountains with the Altaic chain. There they give rise to the Oby, the Irtis, and the Jenisei, which begin their course about the 50th degree of north latitude, and fall into the Frozen Ocean.

The Altaic chain, after having embraced and united all the rivers which supply the Jenisei, is continued under the name of Saianes, without the smallest interruption, as far as the Baikal lake. The extension of this chain to the south forms that immense and elevated plain which is lost in Chinese Tartary, which may be compared with the only plain in Quito, and which is called Gobi or Chamo. The Altai afterwards interposing between the source of the Tchikoi and of the rivers which supply the Amur or Sagaleen, rises towards the Lena, approaches the city Jakuck beyond the 60th degree of latitude, runs from that to the sea of Kamtschatka, turns round the Ochockoi and Pensink gulphs, joins the great marine chain of the Kurile isles near Japan, and forms the steep shores of Kamtschatka, between the 55th and 60th degrees of latitude. Such is the direct course of the high mountains constituting the belt which, we imagine, is to be found in the northern hemisphere, and which, after becoming lower, passing under the sea, and forming by means of their elevated peaks that archipelago of islands which derives its name from the unfortunate Bhering, again rise and enter North America, on the western side, about the Straits of Anian. After running in the same parallel, and giving rise to the Ohio, the Riviere-Longue, the river St. Lawrence, and the Mississippi, they are lost in Canada. From the eastern shores of America to the western shores of Europe, we find a vast interruption. Perhaps the chain was at first continued completely round the globe; but extraordinary revolutions, by separating the old and new continents, may have occasioned this division, and left nothing but the Azores and some detached points as a monument of what formerly existed, till we come to the British isles.

Before we proceed to inquire whether a belt of a similar elevation exists in the southern hemisphere, we may remark those branches and ramifications which the great northern Alpine belt sends forth both towards the equator and the antarctic pole. These new chains, which gradually become lower as they approach the boundary towards which they tend, appear a sufficient proof that the equator is not the most elevated part of the earth.

The European Alps produce three principal chains which run towards the equator, and some smaller ones running towards the pole. The first southern chain is sent out through Dauphiné; traverses Vivarais, Lyonnois, Auvergne, Cevennes, and Languedoc; and, after joining the Pyrenees, enters Spain. There it divides into two or three ramifications, one of which runs through Navarre, Biscay, Arragon, Castile, Marche, and Sierra Morena, and extends into Portugal,

Portugal. The other, after traverſing Andaluſia and the kingdom of Granada, and there forming a number of ſierras, again makes its appearance, beyond the Straits of Gibraltar, in Africa, and coaſts along its northern ſhores under the name of Mount Atlas.—The ſecond principal chain of the Alps paſſes out through Savoy and Piedmont; ſpreads its roughneſſes over the ſtraits of Genoa and Parma; forms the belt of the Apennines; and after frequently changing its name, and dividing Italy into two parts, terminates in the kingdom of Naples and in Sicily, producing volcanoes in every part of its courſe. The third chain is ſent off from Hungary, and ſcatters innumerable mountains over all Turkey in Europe, as far as the Morea and the Archipelago at the bottom of the Mediterranean ſea. The northern branches, though ſmaller at firſt, are no leſs clearly defined; and ſome of them even extend their ramifications as far as the Frozen Ocean. An Alpine branch, iſſuing from Savoy through the country of Gex, proceeds through Franche Comte, Suntgaw, Alſace, the Palatinate, and Veterabia.—Another iſſues from the territory of Saltzbourg, paſſes along Bohemia, enters Poland, ſends off a ramification into Pruſſia towards the deſerts of Waldow, and after having paſſed through Ruſſia is loſt in the government of Archangel.

The Aſiatic Alps ſend forth in like manner ſeveral branches both to the ſouth and north. The Ouralic mountains, between the ſources of the Bielaïa and the Jaik, produce three principal branches; the firſt of which, including the Caſpian Sea in one of its diviſions, enters Circaſſia through the government of Aſtracan, paſſes through Georgia under the name of Caucaſus, ſends a vaſt number of ramifications to the weſt into Aſiatic Turkey, and there produces the mountains Tſchilder, Ararat, Taurus, Argée, and many others in the three Arabias; while the other diviſion, paſſing between the Caſpian Sea and the lake Aral, penetrates through Choraſan into Perſia. The ſecond branch, taking a more eaſterly direction, leaves the country of the Eleuths; reaches Little Bucharia; and forms the ramparts of Gog and Magog, and the celebrated mountains formerly known by the name of Caf, which M. Bailly has made the ſeat of the war between the Dives and the Peris. It traverſes the kingdoms of Caſgar and Turkeſtan, enters through that of Lahor into the Mogul territory, and, after giving riſe to the elevated deſert of Chamo, forms the weſtern peninſula of India. While theſe two branches run towards the ſouth, the third branch of the Ouralic chain riſes towards the north, following almoſt the 79th degree of longitude, and forms a natural boundary between Europe and Aſia; without, however, bounding the immenſe empire of Ruſſia. This chain, after coming oppoſite to Nova Zembla, divides into two conſiderable branches. The one, running to the north-eaſt, paſſes along the Arctic ſhores; the other, proceeding towards the north-weſt, meets the northern European chain, traverſes Scandinavia in the ſhape of a horſeſhoe, covers the low-lands of Finland with rocks; and, as is obſerved by Dr. Pallas, appears to be continued from the North Cape of Norway through the marine chain of Spitzbergen, ſcattering iſlands and ſhelves perhaps throughout the northern ocean, that, paſſing through the pole, it may join the northern and eaſtern points of Aſia and North America.

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The Ouralic, which in the country of the Mongols becomes the Altaic, chain, proceeds towards the equator. After forming the mountains and caverns wherein, as we are told, the ashes of the Mongol emperors of the race of Ghengis-Kan are deposited, together with the vast plain of Chamo, consisting of arid sand, and the frightful rocks and precipices of Thibet, which form the mysterious and desert retreats of the Grand Lama, it crosses the rivers Ava and Menan; contains in its subdivisions the kingdoms of Ava, Pegu, Laos, Tonquin, Cochin China, and Siam; supports the peninsula of Malacca; and overspreads the Indian ocean with the isles of Sonda, the Moluccas, and the Philippines. From the borders of the Baikal lake and of the province of Selinginskoy, a branch is detached, which spreads over Chinese Tartary and China, is continued into Corea, and gives rise to the islands of Japan.

The great chain having extended to the north, near the city of Jakuck, upon the banks of the Lena, sends off one of its branches to the north-west, which, passing between the two Tungusta, is lost in marshy grounds lying in the northern parts of the province of Jennisseiskoy. The same chain, after it has reached the eastern part of Asia, is lost in the icy regions of the north about Nos-Tschalatskoy or the Icy Promontory, and Cap Czuczenskoy.

It will be more difficult, perhaps, to trace the elevated belt in the southern hemisphere beyond the tropic of Capricorn, than it has been to distinguish that towards the north. An immense extent of ocean seems to occupy the whole antarctic part of the globe. The greatest south latitude of the old continent is not more than thirty-four degrees, and South America scarcely extends to the 55th degree. In vain has the enterprising Cook attempted to discover regions towards the pole: his progress was constantly interrupted by tremendous mountains and fields of ice. Beyond the 50th degree no land and no habitation is to be found. The islands of New Zealand are the farthest land in these desert seas; and yet the south cape of Taral-Poenamoo extends only to the 48th degree: we do not mention Sandwich-land, which is situated in the 58th degree, because it is too small and too low. It must be recollected, however, that, according to the declarations of travellers, the Cordilleras become higher as they advance southward to the Straits of Magellan; and that the Terra del Fuego, which lies in the latitude of fifty-five, is nothing but a mass of rocks of prodigious elevation. America, however, exhibits to our view elevated points, whence chains of mountains are distributed in different directions over the whole surface of the new continent. There must likewise be great reservoirs, where the most remarkable rivers take their rise, and from which they necessarily descend towards their mouth. In the southern hemisphere, this elevated belt is nearer the equator; and, though it does not extend to the 50th degree, it is evidently to be met with and may be accurately traced between the 20th and 30th degrees. The high mountains of Tucuman and of Paraguay, which intersect South America about the 25th degree of latitude, may be considered as the American Alps. If we look into the map of the world, we shall be able to distinguish an elevated belt all along this parallel. In Africa, Monomotapa and Caffraria are covered with very high mountains, from which pretty large rivers descend. In the Pacific Ocean, we find New Holland, New Caledonia, the New Hebrides, and the

Friendly and the Society islands, under the same parallel. We may, therefore, with sufficient propriety, distinguish this parallel by the name of the Southern Alps, as we have already distinguished the elevated belt of the 50th degree of north latitude by that of the Northern Alps. In America, the Rio de la Plata, which after a course of five hundred leagues falls into the ocean at the 35th degree of south latitude; the Pavana, which rises from the mountains of the Arapes, and falls into the Plata at Corriente; the great number of rivers which flow into that of the Amazons, such as the Paraba, which receives in its course the tribute of more than thirty other rivers; the Madera, the Cuchirara, the Ucayal, &c. &c. all descend from these southern Alps. From these Alps likewise three considerable branches of mountains are detached, which go by the common name of Andes or Cordilleras.—The first branch, which extends towards the south, and passes out from Paraguay through Tucuman, separates Chili from these provinces and from Chimito, and is continued through the Terra Magellanica as far as Terra del Fuego. The second branch, directing its course towards the equator, traverses Peru, in vain endeavouring to conceal treasures which the avarice of men has taught them to discover in its bowels; bounds the Spanish Missions; enters Terra Firma through Popayan; and unites South and North America by the isthmus of Panama. The third division, issuing from Paraguay through Guayra and the territory of Saint Vincent, traverses Brazil, distributes ramifications into Portuguese, French, and Dutch, Guiana, crosses the Oroonoko, forms the mountains of Venezuela, and near Carthagena meets the second branch coming from Popayan.

We have already supposed, that the elevated belt of North America was situated about the 45th degree of north latitude; and there we imagined we recognized the continuation of the northern Alps of the old continent. This chain likewise sends forth considerable branches on both sides. One of them is detached across the sources of the Mississippi, the Belle-Riviere, and the Missouri, and at the entrance of New Mexico divides, in order to form California to the west, and the Apalachian mountains to the east.—Thence proceeding through New Biscay, the audience of Guadalaxara, Old Mexico, and Guatimala, it meets at Panama the southern branch, which is part of the Alps of Paraguay. The second branch, following the course of the Mississippi, separates Louisiana from Virginia; serves as a bulwark to the united states of America; forms the Apalachian mountains in Carolina; and at last, traversing East Florida, incloses the Gulph of Mexico with the Great and Little Antilles. In the north, we can trace the branches of the elevated belt; on one side observe them proceeding towards Canada, directing their course through Labrador to Hudson's Straits, and at length confounded with the rocks of Greenland, which are covered with eternal snow and ice. On the other side, we see them rising through the country of the Assinipoels and the Kristinos, as far as Michinipis and the northern Archipelago.

So many observations fully shew that the primitive mountains may be considered as the foundation of our globe. By their shape, elevation, direction, and continuity, they give rise to the greatest part of winds, or produce that variety which prevails among them. Primitive mountains, as we have already said, are distinguished likewise

wise by their internal structure, by the nature of the stones of which they are composed, and by the minerals which they contain. The highest mountains, are, properly speaking, nothing but peaks or cones consisting of solid rock. This pyramidal form has been supposed to be at first owing to a kind of crystallization; and the late M. Rouelle was of opinion, that the substances of which our globe is composed originally swam in a fluid. The similar parts, of which the great mountains consist, according to this philosopher, approached one another and formed a crystallization, sometimes in a group, and at other times detached at the bottom of the waters. Upon this supposition, we might analyse different portions or blocks of rock taken from primitive mountains; and, by making them crystallise, we should then have in miniature a part of the same economy or connection of mountains; a figurative portion, in short, of the skeleton of the earth.—We may farther presume, that those steep rocks which it now seems almost impossible to surmount even in imagination, are co-eval with the existence of the world.

Mountains with flat summits sometimes rest on the base of primitive mountains; and contain marble, fossils, and limestone. When mountains of the same kind possess a round and more regular shape, they consist of chalk and other calcareous and friable substances arranged in strata. Granite-argillous mountains, like those of Shemnitz, generally form metallic districts. Hills composed of brown free-stone every where present irregular points, indicating broken strata and heaps of rubbish.

Dr. Pallas (in the systematic part of the Memoir above-mentioned, concerning the substances of which the highest mountains are composed) lays it down as an axiom, that the highest mountains of the globe, forming continued chains, are composed of that rock which is called granite, the base of which is always a quartz, with a greater or smaller mixture of felt-spar, mica, and small schoerls, scattered without order, and in irregular fragments of different sizes. This old rock, and the sand arising from its decomposition, form the base of all continents. Granite is found below mountains composed of strata (this observation is not applicable to the courses of mountains formed by strata); it constitutes the large protuberances, and as it were the heart, of the greatest Alps in the known world: hence we may with the greatest probability infer, that this rock forms the principal ingredient in the internal composition of our globe. It is never found in regular strata, but in huge masses and in shapeless blocks; its origin is prior to that of all animated beings; it exhibits not the smallest traces of petrifaction, and seems not to have received the least impression from any organised substance. High eminences, whether in continued chains or in the form of steep peaks, are never covered with clayey or calcareous strata, deriving their origin from the sea; but appear to have been from their very first formation elevated above the level of the ocean. The sides of these great chains are for the most part covered with schistous belts, and surrounded with mountains of the second and third orders. This is proved by the Ouralic and Altaic chains, which have been traced by Dr. Pallas. Such is the system proposed by this author. The high or primitive and ancient mountains, which have existed from the beginning of time, are granitous; the schistous mountains, to which he gives the name of secondary, have arisen from the sides of the primitive by the decom-

position of the granite; and those which he calls tertiary mountains, or mountains of the third order, are nothing but substances deposited by the sea, and raised up by volcanoes, or swept away by a violent irruption, a powerful inundation, or an universal deluge. This hypothesis concerning the formation of mountains is borrowed from nature itself, and appears to be confirmed by many facts in natural history.

We shall now proceed to state the height of most of the primitive mountains; an object no less worthy of attention than their structure and variety.

According to M. Pontoppidan, the highest mountains in Norway are 3000 toises in height. According to M. Brovallius, the highest mountains in Sweden are 2333 toises. It is supposed, however, that both these calculations are erroneous.

From the Memoirs of the Academy of Sciences at Paris, it appears, that the mountains in France most elevated above the surface of the Mediterranean are the Puy-de-Dome, which is 817 toises, and the Mont d'Or, which is 1048 toises. These two mountains are in Auvergne, and are supposed to be extinguished volcanoes. Mont Cantal is 993 toises high: Mont Ventoux is 1036: the south peak of Canigou in the Pyrenees, according to M. de Rocheblave, is 1442; and according to M. de Plantade, 1453: and Saint Barthelemi is 1184.

M. Needham observes, that the highest Alps in Savoy are the convent of the great Saint Bernard, at the point of the rock to the southwest of that mountain, which is 1274 toises; Mont Sérené, which is 1283; and Mont Touré, which is 1683. According to the measurement of the English observer, the peak or needle of Argentiere is 2094 toises high. M. Facio de Duiller and M. Duluc make the ridge of Mont Blanc 2213 toises; but, according the observation of M. Shuckburgh, its elevation is 2447 toises one foot (by M. de Saussure's measurement 2426 toises) above the level of the Mediterranean.

The principal mountains of the Alps are among the most elevated in the world; and particularly Mont Blanc, that enormous mass of granite, which is situated in the centre of the Alps, and the access to which is rendered so difficult by the sharp peaks, walls of ice, and everlasting snows, wherewith it is covered, is the highest mountain which has been measured either in Europe, Asia, or Africa. The altitude of the Alps of Switzerland has been ascertained by different philosophers: we shall content ourselves with mentioning the most remarkable of those mountains covered with snow, which in Switzerland are called Gletschers or Glaciers. St. Gothard, according to Scheuchzer, is 1650 toises; and Lignon, near the lake of Como, north-east, is, according to Pini, 1486 toises in height. M. Pasumot, engineer to the late king of the French, justly observes, that the heights assigned by Mikheli to the mountains of Switzerland appear rather to be ideal computations than founded on observations. An opinion of them may be formed from the following:—According to this author, Mont Pilate or Frakmont, in the district of Lucerne, is 1403 toises in height; Mont Cenis, 1445; Raukhstok, 1760; the Nolle ridge of Titlisberg, 2001; Ghemi, 2421; Grimselberg, in the canton of Berne, 2539; the Cornera, part of Loukmanier, 2654; Fourke, 2669; Schrekhorn, 2724; and St. Gothard, at its most elevated

elevated point, 2750. Mikheli likewise reckons twenty other mountaints, the height of which exceeds 2000 toises.

Throughout the globe we will not perhaps meet with higher mountains than those of Peru, which go by the name of Cordilleras de los Andos. According to the observations of the academicians sent to South America in 1735 by the Spanish and French courts, to measure a degree of the meridian and to ascertain the true figure of the earth, the principal summits of these extraordinary mountains, which are situated near Quito, and which are constantly covered with snow though they lie under the equator, have the following geometrical elevations above the level of the sea: Quito-Capilate, 1707 toises; El-Corason, 2470*; Cotacatche, 2570; Ek-Atlas, 2730; and Noyamble-orcu, under the line, 3030. All the other mountains have been, or still are, volcanoes. The following is an enumeration of them, together with their several heights: Pichincha, 2430; Cargavi-raso, 2450; Sinchonalagon or Sinchoulagoa, 2570; Sangai, 2680; Illinika 2717, Kotopaxi, 2950; Antisana, 3020; Cagambeor, situated under the line, 3030; Cimboraso or Chimboraço, 3220. The last mentioned mountain, which forms part of the Cordilleras in Peru, is one of the largest and probably the highest in the world. It is seen at sea from the gulph of Guayaquil, which is more than sixty leagues distant.

Other very elevated mountains are Mont Sinai in Japan; Mont Caucasus in Asia; the southern peak of the Pyrenees; the peak of Teneriffe in one of the Canary islands, which according to M. Bouguer is 2100 toises (according to later observations, made by M. M. de Verdun, de Borda, and Pingré, French academicians, in 1754, the peak of Teyde, more commonly known by the name of the peak of Teneriffe, is only 1904 toises perpendicular height above the level of the sea); Mont Gibel or Etna in Sicily is 1672 toises; St. George's peak in the Azores; Adam's peak in Ceylon; the mountains of the Moon; Monts Athos, Olympus, Taurus, and Emaus; Mont Cenis in the Alps, on the road from France to Italy, is 1460 toises; the Great and Little Atlas; and many others, on the top of which we feel, even in the middle of summer, a more piercing cold than that of the severest frosts of our climates. After this, it cannot appear wonderful that the vapours which reach so great heights are there congealed; and, that the summits of these mountains, even in the warmest climates, are constantly covered with snow, while the inhabitants of the plain enjoy a temperate atmosphere, or are subject to extreme heat. The height of these mountains, added to their being placed on the most elevated parts of the globe, is the chief cause of the phenomena peculiar to them. In that part of Asia which is separated by the chain of mountains called the Ghauts, there are two very different seasons at one and the same time. While it is winter on the Malabar coast, for instance, the Coromandel coast, which has the same degree of elevation, and in some places is only twenty leagues distant, enjoys an agreeable spring or the temperature of autumn. The traveller in the Alps generally experiences, even in

* This is the greatest height to which any person is known to have ascended in America: the greatest elevation which has been reached in the Alps is the top of Mont Blanc, which is 2426 toises, and which Dr. Paccard ascended on the 8th of August 1786. M. de Saussure arrived there likewise on the 3d of August 1787, accompanied by seventeen persons.

summer,

ſummer, the four ſeaſons of the year. In the Andes we meet with a change of temperature no leſs curious; for, as we deſcend from their ſummit to their baſe, we experience all the varieties of heat and cold which are felt in every climate of the earth, at whatever ſeaſon*. There are many other mountainous countries in which we paſs at once from a ſerene ſky to dreadful ſtorms and tempeſts. It cannot therefore be doubted, that mountains have a great influence on the temperature of the countries to which they belong, by ſtopping the courſe of certain winds, by forming barriers to the clouds, by reflecting the ſun's rays, and by ſerving as elevated conductors to the electricity of the atmoſphere. It was formerly ſaid by travellers, that on the peak of Teneriffe they found that brandy loſt its ſtrength; that ſpirit of wine became almoſt inſipid; that pepper, ginger, and ſalt, had little or no taſte when applied to the tongue; but, it was alleged, that Canary wines ſtill retained their taſte on that mountain. Theſe ſtories appeared too marvellous not to require new experiments; and MM. de Lamanon and Mongez, who viſited this peak in 1785, tell us, that the flavour and taſte of liquors appeared to have ſuſtained no loſs at that height. At the foot, and ſometimes at the middle, of thoſe lofty mountains, the tops of which are always covered with ſnow, we frequently find ſprings which begin to run in May and dry up in September. When the ſun approaches near enough to the tropic to warm the ſummits of theſe mountains, the ſnow with which they are covered melts, filtrates through their interior parts, and iſſues forth at their baſe. The only trees which grow on mountains of this kind are firs, pines, and other reſinous trees; and the graſs becomes ſhorter towards their ſummit.

Mountains were not formed to be an uſeleſs load upon the earth, but evidently anſwer very important purpoſes; and we cannot enough admire their form and that kind of harmony which is diſcernible in their arrangement. Some of them, vomiting out fire or ſmoke, lava, and ſulphur, indicate that they in ſome meaſure anſwer

* The more we are elevated above the ſurface of the earth, it becomes the colder; and accordingly the tops of the higheſt mountains are always covered with ſnow. At the height of about 2300 toiſes above the level of the ſea no plant whatever is found to grow: and it appears from the obſervations of MM. de la Condamine, Bouguer, Godin, Dom George Juan, and Dom Antonio de Ulloa, the academicians ſent to Quito in 1735, that at the height of 2434 the ſnow is perpetual, and never melts at any time of the year even under the equator. The congelation begins and continues in all the mountains of the Cordilleras at the ſame height above the level of the ſea, which is determined by an equal elevation of the mercury in the barometer. But from experiments which have been made, Sir Iſaac Newton concludes, that the denſity of the atmoſphere at any height is as the weight of the incumbent air, that is, as the height of the mercury in the barometer; and conſequently the denſity of the air is the ſame in the whole region of the atmoſphere, where the congelation is continual, and where that perpetual cold commences which is felt on all mountains. Above this conſtant height the denſity of the air continues to diminiſh, and the cold becomes greater and greater till we reach the ſummits of the mountains, which preſent to our view all the horrors of winter as they are felt in the polar regions. But below this height, as the denſity of the air becomes greater in conſequence of being conſtantly preſſed upon by a great ſuperincumbent weight, the ſun's heat increaſes, ſo that thoſe who inhabit the plains at the foot of the mountain are expoſed to all the inconveniences of the torrid zone.

the purpose of a chimney to something within the earth, which, if confined, would burst it in pieces. Of this kind are Mont Hecla in Iceland, Mont Etna in Sicily, Mont Vesuvius in the kingdom of Naples, Pichincha and Cotopaxi in America, &c. Others, the summits of which reach into the clouds, attract and absorb the vapours of the sea, &c. which float in the air. It is observed by M. l'Abbé Palasson, that storms are most frequent at the foot of those high mountains which form extensive chains. Their enormous masses, which seem to support the heavens on their shoulders, arrest and fix the different meteors as they are formed. The clouds, in like manner, driven by the winds from different points of the horizon, there meet with impenetrable barriers, are there accumulated in great quantity, and remain suspended on these bulwarks of the globe's surface, till the agitation of the atmosphere, succeeding the calm, produces storms, which are so much the more terrible that they cannot expand and be dispersed but with great difficulty. They are commonly repelled from the mountains; and are then observed to spread over whole countries, to dissolve with peals of thunder, and to fall down in destructive hail-showers fatal to the harvest and to the whole produce of the fields. This scourge is peculiarly dreadful during the seasons of spring and summer, when a sufficient quantity of snow remains on the mountains to cool the atmosphere.

Some chains of mountains have openings; in others they are wanting: of the former kind are the straits of Thermopylæ, the Caspian straits, the pass of the Cordilleras, &c. Those spaces which separate the tops of mountains are so many basons destined for the reception of the condensed mists, and of the clouds precipitated into rain. The bowels of mountains appear to be great and inexhaustible reservoirs, and to contain subterraneous canals and lateral openings formed by the hand of nature, that the several species of animals may be supplied with drink, that the earth may be fertilised, and that nourishment may be afforded for the growth of vegetables. The streams and rivers descend from the ridges of mountains, the declivities of which form so many inclined plains: thus we find the Alps give rise to the Rhine, the Danube, the Rhone, and the Po.

Mountains of the first order form vast solitudes and horrid deserts, where the habitations of men are not to be seen, and their footsteps are seldom to be traced. By their grandeur, their elevation, the variety of their positions, the sublime and awful exhibition of wonders which they contain, they elevate the mind and fire the imagination of the observer. But these majestic eminences have other advantages which deserve our attention. They form the common retreat of a multitude of wild beasts, which are subservient to our use: there the bear, the lynx, the ermine, the martin, the fox, and many other animals, the skin of which we employ for furs, take up their abode; and thither the eagle and the vulture resort in safety. Mountains likewise afford nourishment to rein-deer, buffaloes, fallow-deer, roe-deer, and chamois; and they are visited by birds of passage which, under the guidance of instinct, follow the shortest road to the place of their destination. They produce medicinal plants, which almost never grow elsewhere. In Switzerland they are also covered with deep forests, which, by the great height of the trees, announce their antiquity. They afford both timber and fuel, and supply the inhabitants

inhabitants with abundance of excellent pasture for their bestial during the whole summer. The most precious stones, both for brilliancy and hardness, acquire their forms and colours in the fissures of the rocks: the internal rents of mountains are filled and in a manner cemented by different metallic substances; while the grottos are furnished with numerous congelations, shining crystals, and substances of an extraordinary nature and figure. In short, every thing concurs to shew, that the existence of mountains is absolutely necessary; and that, in order to acquire a proper knowledge of them, they must be considered in many different points of view. Their position, their direction, their elevation, the extent of their base, their figure, their various external windings, their internal structure; in a word, every thing relating to the theory of the globe, and to the different temperatures of the atmosphere, must engage the observer's attention; and by studying and carefully examining the general constitution of mountains, the particular facts which they present to our view, their influence, their action on the atmosphere, the different substances of which they are composed, together with the arrangement and mixture of these substances, we may at length discover the true mechanism of the earth.

The difficulty and danger of ascending to the tops of mountains proceeds not from the thinness of the air, as has been commonly reported; but the reason is, that they rise with such a rugged and precipitate ascent, that they are utterly inaccessible. In some places they appear like a great wall of six hundred or seven hundred feet high; in others, there stick out enormous rocks, that hang upon the brow of the steep, and every moment threaten destruction to the traveller below. In this manner almost all the tops of the highest mountains are bare and pointed: and this naturally proceeds from their being so continually assaulted by thunders and tempests. All the earthy substances with which they might have been once covered, have for ages been washed away from their summits; and nothing is left remaining but immense rocks, which no tempest has hitherto been able to destroy.

Nevertheless, time is every day and every hour making depredations; and huge fragments are seen tumbling down the precipice, either loosened from the summit by the frost or rains, or struck down by lightning. Nothing can exhibit a more terrible picture than one of these enormous rocks, commonly larger than an house, falling from its height with a noise louder than thunder, and rolling down the side of the mountain. Dr. Plot tells us of one in particular, which being loosened from its bed, tumbled down the precipice, and was partly shattered into a thousand pieces. Notwithstanding, one of the largest fragments of the same, still preserving its motion, travelled over the plain below, crossed a rivulet in the midst, and at last stopped on the other side of the bank! These fragments, as was said, are often struck off by lightning, and sometimes undermined by rains; but the most usual manner in which they are disunited from the mountain is by frost: the rains, insinuating between the interstices of the mountain, continue there until there comes a frost; and then, when converted into ice, the water swells with an irresistible force, and produces the same effect as gun-powder, splitting the most solid rocks, and thus shattering the summits of the mountain.

But

But not rocks alone, but whole mountains, are, by various causes, disunited from each other. We see, in many parts of the Alps, amazing clefs, the sides of which so exactly correspond with the opposite, that no doubt can be entertained of their having been once joined together. At Cajeta in Italy, a mountain was split in this manner by an earthquake; and there is a passage opened through it, that appears as if elaborately done by the industry of man. In the Andes these breaches are frequently seen. That at Thermopylæ in Greece has been long famous. The mountain of the Troglodytes in Arabia has thus a passage through it; and that in Savoy, which nature began and which Victor Amadeus completed, is an instance of the same kind.

We have accounts of some of these disruptions immediately after their happening. "In the month of June, in the year 1714, a part of the mountain of Diableret, in the district of Valais in France, suddenly fell down, between two and three o'clock in the afternoon, the weather being very calm and serene. It was of a conical figure, and destroyed fifty-five cottages in the fall. Fifteen persons, together with about one hundred beasts, were also crushed beneath its ruins, which covered an extent of a good league square. The dust it occasioned instantly covered all the neighbourhood in darkness. The heaps of rubbish were more than three hundred feet high. They stopped the current of a river that ran along the plain, which now is formed into several new and deep lakes. There appeared, through the whole of this rubbish, none of those substances that seemed to indicate that this disruption had been made by means of subterraneous fires. Most probably, the base of this rocky mountain was rotted and decayed; and thus fell, without any extraneous violence." In the same manner, in the year 1618, the town of Pleurs in France was buried beneath a rocky mountain, at the foot of which it was situated.

These accidents, and many more that might be enumerated of the same kind, have been produced by various causes: by earthquakes, as in the mountain at Cajeta; or by being decayed at the bottom, as at Diableret. But the most general way is, by the foundation of one part of the mountain being hollowed by waters, and, thus wanting a support, breaking from the other. Thus it generally has been found in the great chasms in the Alps; and thus it almost always is known in those disruptions of hills which are known by the name of land-slips. These are nothing more than the sliding down of an higher piece of ground, disrooted from its situation by subterraneous inundations, and settling itself upon the plain below.

There is not an appearance in all nature that so much astonished our ancestors as these land-slips. In fact, to behold a large upland, with its houses, its corn, and cattle, at once loosened from its place, and floating as it were upon the subjacent water; to behold it quitting its ancient situation, and travelling forward like a ship, in quest of new adventures; this is certainly one of the most extraordinary appearances that can be imagined; and, to a people ignorant of the powers of nature, might well be considered as a prodigy. Accordingly, we find all our old historians mentioning it as an omen of approaching calamities. In this more enlightened age, however, its cause is very well known; and, instead of exciting ominous apprehensions in the populace, it only gives rise to some very ridiculous

 law-

law-suits among them, about whose the property shall be; whether the land which has thus slipt shall belong to the original possessor or to him upon whose grounds it has encroached and settled. What has been the determination of the judges is not so well known; but the circumstances of the slips themselves have been minutely enough and exactly described.

In the lands of Slatberg, in the kingdom of Ireland, there stood a declivity gradually ascending for near half a mile. In the year 1713, and on the 10th of March, the inhabitants perceived a crack on its side, somewhat like a furrow made with a plough, which they imputed to the effects of lightning, as there had been thunder the night before. However, on the evening of the same day, they were surprised to hear an hideous confused noise issuing all around from the side of the hill; and, their curiosity being raised, they resorted to the place. There, to their amazement, they found the earth for near five acres all in gentle motion, and sliding down the hill upon the subjacent plain. This motion continued the remaining part of the day and the whole night: nor did the noise cease during the whole time; proceeding, probably, from the attrition of the ground beneath. The day following, however, this strange journey down the hill ceased entirely; and above an acre of the meadow below was found covered with what before composed a part of the declivity.

These slips, when a whole mountain's side seems to descend, happen but very rarely. There are some of another kind, however, much more common; and, as they are always sudden, much more dangerous. These are snow-slips, well-known and greatly dreaded by travellers. It often happens, that, when snow has long been accumulated on the tops and on the sides of mountains, it is borne down the precipice either by means of tempests or its own melting. At first, when loosened, the volume in motion is but small: but it gathers as it continues to roll; and, by the time it has reached the habitable parts of the mountain, it is generally grown of enormous bulk. Wherever it rolls, it levels all things in its way, or buries them in unavoidable destruction. Instead of rolling, it sometimes is found to slide along from the top; yet even thus it is generally as fatal as before. Nevertheless, we have had an instance, a few years ago, of a small family in Germany that lived for above a fortnight beneath one of these snow-slips. Although they were buried during that whole time in utter darkness, and under a bed of some hundred feet deep, yet they were luckily taken out alive, the weight of the snow being supported by a beam that kept up the roof, and nourishment supplied them by the milk of a she-goat that was buried under the same ruin.

DESCRIPTION OF THE CITY OF PEKIN.

IN our last we laid before our readers a brief account of Lord Macartney's embassy to China. The following particulars respecting Pekin will be found curious and interesting.

The capital of China is situated in a fertile plain about sixty or seventy miles from the famous wall, and is the ordinary residence of the emperors. Its name Pekin signifies the Court of the North, in distinction from Nankin, which means the Court of the South. The latter

latter was for many ages the residence of the emperors, until they found it absolutely necessary to remove northward, to be more at hand to repel the numerous incursions of the Tartars their restless neighbours.

Pekin is built in a square form, and divided into two cities; namely, Sin-Ching, or the New City, where the emperor commonly resides, and Lau-Ching, or the Old City. The new city, which was built in 1405, is chiefly inhabited by Tartars who made good their settlement in the empire.—The old by Chinese. The walls of the new city are stately, and worthy of the capital of the greatest empire of the world: those of the old are less so, and similar to those of other Chinese cities. A horseman may ascend the walls of the new city by means of a path, intended for the purpose. In several places there are houses built for a corps-de-garde. The towers are within bow-shot of each other. Some, larger than the rest, contain detachments of troops.

The gates of the city, which are nine in number, are lofty and well arched, and support very large pavilions nine stories high, each story being furnished with windows and loop-holes. The lowest story is for the retreat of the officers and soldiers of the guard. Before each gate there is an open area or parade about three hundred and sixty feet, encompassed by a semi-circular wall of equal height and breadth with that of the city: it serves as a deposit for arms. This parade has no access from the great road, and is commanded by the cannon of the pavilion. There is also another pavilion like the former to command the road; so that each gate is provided with two pavilions, and the cannon of the one can play upon the city, while those of the other can scour the neighbouring territory.

The streets of Pekin are perfectly straight, about a league in length, and one hundred and twenty feet wide. The houses are generally only one story high, and make a mean appearance. The shops, however, on both sides are neat, and in riches perhaps excel most in Europe. The entrance into them is adorned with gildings, sculptures, paintings, and japannings, in a manner which charms the eye. The streets are crowded with infinite multitudes of people, among whom not one woman is to be seen; and it is astonishing to see the confusion caused by the surprising number of horses, mules, asses, camels, waggons, and chairs, without reckoning the various crowds of men, one hundred and two hundred in a cluster, which are every now and then met with, either collected about some fortune-teller, or juggler with cups and balls, or listening to ballad-singers, and others who repeat ludicrous stories for their diversion, or else gaping at quacks, who distribute their medicines, and are very eloquent in the display of their admirable effects. Were it not for a horseman who goes before to clear the way, people of distinction would be stopped every moment.

Pekin is the great mart of all the riches and commodities of the empire. People are carried through the streets in chairs by men, others on horses, which here stand in the streets for hire, like coaches in London, and may be had for six-pence or seven-pence a day—the owner, when desired, leads the horse by the bridle to any part of the city, and is acquainted with the residences of all the principal people.

The police is wonderfully well conducted, insomuch, that the most perfect harmony prevails among the millions of Tartars and Chinese. Many years pass without an instance of house-breaking or murder; and so strict are the regulations, that the perpetrator of any crime cannot possibly escape punishment. In the great streets there are guard-houses of soldiers, who day and night parade the city with swords and whips, chastising, without distinction, all whom they find making any disturbance. Even the small streets are overlooked by the soldiers from the large ones, from which they are separated by cross-barred gates, which are shut up every night, so that none of the inhabitants can possibly leave their own district. They are never opened in the night, unless the person has a lanthorn in his hand, and assigns a sufficient cause, such as the want of a physician; so that here there are no midnight revels and assemblies as in the large cities of Europe. Were even those belonging to the emperor's palace to be found in the streets at improper hours, they would be taken into custody.

The streets are kept very clean, for the soldiers, besides watching in the night, see that every person cleans before his door, and sweeps and waters every morning and evening in dry weather, removing the dirt after rain. The soldiers are also employed in cleansing the middle of the streets, after they have taken up the dirt; for the city is not paved: they either beat it, or dry it by turning, or else mix it up with other dry earth, insomuch that within two hours after the heaviest rains, a person may walk all over the city without soiling his shoes. This however is chiefly spoken of the streets of the new city; for those of the old are narrower, and have not the advantage of the soldiers to clean them.

The center of the new city is inclosed by another wall, low and narrow, but adorned with large gates, called *Wang-chin*, that is the Imperial wall. Its southern gate forms that of the palace, and is about one hundred fathoms from the principal gate of the city, the scite of which is due south.

The imperial palace covers a large tract of ground, and consists of a prodigious assemblage of large buildings, spacious courts and gardens, inclosed within a brick-wall, which has battlements along the curtains, and is adorned with small pavilions at the angles. Over each gate there is a pavilion, stronger and more lofty than the former, surrounded by a gallery supported by pillars. This is what is properly called the palace, as it contains the apartments of the emperor and his family. Without the palace, and between its inclosure and the first wall, are the residences of the officers of the household and the eunuchs—the tribunals of justice are also there.—The architecture of the palace is very different from the European stile. Nevertheless it is vast, and strikes the eye by the regular disposition of the apartments, and the structure of the roofs, which have four sides rising very high, adorned on the supports with a border of flower-work turned up at the ends: the whole covered with varnished tiles of so beautiful a yellow, that they appear at a distance to be gilt. A second roof, equally glittering, rises from the walls, and goes quite round, supported by an immense number of beams, joints, and spars, all japanned, of a green colour, and ornamented with gold figures. This second roof, with the projection of the first, makes a kind of crown to the buildings, and has a very fine effect. The splendid

effect

effect of the whole, producing one entire structure, is extremely magnificent, perfectly august, and worthy of the greatest empire upon earth. The terraces upon which the apartments are constructed essentially contribute to the general air of grandeur: these are fifteen feet from the ground, are cased with white marble, adorned with balustrades, and are open only at the entrance of the staircases, which are placed on the sides, and in the middle and corners of the front.

The entrance in the middle is a slope of marble, not stairs. This is the emperor's exclusively—no one else is allowed to enter by it; and on public days he is conveyed this way into his palace, in a covered chair.

The terraces extend from east to west, and form, before the doors and windows of the apartments, a very broad platform paved with marble, and projecting in every direction eight feet beyond the building. In the outer court, fronting the imperial hall, the mandarins range themselves on appointed days, to renew their homage and perform the prescribed ceremonies; and this they do whether the emperor be present or not.—It is customary for them even in his absence to lay their foreheads on the ground before the gates of the palace, with the same formality as if they were before the emperor on his throne.

The royal halls are about one hundred and thirty feet square, their cielings being of carved work, varnished with green, and adorned with gilt dragons. The pillars which support the roof within are six or seven feet in circumference at the base, and crusted over with a kind of paste, japanned with red. The pavement is partly covered with carpets, similar to those of Turkey: the walls are white, but without hangings, paintings, or looking-glasses.

The throne is in the middle of the hall, and consists of a lofty alcove, very neat, but neither rich nor magnificent. It has inscribed upon it the word, *Shing*, which, in its most usual acceptation, signifies *holy*, but, as applied to the emperor, denotes *excellent*, *perfect*, *most wise*. On the platform in front are very capacious brazen vessels, in which perfumes are burnt during ceremonies; and candlesticks shaped like birds, large enough to hold flambeaux. Besides the large hall there are two smaller, in which the emperor frequently reposes or robes himself—one of these is of a circular form, with windows looking every way, and a door facing the north, through which the emperor passes when going to the throne to receive the homage of the empire. On this occasion he is carried in a chair, the bearers of which are dressed in red vests, embroidered with silk, and caps ornamented with feathers,

The court before the great imperial hall is about three hundred feet long, and two hundred and fifty wide. It is surrounded by a gallery, over which are the imperial museums, which are opened on certain occasions—such as coronations, &c. In one of these are kept vases, and other works in metals. In another, large quantities of beautiful furs. A third contains magnificent garments, adorned with costly furs, with which the emperor sometimes rewards his servants. In a fourth are kept precious stones, marbles, and pearls, found in Tartary. In the largest of all, which consists of two stories, are presses, in which are kept the silks fabricated for the use of the emperor, and his family, under the inspection of a mandarin, who would

would be punished if they were not as highly finished as possible. There are other store-houses, in which are deposited bows, arrows, and horse-furniture, either made at Pekin, or brought from foreign countries as presents to the emperor. There is one also in which the choicest teas, drugs, and other productions of China, are kept.

Next to the imperial palace are those of the emperor's children, and other princes of the blood. They are very neat within, extremely capacious, and have been built at a vast expence. With respect to the buildings and embellishments, the same stile pervades the whole. The former consists of a series of courts, adorned on the sides with buildings, and in the front with a varnished hall raised on a platform, three or four feet high, bordered by large square blocks of hewn stone, and paved with square tiles. The gates open into little streets, not much frequented, and have no other ornaments, besides two lions of white stone, of indifferent workmanship, without any order of architecture, or sculpture in stone, such as is found in the triumphal arches in China.

The tribunals of the supreme jurisdictions are also very large, but ill built, and in no way suitable to the splendour of the empire. They are six in number, and to each is committed a particular superintendence.

The Chinese call their empire—*Tien Hia*, or *Su hui Chinun*, i. e. All *that is under the canopy of Heaven*, or *between the four seas*. They give to their emperors most lofty and magnificent titles, such as Holy Son of Heaven, Sovereign of the Empire, Lord of Ten Thousand Years: notwithstanding all this, say the Chinese writers, our monarch is neither so vain as the Prince of Monomotopa, who thinks he has the power of commanding the sun, moon, or stars; nor so ambitiously politic as the King of Siam, who, knowing by experience that the great river which crosses his country, at a certain period, annually overflows its banks, and that at a certain time it returns, marches forth in great pomp and state, attended by a numerous band, and, when he arrives at the place where the river overflows, commands the waters to retreat, and flow back to the sea in their regular current, in the space of three days.

Father Magellant, who resided many years in the court of Pekin, asserts, that there are annually carried into the magazines of the court the following articles:

1. Forty three millions three hundred twenty-eight thousand eight hundred thirty-four sacks of wheat and rice.

2. Thirteen hundred and fifteen thousand nine hundred and thirty seven loaves of salt, each loaf weighing fifty pounds.

3. Two hundred and fifty-eight pounds of very fine vermillion.

4. Fourscore and fourteen thousand seven hundred thirty-seven pounds of varnish.

5. Thirty-eight thousand five hundred and fifty pounds of dried fruits, as raisins, figs, walnuts, &c.

Into the king's wardrobe are annually brought:

1. Sixteen hundred fifty five thousand four hundred thirty-two pieces of silk of several colours, as velvets, satins, damasks, and other sorts, not including the royal habits which are brought in barks.

2. Four hundred seventy-six thousand two hundred and seventy pieces of slight silk, such as the Chinese wear in summer.

3. Two

3. Two hundred ſeventy-two thouſand nine hundred and two pounds of raw ſilk.

4. Three hundred fourſcore and fifteen thouſand four hundred fourſcore pieces of cotton cloth.

5. Four hundred ſixty-four thouſand two hundred and ſeventeen pounds of cotton.

6. Fifty thouſand two hundred and fourſcore pieces of flaxen cloth.

ACCOUNT OF PETER THE WILD BOY.

PETER, commonly known by the name of Peter the Wild Boy, was found in the woods near Hamelen, a fortified town in the electorate of Hanover, in 1725, when his majeſty George I. with his attendants, was hunting in the foreſt of Hertſwold. He was ſuppoſed to be then about twelve years of age, and had ſubſiſted in thoſe woods upon the bark of trees, leaves, berries, &c. for ſome conſiderable length of time. How long he had continued in that wild ſtate is altogether uncertain; but that he had formerly been under the care of ſome perſon was evident from the remains of a ſhirt-collar about his neck at the time when he was found. As Hamelen was a town where criminals were confined to work upon the fortifications, it was then conjectured at Hanover, that Peter might be the iſſue of one of thoſe criminals, who had either wandered into the woods, and could not find his way back again; or, being diſcovered to be an ideot, was inhumanly turned out by his parents, and left to periſh, or ſhift for himſelf. In the following year, 1726, he was brought over to England, by the order of Queen Caroline, then Princeſs of Wales, and put under the care of Dr. Arbuthnot. But, notwithſtanding there appeared to be no natural defect in his organs of ſpeech, after all the pains that had been taken with him he could never be brought diſtinctly to articulate a ſingle ſyllable, and proved totally incapable of receiving any inſtruction. He was afterwards intruſted to the care of Mrs. Titchbourn, one of the queen's bedchamber women, with a handſome penſion annexed to the charge. Mrs. Titchbourn uſually ſpending a few weeks every ſummer at the houſe of Mr. James Fenn, a yeoman farmer, at Axter's End, near Northchurch, Peter was left to the care of the ſaid Mr. Fenn, who was allowed thirty-five pounds a year for his ſupport and maintenance. After the death of James Fenn, he was tranſferred to the care of his brother, Thomas Fenn, at another farm-houſe in the ſame pariſh, called Broadway, where he lived with the ſeveral ſucceſſive tenants of that farm, and with the ſame proviſion allowed by government, to the time of his death, Feb. 22, 1785, when he was ſuppoſed to be about ſeventy-two years of age.

Peter was well made, and of the middle ſize. His countenance had not the appearance of an ideot, nor was there any thing particular in his form, except that two of the fingers of his left hand were united by a web up to the middle joint. He had a natural ear for muſic, and was ſo delighted with it, that, if he had heard any muſical inſtrument played upon, he would immediately dance and caper about till he was almoſt quite exhauſted with fatigue; and, though

though he could never be taught the diſtinct utterance of any word, yet he could eaſily learn to hum a tune.—All thoſe idle tales which have been publiſhed to the world about his climbing up trees like a ſquirrel, running upon all fours like a wild beaſt, &c. are entirely without foundation; for he was ſo exceedingly timid and gentle in his nature, that he would ſuffer himſelf to be governed by a child. There have been alſo many falſe ſtories propagated of his incontinence; but, from the minuteſt inquiries among thoſe who conſtantly lived with him, it does not appear that he ever diſcovered any natural paſſion for women, though he was ſubject to the other paſſions of human nature, ſuch as anger, joy, &c. Upon the approach of bad weather he always appeared ſullen and uneaſy. At particular ſeaſons of the year, he ſhewed a ſtrange fondneſs for ſtealing away into the woods, where he would feed eagerly upon leaves, beech-maſt, acorns, and the green bark of trees; which proves evidently that he had ſubſiſted in that manner for a conſiderable length of time before he was firſt taken. His keeper therefore at ſuch ſeaſons generally kept a ſtrict eye over him, and ſometimes even confined him, becauſe, if he ever rambled to any diſtance from his home, he could not find his way back again; and once in particular, having gone beyond his knowledge, he wandered as far as Norfolk, where he was taken up, and, being carried before a magiſtrate, was committed to the houſe of correction in Norwich, and puniſhed as a ſturdy and obſtinate vagrant, who would not (for indeed he could not) give any account of himſelf: but, Mr. Fenn having advertiſed him in the public papers, he was releaſed from his confinement, and brought back to his uſual place of abode.

Notwithſtanding the extraordinary and ſavage ſtate in which Peter was firſt found greatly excited the attention and curioſity of the public; yet, after all that has been ſaid of him, he was certainly nothing more than a common ideot without the appearance of one. But as men of ſome eminence in the literary world have in their works publiſhed ſtrange opinions and ill-founded conjectures about him, which may ſeem to ſtamp a credit upon what they have advanced; that poſterity may not, through their authority, be hereafter miſled upon the ſubject, this ſhort and true account of Peter is recorded in the pariſh regiſter by one who conſtantly reſided above thirty years in his neighbourhood, and had daily opportunities of ſeeing and obſerving him.

A braſs-plate is fixed up in the pariſh church of North Church, Herts, where he lies buried, on the top of which is a ſketch of the head of Peter, drawn from a very good engraving of Bartolozzi, and underneath it is the following inſcription:

"To the memory of Peter, known by the name of the Wild Boy, having been found wild in the foreſt of Hertſwold, near Hanover, in the year 1725. He then appeared to be about twelve years old. In the following year he was brought to England by the order of the late Queen Caroline, and the ableſt maſters were provided for him. But, proving incapable of ſpeaking, or of receiving any inſtruction, a comfortable proviſion was made for him at a farm-houſe in this pariſh, where he continued to the end of his inoffenſive life. He died on the 22d day of February, 1785, ſuppoſed to be aged 72."

ACCOUNT OF THE CASCADE OF VELINO, IN ITALY.

With an elegant Copper-Plate Engraving.

THE river Nera taking its course near the castle of Arona, where there is a stone bridge, encreases to a great size, till it falls with astonishing noise and velocity into the lake of Velino, commonly called the lake of *Piè di Luco*. When this majestic cascade is seen from the valley below, there always appears in the air a rainbow, with a thick mist formed by the dashing of the waters, divided into the minutest drops by their precipitate fall, and various percussions among the rocks.

The river Velino issues from two sources. The first is at a great distance from the place in question, rising near *Civita Ducale*; the other begins near the castle of *Antrodoco*, where these two fountains being united, they traverse the country of Riety. At a little distance from that city the river Velino, being encreased from other sources, forms the lake of *Piè di Luco*, called by Tacitus the lake *Velinus*. Before the waters of the adjacent sources enter the Velino, they first form a marsh, and from thence flow into the lake, where being collected in great abundance, it was necessary to give them vent, to prevent their deluging the circumjacent country; the Romans therefore cut that passage through the rock, through which the waters descend with such rapidity. The lake has taken the modern name of *Piè di Luco*, from a little castle so called, situated on its banks to the left. The situation of this lake is upon a high mountain, on every side surrounded by hills; its waters are clear, but so much impregnated with a petrifying quality, that it is constantly requisite to keep the passage open by cutting the rock through which the waters fall into the subjacent valley. It is also stored with excellent fish; and round it are many little towns, from whence boats are continually passing from one to the other. Leander Alberti is of opinion, that the lines of Virgil,

Est locus Italiæ medio sub montibus altis, &c.

refer to this lake, and to the cascade of Marmore as it is commonly called. But of this there are a variety of opinions, the most probable of which is, that the place in question is situated among the Sabini.

HISTORY OF GHOSTS.

THE ancients supposed every man to be possessed of three different ghosts, which after the dissolution of the human body were differently disposed of. These three ghosts are distinguished by the *Manes, Spiritus, Umbra*. The *manes*, they fancied, went down into the infernal regions; the *spiritus* ascended to the skies; and the *umbra* hovered about the tomb, as being unwilling to quit its old connections. Thus Dido (Virg. Æn. iv. 384) threatens Æneas after death that she will haunt him with her umbra, whilst her manes rejoice in his torments below. This idea of a threefold soul is very clearly expressed in these lines, which have been attributed to Ovid.

Bis duo sunt homini: MANES, CARO, SPIRITUS, UMBRA:
Quatuor ista loci bis duo suscipiunt
Terra tegit CARNEM, *tumulum circumvolat* UMBRA,
Orcus habet MANES, SPIRITUS *astra petit.*

The moſt ſtriking outlines of the popular ſuperſtitions reſpecting ghoſts among us, are thus humorouſly collected by Captain Groſe in his Provincial Gloſſary: "A ghoſt is ſuppoſed to be the ſpirit of a perſon deceaſed, who is either commiſſioned to return for ſome eſpecial errand, ſuch as the diſcovery of a murder, to procure reſtitution of lands or money unjuſtly with-held from an orphan or widow—or, having committed ſome injuſtice whilſt living, cannot reſt till that is redreſſed. Sometimes the occaſion of ſpirits reviſiting this world, is to inform their heir in what ſecret place, or private drawer in an old trunk, they had hidden the title-deeds of the eſtate; or where, in troubleſome times, they buried their money or plate. Some ghoſts of murdered perſons, whoſe bodies have been ſecretly buried, cannot be at eaſe till their bones have been taken up, and depoſited in conſecrated ground with all the rites of Chriſtian burial.

Sometimes ghoſts appear in conſequence of an agreement made, whilſt living, with ſome particular friend, that he who firſt died ſhould appear to the ſurvivor.

Glanvil tells us of the ghoſt of a perſon who had lived but a diſorderly kind of life, for which it was condemned to wander up and down the earth, in the company of evil ſpirits, till the day of judgment.

In moſt of the relations of ghoſts, they are ſuppoſed to be mere aerial beings, without ſubſtance, and that they can paſs through walls and other ſolid bodies at pleaſure. A particular inſtance of this is given, in relation the 27th, in Glanvil's Collection, where one David Hunter, neat-herd to the Biſhop of Down and Conner, was for a long time haunted by the apparition of an old woman, whom he was by a ſecret impulſe obliged to follow whenever ſhe appeared, which he ſays he did for a conſiderable time, even if in bed with his wife: and, becauſe his wife could not hold him in his bed, ſhe would go too, and walk after him till day, though ſhe ſaw nothing; but his little dog was ſo well acquainted with the apparition, that he would follow it as well as his maſter. If a tree ſtood in her walk, he obſerved her always to go through it. Notwithſtanding this ſeeming immateriality, this very ghoſt was not without ſome ſubſtance; for, having performed her errand, ſhe deſired Hunter to lift her from the ground; in the doing of which, he ſays, ſhe felt juſt like a bag of feathers. We ſometimes alſo read of ghoſts ſtriking violent blows; and that, if not made way for, they overturn all impediments, like a furious whirlwind. Glanvil mentions an inſtance of this, in relation 17th, of a Dutch lieutenant who had the faculty of ſeeing ghoſts; and who, being prevented making way for one which he mentioned to ſome friends as coming towards them, was, with his companions, violently thrown down, and ſorely bruiſed. We further learn, by relation 16th, that the hand of a ghoſt is 'as cold as a clod.'

The uſual time at which ghoſts make their appearance is midnight, and ſeldom before it is dark; though ſome audacious ſpirits have been ſaid to appear even by day-light: but of this there are few inſtances, and thoſe moſtly ghoſts who have been laid, perhaps in the Red Sea (of which more hereafter), and whoſe times of confinement were expired: theſe, like felons confined to the lighters, are ſaid to return more troubleſome and daring than before. No ghoſts can appear on Chriſtmas eve; this Shakeſpeare has put into the mouth of one of his characters in Hamlet.

Ghoſts

Ghosts commonly appear in the same dress they usually wore whilst living, though they are sometimes clothed all in white; but that is chiefly the church-yard ghosts, who have no particular business, but seem to appear *pro bono publico*, or to scare drunken rustics from tumbling over their graves.

I cannot learn that ghosts carry tapers in their hands, as they are sometimes depicted, though the room in which they appear, if without fire or candle, is frequently said to be as light as day. Dragging chains is not the fashion of English ghosts; chains and black vestments being chiefly the accoutrements of foreign spectres seen in arbitrary governments: dead or alive, English spirits are free. One instance, however, of an English ghost dressed in black, is found in the celebrated ballad of William and Margaret, in the following lines:

And clay-cold was her lily hand,
That held her *sable shrowd*.

This, however, may be considered as a poetical licence, used in all likelihood for the sake of the opposition of *lily* to *sable*.

If, during the time of an apparition, there is a lighted candle in the room, it will burn extremely blue: this is so universally acknowledged, that many eminent philosophers have busied themselves in accounting for it, without once doubting the truth of the fact. Dogs too have the faculty of seeing spirits, as is instanced in David Hunter's relation above quoted; but in that case they usually shew signs of terror, by whining and creeping to their master for protection: and it is generally supposed that they often see things of this nature when their owner cannot; there being some persons, particularly those born on a Christmas eve, who cannot see spirits.

The coming of a spirit is announced some time before its appearance, by a variety of loud and dreadful noises; sometimes rattling in the old hall like a coach and six, and rumbling up and down the staircase like the trundling of bowls or cannon balls. At length the door flies open, and the spectre stalks slowly up to the bed's foot, and, opening the curtains, looks stedfastly at the person in bed by whom it is seen; a ghost being very rarely visible to more than one person, although there are several in company. It is here necessary to observe, that it has been universally found by experience, as well as affirmed by diverse apparitions themselves, that a ghost has not the power to speak till it has been first spoken to; so that, notwithstanding the urgency of the business on which it may come, every thing must stand still till the person visited can find sufficient courage to speak to it: an event that sometimes does not take place for many years. It has not been found that female ghosts are more loquacious that those of the male sex, both being equally restrained by this law.

The mode of addressing a ghost is by commanding it, in the name of the Three Persons of the Trinity, to tell you who it is, and what is its business: this it may be necessary to repeat three times; after which it will, in a low and hollow voice, declare its satisfaction at being spoken to, and desire the party addressing it not to be afraid, for it will do him no harm. This being premised, it commonly enters into its narrative; which being completed, and its request or commands given, with injunctions that they be immediately executed, it vanishes away, frequently in a flash of light; in which case, some ghosts have been so considerate as to desire the party to whom they ap-

peared to shut their eyes: sometimes its departure is attended with delightful music. During the narration of its business, a ghost must by no means be interrupted by questions of any kind; so doing is extremely dangerous: if any doubts arise, they must be stated after the spirit has done its tale. Questions respecting its state, or the state of any of their former acquaintance, are offensive, and not often answered; spirits perhaps being restrained from divulging the secrets of their prison-house. Occasionally spirits will even condescend to talk on common occurrences, as is instanced by Glanvil in the apparition of Major George Sydenham to Captain William Dyke, relation 10th, wherein the major reproved the captain for suffering a sword he had given him to grow rusty; saying, 'Captain, captain, this sword did not use to be kept after this manner when it was mine.' This attention to the state of arms, was a remnant of the major's professional duty when living.

It is somewhat remarkable that ghosts do not go about their business like the persons of this world. In cases of murder, a ghost, instead of going to the next justice of peace, and laying its information, or to the nearest relation of the person murdered, appears to some poor labourer who knows none of the parties, draws the curtains of some decrepit nurse or alms-woman, or hovers about the place where his body is deposited. The same circuitous mode is pursued with respect to redressing injured orphans or widows; when it seems as if the shortest and most certain way would be, to go to the person guilty of the injustice, and haunt him continually till he be terrified into a restitution. Nor are the pointing out lost writings generally managed in a more summary way; the ghost commonly applying to a third person, ignorant of the whole affair, and a stranger to all concerned. But it is presumptuous to scrutinize too far into these matters: ghosts have undoubtedly forms and customs peculiar to themselves.

If, after the first appearance, the persons employed neglect, or are prevented from, performing the message or business committed to their management, the ghost appears continually to them, at first with a discontented, next an angry, and at length with a furious, countenance, threatening to tear them in pieces if the matter is not forthwith executed; sometimes terrifying them, as in Glanvil's relation 26th, by appearing in many formidable shapes, and sometimes even striking them a violent blow. Of blows given by ghosts there are many instances, and some wherein they have been followed with an incurable lameness.

It should have been observed, that ghosts, in delivering their commissions, in order to ensure belief, communicate to the persons employed some secret, known only to the parties concerned and themselves, the relation of which always produces the effect intended. The business being completed, ghosts appear with a cheerful countenance, saying they shall now be at rest, and will never more disturb any one; and, thanking their agents, by way of reward communicate to them something relative to themselves, which they will never reveal.

Sometimes ghosts appear, and disturb a house, without deigning to give any reason for so doing: with these, the shortest and only way is to exorcise and eject them; or, as the vulgar term is, lay them.

them. For this purpose there must be two or three clergymen, and the ceremony must be performed in Latin; a language that strikes the most audacious ghost with terror. A ghost may be laid for any term less than an one hundred years, and in any place or body, full or empty; as, a solid oak—the pommel of a sword—a barrel of beer, if a yoeman or simple gentleman—or a pipe of wine, if an esquire or a justice. But of all places the most common, and what a ghost least likes, is the Red Sea; it being related, in many instances, that ghosts have most earnestly besought the exorcists not to confine them in that place. It is nevertheless considered as an indisputable fact, that there are an infinite number laid there, perhaps from its being a safer prison than any other nearer at hand; though neither history nor tradition gives us any instance of ghosts escaping or returning from this kind of transportation before their time.

Another species of human apparition may be here noticed, though it does not come under the strict description of a ghost. These are the exact figures and resemblances of persons then living, often seen not only by their friends at a distance, but many times by themselves; of which there are several instances in Aubery's Miscellanies: one of Sir Richard Napier, a physician of London, who being on the road from Bedfordshire to visit a friend in Berkshire, saw at an inn his own apparition lying on his bed as a dead corpse; he nevertheless went forward, and died in a short time: another of Lady Diana Rich, daughter of the Earl of Holland, who met her own apparition walking in a garden at Kensington, and died a month after of the small-pox. These apparitions are called *fetches*; in Cumberland, *swarths*; and in Scotland, *wraiths*: they most commonly appear to distant friends and relations, at the very instant preceding the death of the person whose figure they put on. Sometimes, as in the instances above-mentioned, there is a greater interval between the appearance and death." We shall enter more particularly in this subject, in some future Magazine, in a Philosophical Enquiry concerning Apparitions and Spectres.

DEFINITION OF THE CAUSES OF LAUGHTER.

LAUGHTER is an affection peculiar to mankind, occasioned by something that tickles the fancy. In laughter, the eye-brows are raised about the middle, and drawn down next the nose; the eyes are almost shut; the mouth opens and shews the teeth, the corners of the mouth being drawn back and raised up; the cheeks seem puffed up, and almost hide the eyes; the face is usually red, the nostrils are open; and the eyes wet.

Authors attribute laughter to the fifth pair of nerves, which sending branches to the eye, ear, lips, tongue, palate, and muscles of the cheek, parts of the mouth, præcordia, &c. there hence arises a sympathy, or consent, between all these parts; so that when one of them is acted upon, the others are proportionably affected. Hence a savoury thing seen, or smelt, affects the glands, and parts of the mouth; a thing seen, or heard, that is shameful, affects the cheeks with blushes: on the contrary, if it please and tickle the fancy, it affects the præcordia, and muscles of the mouth and face with laughter; if it cause sadness and melancholy, it likewise affects the

the præcordia, and demonstrates itself by causing the glands of the eyes to emit tears. Dr. Willis accounts for the pleasure of kissing from the same cause; the branches of this fifth pair being spread to the lips, the præcordia, and the genital parts; whence arises a sympathy between those parts.

The affection of the mind by which laughter is produced is seemingly so very different from the other passions with which we are endowed, that it hath engaged the attention of very eminent persons to find it out.—1. Aristotle, in the fifth chapter of his Poetics, observes of comedy, that "it imitates those vices or meannesses only which partake of the ridiculous:—now the ridiculous consists of some fault or turpitude not attended with great pain, and not destructive." 2. "The passion of laughter (says Mr. Hobbes) is nothing else but sudden glory arising from some sudden conception of some eminency in ourselves, by comparison with the infirmity of others, or with our own formerly. For men laugh at the follies of themselves past, when they come suddenly to remembrance, except when we bring with them any sudden dishonour." 3. Akenside, in the third book of his excellent poem, treats of ridicule at considerable length. He gives a detail of ridiculous characters; ignorant pretenders to learning, boastful soldiers, and lying travellers, hypocritical churchmen, conceited politicians, old women that talk of their charms and virtue, ragged philosophers who rail at riches, virtuosi intent upon trifles, romantic lovers, wits wantonly satirical, fops that out of vanity appear to be diseased and profligate, dastards who are ashamed or afraid without reason, and fools who are ignorant of what they ought to know. Having finished the detail of characters, he makes some general remarks on the cause of ridicule; and explains himself more fully in a prose definition illustrated by examples. The definition, or rather description, is in these words: "That which makes objects ridiculous, is some ground of admiration or esteem connected with other more general circumstances comparatively worthless or deformed: or it is some circumstance of turpitude or deformity connected with what is in general excellent or beautiful; the inconsistent properties existing either in the objects themselves, or in the apprehension of the person to whom they relate; belonging always to the same order or class of being; implying sentiment and design, and exciting no acute or vehement commotion of the heart."—4. Hutcheson has given another account of the ludicrous quality, and seems to think that it is the contrast or opposition of dignity and meanness which occasions laughter.

All these opinions are refuted by Dr. Beattie in his Essay on Laughter and Ludicrous Composition, where he has treated the subject in a masterly manner. "To provoke laughter, is not essential either to wit or humour. For though that unexpected discovery of resemblance between ideas supposed dissimilar, which is called wit,—and that comic exhibition of singular characters, sentiments, and imagery, which is denominated humour,—do frequently raise laughter, they do not raise it always. Addison's poem to Sir Godfrey Kneller, in which the British kings are likened to heathen gods, is exquisitely witty, and yet not laughable. Pope's Essay on Man abounds in serious wit; and examples of serious humour are not uncommon in Fielding's History of Parson Adams, and in Addison's account of Sir Roger de Coverley. Wit, when the subject is grave, and the al-

lusions sublime, raises admiration instead of laughter: and, if the comic singularities of a good man appear in circumstances of real distress, the imitation of these singularities in the epic or dramatic comedy will form a species of humour, which, if it should force a smile, will draw forth a tear at the same time. An inquiry, therefore, into the distinguishing characters of wit and humour has no necessary connection with the present subject.

Some authors have treated of ridicule, without marking the distinction between ridiculous and ludicrous ideas. But I presume the natural order of proceeding in this inquiry, is to begin with ascertaining the nature of what is purely ludicrous. Things ludicrous and things ridiculous have this in command, that both excite laughter; but the former excite pure laughter, the latter excite laughter mixed with disapprobation and contempt. My design is to analyse and explain that quality in things or ideas, which makes them provoke pure laughter, and intitles them to the name of ludicrous or laughable.

When certain objects, qualities, or ideas, occur to our senses, memory, or imagination, we smile or laugh at them, and expect that other men should do the same. To smile on certain occasions is not less natural, than to weep at the sight of distress, or cry out when we feel pain.

There are different kinds of laughter. As a boy, passing by night through a church-yard, sings or whistles in order to conceal his fear even from himself; so there are men, who, by forcing a smile, endeavour sometimes to hide from others, and from themselves too perhaps, their malevolence or envy. Such laughter is unnatural. The sound of it offends the ear; the features distorted by it seem horrible to the eye. A mixture of hypocrisy, malice, and cruel joy, thus displayed on the countenance, is one of the most hateful sights in nature, and transforms the "human face divine" into the visage of a fiend. Similar to this is the smile of a wicked person pleasing himself with the hope of accomplishing his evil purposes. Milton gives a striking picture of it in that well-known passage:

> He ceas'd; for both seem'd highly pleas'd; and Death
> Grinn'd horrible a ghastly smile, to hear
> His famine should be fill'd, and blest his maw
> Destin'd to that good hour.——

But enough of this. Laughter that makes man a fiend or a monster, I have no inclination to analyse. My inquiries are confined to that species of laughter which is at once natural and innocent.

Of this there are two sorts. The laughter occasioned by tickling or gladness is different from that which arises on reading the Tale of a Tub. The former may be called animal-laughter: the latter (if it were lawful to adopt a new word which has become very common of late) I should term sentimental. Smiles admit of similar divisions. Not to mention the scornful, the envious, the malevolent, smile, I would only remark, that of the innocent and agreeable smile, there are two sorts. The one proceeds from the risible emotion, and has a tendency to break out into laughter. The other is the effect of good-humour, complacency, and tender affection. This last sort of smile renders a countenance amiable in the highest degree. Homer ascribes it to Venus in an epithet, which Dryden and Pope, after Waller,

Waller, improperly translate laughter-loving; an idea that accords better with the character of a romp or hoyden than with the goddess of love and beauty.

Animal-laughter admits of various degrees; from the gentle impulse excited in a child by moderate joy, to that terrifying and even mortal convulsion which has been known to accompany a change of fortune. This passion may, as well as joy and sorrow, be communicated by sympathy; and I know not whether the entertainment we receive from the playful tricks of kittens and other young animals may not in part be resolved into something like a fellow feeling of their vivacity.—Animal and sentimental laughter are frequently blended; but it is easy to distinguish them. The former is often excessive; the latter never, unless heightened by the other. The latter is always pleasing, both in itself and in its cause; the former may be painful in both. But their principal difference is this:—The one always proceeds from a sentiment or emotion excited in the mind, in consequence of certain ideas or objects being presented to it, of which emotion we may be conscious even when we suppress laughter;—the other arises not from any sentiment or perception of ludicrous ideas, but from some bodily feeling, or sudden impulse on what is called the animal spirits, proceeding, or seeming to proceed, from the operation of causes purely material. The present inquiry regards that species that is here distinguished by the name of sentimental laughter.

The pleasing emotion, arising from the view of ludicrous ideas, is known to every one by experience; but, being a simple feeling, admits not of definition. It is to be distinguished from the laughter that generally attends it, as sorrow is to be distinguished from tears; for it is often felt in a high degree by those who are remarkable for gravity of countenance. Swift seldom laughed, notwithstanding his uncommon talents in wit and humour, and the extraordinary delight he seems to have had in surveying the ridiculous side of things. Why this agreeable emotion should be accompanied with laughter as its outward sign, or sorrow express itself by tears, or fear by trembling or paleness, I cannot utimately explain, otherwise than by saying, that such is the appointment of the Author of nature.—All I mean by this inquiry is, to determine, "What is peculiar to those things which produce laughter;—or rather, which raise in the mind that pleasing sentiment or emotion whereof laughter is the external sign."

Philosophers have differed in their opinions concerning this matter. In Aristotle's definition quoted above, it is clear that he means to characterise, not laughable qualities in general, as some have thought, but the objects of comic ridicule only; and in this view the definition is just, however it may have been overlooked or despised by comic writers. Crimes and misfortunes are often in modern plays, and were sometimes in the ancient, held up as objects of public merriment; but, if poets had that reverence for nature which they ought to have, they would not shock the common sense of mankind by so absurd a representation.—The definition from Aristotle does not, however, suit the general nature of ludicrous ideas; for it will appear by and by, that men laugh at that in which there is neither fault or turpitude of any kind.

The theory of Mr. Hobbes would hardly have deserved notice, if Addison had not spoken of it with approbation in the 47th paper of the

the Spectator. He justly observes, after quoting the words of Mr. Hobbes formerly mentioned, that, "according to this account, when we hear a man laugh excessively, instead of saying that he is very merry, we ought to tell him that he is very proud." It is strange, that the elegant author should be aware of this consequence, and yet admit the theory: for so good a judge of human nature could not be ignorant, that laughter is not considered as a sign of pride; persons of singular gravity being often suspected of that vice, but great laughers seldom or never. When we see a man attentive to the innocent humours of a merry company, and yet maintain a fixed solemnity of countenance, is it natural for us to think that he is the humblest, and the only humble person in the circle?

Another writer in the Spectator, No. 249, remarks, in confirmation of this theory, that the vainest part of mankind are most addicted to the passion of laughter. Now, how can this be, if the proudest part of mankind are also most addicted to it, unless we suppose vanity and pride to be the same thing? But they certainly are different passions. The proud man despises other men, and derives his chief pleasure from the contemplation of his own importance: the vain man stands in need of the applause of others, and cannot be happy without it. Pride is apt to be reserved and sullen; vanity is often affable, and officiously obliging. The proud man is so confident of his merit, and thinks it so obvious to all the world, that he will scarcely give himself the trouble to inform you of it: the vain man, to raise your admiration, scruples not to tell you, not only the whole truth, but even a great deal more. In the same person these two passions may, no doubt, be united; but some men are too proud to be vain, and some vain men are too conscious of their own weakness to be proud. Be all this, however, as it will, we have not as yet made any discovery of the cause of laughter: in regard to which, I apprehend, that the vain are not more intemperate than other people; and I am sure that the proud are much less so.

Hutcheson's account of the origin of laughter is equally unsatisfactory. Granting what he says to be true, I would observe, in the first place, what the ingenious author seems to have been aware of, that there may be a mixture of meanness and dignity where there is nothing ludicrous. A city, considered as a collection of low and lofty houses, is no laughable object. Nor was that person either ludicrous or ridiculous, whom Pope so justly characterises,

The greatest, wisest, meanest, of mankind.

—But, secondly, cases might be mentioned, of laughter arising from a group of ideas or objects, wherein there is no discernible opposition of meanness or dignity. We are told of the dagger of Hudibras, that

It could scrape trenchers, or chip bread,
Toast cheese or bacon, though it were
To bait a mouse-trap, 'twou'd not care;
'Twould make clean shoes, or in the earth
Set leeks and onions, and so forth.

The humour of the passage cannot arise from the meanness of these offices compared with the dignity of the dagger, nor from any opposition of meanness and dignity in the offices themselves, they being

all equally mean; and must therefore be owing to some peculiarity in the description. We laugh, when a droll mimics the solemnity of a grave person; here dignity and meanness are indeed united: but we laugh also (though not so heartily perhaps) when he mimics the peculiarities of a fellow as insignificant as himself, and displays no opposition of dignity and meanness. The levities of Sancho Panca opposed to the solemnity of his master, and compared with his own schemes of preferment, form an entertaining contrast: but some of the vagaries of that renowned squire are truly laughable even when his preferment and his master are out of the question. Men laugh at puns; the wisest and wittiest of our species have laughed at them; Queen Elizabeth, Cicero, and Shakespear, laughed at them; clowns and children laugh at them; and most men, at one time or other, are inclined to do the same: but in this sort of low wit, is it an opposition of meanness and dignity that entertains us? Is it not rather a mixture of sameness and diversity,—sameness in the sound, and diversity in the signification?

In the characters mentioned by Akenside, the author does not distinguish between what is laughable and what is contemptible; so that we have no reason to think, that he meant to specify the qualities peculiar to those things which provoke pure laughter; and whatever account we may make of his definition, which to those who acquiesce in the foregoing reasonings may perhaps appear not quite satisfactory, there is in the poem a passage that deserves particular notice, as it seems to contain a more exact account of the ludicrous quality than is to be found in any of the theories above-mentioned. The passage we shall have occasion to quote.

Our author now goes on to lay down his own theory concerning the origin of laughter, which he supposes to arise from the view of things incongruous united in the same assemblage. However imperfect (says he) the above-mentioned theories may appear, there is none of them destitute of merit; and indeed the most fanciful philosopher seldom frames a theory without consulting nature in some of her more obvious appearances. Laughter very frequently arises from the view of dignity and meanness united in the same object; sometimes, no doubt, from the appearance of assumed inferiority, as well as of small faults and unimportant turpitudes; and sometimes, perhaps, though rarely, from that sort of pride which is described in the passage already quoted from Hobbes.

All these accounts agree in this, that the cause of laughter is something compounded; or something that disposes the mind to form a comparison, by passing from one object or idea to another. That this is in fact the case, cannot be proved *a priori*; but this holds in all the examples hitherto given, and will be found to hold in all that are given hereafter. May it not then be laid down as a principle, That laughter arises from the view of two or more objects or ideas disposing the mind to form a comparison? According to the theory of Hobbes, this comparison would be between the ludicrous object and ourselves; according to those writers who misapply Aristotle's definition, it would seem to be formed between the ludicrous object and things or persons in general; and if we incline to Hutcheson's theory, which is the best of the three, we shall think that there is a comparison of the parts of the ludicrous object, first with one another, and secondly with ideas or things extraneous.

Further:

Further: every appearance that is made up of parts, or that leads the mind of the beholder to form a comparison, is not ludicrous. The body of a man or woman, of a horse, a fish, or a bird, is not ludicrous, though it consists of many parts; and it may be compared to many other things without raising laughter; but the picture described in the beginning of the epistle to the Pisoes, with a man's head, a horse's neck, feathers of different birds, limbs of different beasts, and the tail of a fish, would have been thought ludicrous eighteen hundred years ago, if we believe Horace, and in certain circumstances would no doubt be so at this day. It would seem then, that 'the parts of a laughable assemblage must be in some degree unsuitable and heterogeneous.'

Moreover: any one of the parts of the Horatian monster, a human head, a horse's neck, the tail of a fish, or the plumage of a fowl, is not ludicrous in itself; nor would those several pieces be ludicrous, if attended to in succession, without any view to their union. For to see them disposed on the different shelves of a museum, or even on the same shelf, nobody would laugh, except, perhaps, the thought of uniting them were to occur to his fancy, or the passage of Horace to his memory. It seems to follow, that the incongruous parts of a laughable idea or object must either be combined so as to form an assemblage, or must be supposed to be so combined.

May we not then conclude, 'that laughter arises from the view of two or more inconsistent, unsuitable, or incongruous, parts or circumstances, considered as united in one complex object or assemblage, or as acquiring a sort of mutual relation from the peculiar manner in which the mind takes notice of them?' The lines from Akenside formerly referred to, seem to point at the same doctrine:

> Where-e'er the pow'r of ridicule displays
> Her quaint-eye'd visage, *some incongruous form,*
> *Some stubborn dissonance of things combin'd,*
> Strikes on the quick observer.

And to the same purpose, the learned and ingenious Dr. Gerard, in his Essay on Taste: 'The sense of ridicule is gratified by an inconsistence and dissonance of circumstances in the same object, or in objects nearly related in the main; or by a similitude or a relation unexpected between things on the whole opposite and unlike.'

And therefore, instead of saying, with Hutcheson, that the cause or object of laughter is an 'opposition of dignity and meanness;' I would say, in more general terms, that it is 'an opposition of suitableness or unsuitableness, or of relation and the want of relation, united, or supposed to be united, in the same assemblage.' Thus the offices ascribed to the dagger of Hudibras seem quite heterogeneous; but we discover a bond of connection among them, when we are told that the same weapon could occasionally perform them all. Thus, even in that mimicry which displays no opposition of dignity and meanness, we perceive the actions of one man joined to the features and body of another; that is, a mixture of unsuitableness, or want of relation, arising from the difference of persons, with congruity and similitude, arising from the sameness of the actions. And here let it be observed in general, that the greater number of incongruities that are blended in the same assemblage, the more ludicrous it

it will probably be. If, as in Butler's resemblance of the morning to a boiled lobster, there is a mixture of dignity and meanness, as well as of likeness and dissimilitude, the effect of the contrast will be more powerful than if only one of the oppositions had occurred in the ludicrous idea. The sublimity of Don Quixote's mind, contrasted and connected with his miserable equipage, forms a very comical exhibition; but, when all this is still further connected and contrasted with Sancho Panca, the ridicule is heightened exceedingly. Had the knight of the lions been better mounted and accoutred, he would not have made us smile so often; because, the hero's mind and circumstances being more adequately matched, the whole group would have united fewer inconsistencies, and reconciled fewer incongruities. Butler has combined a still greater variety of uncouth and jarring circumstances in Ralpho and Hudibras: but the picture, though more elaborate, is less natural. Yet this argues no defect of judgment. His design was, to make his hero not only ludicrous, but contemptible; and therefore he jumbles together, in his equipage and person, a number of mean disgusting qualities, pedantry, ignorance, nastiness, and extreme deformity. But the knight of La Mancha, though a ludicrous, was never intended for a contemptible, personage. He often moves our pity, he never forfeits our esteem; and his adventures and sentiments are generally interesting; which could not have been the case if his story had not been natural, and himself been endowed with great as well as good qualities. To have given him such a shape, and such weapons, arguments, boots, and breeches, as Butler has bestowed on his champion, would have destroyed that solemnity which is so striking a feature in Don Quixote; and Hudibras, with the manners and person of the Spanish hero, would not have been that paltry figure which the English poet meant to hold up to the laughter and contempt of his countrymen. Sir Launcelot Greaves is of Don Quixote's kindred, but a different character. Smollet's design was not to expose him to ridicule, but rather recommend him to our pity and admiration. He has therefore given him youth, strength and beauty, as well as courage and dignity of mind; has mounted him on a generous steed, and arrayed him in an elegant suit of armour. Yet, that the history might have a comic air, he has been careful to contrast and connect Sir Launcelot with a squire and other associates of very dissimilar tempers and circumstances.

What has been said of the cause of laughter does not amount to an exact description, far less to a logical definition: there being innumerable combinations of congruity and inconsistence, of relation and contrariety, of likeness and dissimilitude, which are not ludicrous at all. If we could ascertain the peculiarities of these, we should be able to characterise with more accuracy the general nature of ludicrous combination. But, before we proceed to this, it would be proper to evince, that of the present theory thus much at least is true, that, though every incongruous combination is not ludicrous, every ludicrous combination is incongruous.

It is only by a detail of facts or examples that any theory of this sort can either be established or overthrown. By such a detail, the foregoing theories have been, or may be, shewn to be ill-founded, or not sufficiently comprehensive. A single instance of a laughable object, which neither unites, nor is supposed to unite, incongruous ideas,

ideas, would likewise shew the insufficiency of the present; nor will I undertake to prove (for indeed I cannot), that no such instance can be given. A complete enumeration of ludicrous objects it would be in vain to attempt: and therefore we can never hope to ascertain, beyond the possibility of doubt, that common quality which belongs to all ludicrous ideas that are, or have been, or may be, imagined. All that can be done in a case of this kind is to prove by a variety of examples, that the theory now proposed is more comprehensive, and better founded, than any of the foregoing. But as the variety of examples would take up too much room to be inserted here, and as every reader must be capable of adducing numberless instances of ludicrous cases to himself, I shall content myself with the above explanation of the different theories of laughter, referring those who desire further satisfaction to the authors already quoted.

DESCRIPTION OF THE LAVA THROWN OUT BY BURNING MOUNTAINS.

THE lava at its first discharge from the volcano, is in a state of prodigious ignition, greatly superior to any thing we can have an idea of from the small artificial furnaces made by us. Sir William Hamilton informs us, that the lava of Vesuvius, at the place whence it issued (in the year 1767), "had the appearance of a river of red-hot and liquid metal, such as we see in the glass-houses, on which were large floating cinders half lighted, and rolling over one another with great precipitation down the side of the mountain, forming on the whole a most beautiful and uncommon cascade." Now, if we consider the materials of which the lava consists, which undoubtedly are the common matters to be found every where in the earth, namely, stones, metallic ores, clay, sand, &c. we shall find that our hottest furnaces would by no means be able to bring them into any degree of fusion; since the materials for glass cannot be melted without a great quantity of very fusible salts, such as alkalies, nitre, &c. mixed along with them. The heat of a volcano must therefore be immense: and, besides its heat, it is sometimes attended with a very uncommon circumstance; for Sir William Hamilton informs us, that "the red-hot stones thrown up by Vesuvius on the 31st of March 1766 were perfectly transparent," and the like remark he makes on the vast stream of lava which issued from this volcano in 1779. This we cannot look upon to be the mere effect of heat: for mere heat with us will not make a solid body transparent; and these stones, we are sure, were not in a state of fusion, or the resistance of the air would have broke them all to pieces, even supposing them, which is very improbable, to have been in that state detached from the rest of the lava. For the transparency, therefore, we must have recourse to electricity: which in some of our experiments hath the property of rendering opaque bodies transparent. Indeed it is scarcely possible but the lava and every other matter thrown out of a volcano must be in the highest degree electrical, seeing the fire itself most probably takes it rise from electricity.

The lava, after having once broke out, does not constantly continue running from the same vent, but often has intermissions, after which it will burst out sometimes at the same place, and sometimes at another. No real flame ever appears to come from the lava. In the

the day-time its progress is marked by a thick white smoke, from which the light of the red-hot matter being reflected in the night-time, makes it appear like flame. But if, during its progress, it meets with trees or other combustible substances, which it frequently does, a bright flame immediately issues from its surface.—This liquid substance, after having run pure for about one hundred yards (more or less, no doubt, according to different circumstances), begins to collect cinders, stones, and a scum is formed on the surface. Our author informs us, that the lava which he observed, with its scum, had the appearance of the river Thames, as he had seen it after a hard frost and a great fall of snow, when beginning to thaw, carrying down vast masses of snow and ice. In some places it totally disappeared, and ran in a subterraneous passage formed by the scum for several paces; after which it came out pure, having left the scum behind, though a new one was quickly formed. This lava at the farthest extremity from its source did not appear liquid, but like a heap of red-hot coals, forming a wall in some places ten or twelve feet high, which rolling from the top soon formed another wall, and so on.—This was the appearance also put on by the lava which issued in the great eruption of 1783 in Iceland; with this difference, that the wall was at one time two hundred and ten feet high, and the general thickness of it was more than one hundred. While a lava is in this state, Sir William is of opinion, that it is very practicable to divert it into another channel, in a manner somewhat similar to what is practised with rivers. This he was afterwards told had been done with success during the great irruption of Etna in 1669: that the lava was directing its course towards the walls of Catania, and advancing very slowly, when they prepared a channel for it round the walls of the town, and turned it into the sea. A succession of men, covered with sheep-skins wetted, were employed to cut a passage through the tough flanks of lava, till they made a passage for that in the centre, which was in perfect fusion, to disgorge itself into the channel prepared for it. But this, it is evident, can only take place in small streams of this burning matter; with that above-mentioned it would have been impossible. It hath been also observed of the lavas of Etna, that they do not constantly fall down to the lowest places, but will sometimes ascend in such a manner as to make the valleys rise into hills. On this Sir William Hamilton has the following note: "Having heard the same remark with regard to the lavas of Vesuvius, I determined, during an eruption of that volcano, to watch the progress of a current of lava, and I was soon enabled to comprehend this seeming phænomenon, though it is, I fear, very difficult to explain. Certain it is, that the lavas, while in their most fluid state, follow always the laws of other fluids; but, when at a great distance from their source, and consequently encumbered with scoriæ and cinders, the air likewise having rendered their outward coat tough, they will sometimes be forced up a small ascent, the fresh matter pushing forward that which went before it, and the exterior parts of the lava acting always as conductors for the interior parts, that have retained their fluidity from not being exposed to the air."

From the year 1767 to 1779, this gentleman made many curious observations on the lavas of Vesuvius. He found, that they constantly formed channels in the mountain as regular as if they had been made by art; and that, whilst in a state of perfect fusion, they

continued their course in those channels, which were sometimes full to the brim, and at others more or less so according to the quantity of matter thrown out. These channels, after small eruptions, were generally from two to five or six feet wide, and seven or eight in depth. They were often hid from the sight by a quantity of scoriæ that had formed a crust over them, and the lava, having been conveyed in a covered way for some yards, came out again fresh into an open channel. Our author informs us, that he had walked in some of these subterraneous galleries, which were extremely curious, the sides, top, and bottom, being exceedingly smooth and even: others were encrusted with what he calls very extraordinary scoriæ, beautifully ramified white salts, in the form of dropping stalactites, &c.

On viewing a stream of lava while in its fluid state in the month of May 1779, he perceived the operation of it in the channels above described in great perfection. After quitting them, it spread itself in the valley, and ran gently like a river that had been frozen, and had masses of ice floating upon it. The wind happening then to shift, our traveller was so incommoded by the smoke, that the guide proposed to cross it, which was instantly put in execution without any other inconvenience than the violent heat with which the legs and feet were affected. The crust was so tough, that their weight made no impression upon it, and the motion so slow that they were in no danger of falling. This circumstance, according to Sir William points out a method of escape should any person happen to be inclosed between two lavas, but ought never to be tried except in cases of necessity; and indeed, if the current of melted matter was very broad, must undoubtedly be attended with extreme danger, both from the heat of the upper crust and the chance of its breaking and falling down with the passenger into the burning liquid below. That which Sir William Hamilton crossed was about fifty or sixty feet broad.

Having passed this burning stream, our travellers walked up along the side of it to its very source. Here they saw it boiling and bubbling violently up out of the ground, with a hissing and crackling noise like that which attends the playing off an artificial fire-work. An hillock of about fifteen feet high was formed by the continual splashing up and cooling of the vitrified matter. Under this was an arched hollow, red-hot within, like an heated oven; the lava which ran from it being received into a regular channel raised upon a sort of wall of scoriæ and cinders, almost perpendicularly, of about the height of eight or ten feet, and much resembling an ancient aqueduct. On quitting this fountain of lava, they went quite up to the crater, where as usual they found a little mountain throwing up stones and red-hot scoriæ with loud explosions; but the smoke and smell of sulphur was so intolerable, that they were obliged to quit the place with precipitation.

By the great eruption in August 1779, the curious channels abovementioned were entirely destroyed, the cone of the mountain was covered with a stratum of lava full of deep cracks, from whence continually issued a sulpherous smoke that tinged the scoriæ and cinders with a deep yellow, or sometimes white tint. The lava of this eruption appeared to be more perfectly vitrified than that of any former one he had observed. The pores of the fresh lava were generally full of a perfect vitrification, and the scoriæ themselves, viewed

viewed through a magnifying glaſs, appeared like a confuſed heap of filaments of a foul vitrification. When a piece of the ſolid lava had been cracked in its fall, without ſeparating entirely, fibres of perfect glaſs were always obſerved reaching from ſide to ſide within the cracks. The natural ſpun-glaſs which fell in ſome places along with the aſhes of this eruption, and which has likewiſe been obſerved in other places, he is of opinion muſt have proceeded from an operation of the kind juſt mentioned; the lava cracking and ſeparating in the air at the time of its emiſſion from the crater, and by that means ſpinning out the pure vitrified matter from its pores or cells; the wind at the ſame time carrying off the filaments of glaſs as faſt as they were produced.

Our author obſerved a kind of pumice-ſtone ſticking to ſome very large fragments of the new lava. On cloſe inſpection, however, he found that this ſubſtance had been forced out of the minute pores of the ſolid lava itſelf; and was a collection of fine vitreous fibres or filaments confounded together at the time of their being preſſed out by the contraction of the large fragments of lava in cooling, and which had been bent downwards by their own weight. This curious ſubſtance has the lightneſs of a pumice, and reſembles it in every reſpect, except that it is of a darker colour.

When the pores of this lava were large, and filled with pure vitrified matter, the latter was ſometimes found blown into bubbles on the ſurface; probably by the air which had been forced out at the time the lava contracted itſelf in cooling; and from theſe thin bubbles it appeared, that this kind of volcanic glaſs has much the ſame tranſparency with our common glaſs bottles, and like them is of a dirty yellow colour; but when large pieces of it were broken off with a hammer, they appeared perfectly black and opaque.

In the lava of this eruption it was obſerved, that many detached pieces were in the ſhape of a barley-corn or plumb-ſtone, ſmall at each end, and thick in the middle. Some of theſe did not weigh above an ounce; but others could not be leſs than ſixty pounds. Our author took them to be drops from the liquid fountain of fire, which might naturally acquire ſuch a form in their fall. There were alſo many other curious vitrifications, different from any he had ſeen before, mixed with this huge ſhower of ſcoriæ and maſſes of lava.

In the treating of Mount Etna, M. Houel makes mention of a piece of lava which, after having been once ejected by the volcano, was ſwallowed up, and thrown out a ſecond time. The intenſe heat to which it was then ſubjected, had ſuch an effect upon it, that it appeared all full of chinks to a conſiderable depth, and which run at right angles to one another. He had alſo an opportunity of obſerving to great advantage ſome of the hollow channels formed by the lavas of Etna ſimilar to thoſe deſcribed by Sir William Hamilton, but on a much larger ſcale. Here the great eruption of water in 1755 had overturned, in a vertical direction, an huge tube of this kind for the length of half a mile. The tube itſelf appeared to be compoſed of enormous maſſes, ſomewhat reſembling planks, each two feet thick and twelve or fifteen in breadth, continued in a ſtraight line through the whole of that ſpace. At the ſame time by the action of the lava a kind of walls had been formed, from ten to ſixteen feet in height, and curved at the top. Some of theſe walls appear rolled together like

like paper; and M. Houel is of opinion, that these various appearances on the surface of the lava when cooled must have arisen from particles heterogeneous to the real lava; and which detach themselves from it, rising to the surface under a variety of forms proportioned to the spaces of time taken up in cooling. These crusts are formed of different kinds of scoriæ and dirty lava, mixed with sand or ashes. At the same place are found also great numbers of small pieces like those of ice heaped upon one another after having floated for some time on a river. Beneath these the pure lava is met with, and which has evidently been in a state of perfect fusion. This is extremely dense; and, by looking narrowly into its chinks, the composition of the whole appears to be merely homogeneous. "It is curious (says he) to observe, so near one species of lava which is very pure, another which has likewise arrived at the same place in a fluid state, and has there undergone so great a change as scarcely to retain an appearace of its original state. It is, however, like iron dross, in grains of unequal sizes. We find it also at various distances, such as one, two, or more, hundred fathoms. It is sometimes found in large pieces like tables, covered over with sharp points, some longer and others shorter. All these pieces are quite detached from one another, as if they had been brought thither and scattered from a tumbril. The matter of which the crust of the lava is formed, seems to have issued from it in the same manner in which froth rises upon solution of soap in water. It appears afterwards to have swelled, burst, and assumed its present form, presenting to the view various spaces filled with small loose stones. A great number of new lavas were likewise observed, all of them putting forth various kinds of efflorescences in great quantity.

The hardness, density, and solidity, of lavas, no doubt proceed from the degree of heat to which they have been exposed, and which seems to be greater or less according to their quantity. Hence the Icelandic volcanoes, which pour forth the greatest quantities of lava, produce it also in the greatest degree of liquefaction, and Dr. Van Troil observes, that what he saw must have been liquefied to an extreme degree.

The composition of the lavas of different volcanoes, and even of different parts of those of the same volcano, is extremely different. Sir William Hamilton is of opinion that this difference in composition contributes not a little to the facility or difficulty with which they afterwards receive earth capable of vegetation. Some have been in a more perfect state of vitrification than others, and are consequently less liable to the impressions of time. I have often observed on Mount Vesuvius, when I have been close to a mouth from whence the lava was disgorging itself, that the quality of it varied greatly from time to time. I have seen it as fluid and coherent as glass when in fusion; and I have seen it farinaceous, the particles separating as they forced their way out, just like meal coming from under the grindstones. A stream of lava of this sort being less compact, and containing more earthy particles, would certainly be much sooner fit for vegetation than one composed of the more perfect vitrified matter. Mr. Bergman, who has accurately analysed some Icelandic lavas, informs us, that one kind is very coarse, heavy, and hard, full of bladders, almost black, intermixed with white grains resembling quartz, which in some places have a figure not very unlike a

ſquare. This black matter is not attracted by the magnet; but, if a piece of it is held againſt a compaſs, the needle viſibly moves. When tried in the crucible, it yields from ten to twelve pounds of iron in every hundred weight. It does not diſſolve in the leaſt with ſal ſodæ, and very difficultly with borax, and ſcarcely at all with urinous ſalt. It ſeems to contain a great deal of clay in its compoſition, which may be extracted by all acid ſolvents. This laſt he is likewiſe, from experiments, aſſured is the caſe with the lava of *Solfaterra* in Italy.

The white lava, which poſſeſſes more or leſs of thoſe tranſparent grains or rays with which lavas are generally chequered, does not ſeem to be of the nature of quartz, as it cannot be attacked by ſal ſodæ; it is however, ſoluble with ſome difficulty by borax and fuſible urinous ſalt, or microcoſmic acid. Theſe effects are perfectly ſimilar to thoſe produced upon the diamond, ruby, ſapphire, topaz, and hyacinth. The chryſolite, garnet, tourmalin, and ſhirl, can neither be diſſolved by ſal ſodæ, though they are ſomewhat attacked by it when reduced to a fine powder; and upon the two laſt mentioned ones it produces a ſlight effervescence; on which account, ſays Mr. Bergman, it is poſſible that the precious ſtones found upon Mount Veſuvius, which are ſold at Naples, are nearer related to the real precious ſtones than is generally imagined. He found no ſuch grains in a finer kind of lava, quite porous within, and entirely burnt out, and conſiderably lighter than the former ones.

The Iceland agate is of a black or blackiſh-brown colour, a little tranſparent at the thin edges like glaſs, and gives fire with ſteel. It cannot eaſily be melted by itſelf; but becomes white, and flies in pieces. It can hardly be diſſolved in the fire by fuſible urinous ſalt; but it ſucceeds a little better with borax, though with ſome difficulty. With ſal ſodæ it diſſolves very little; though in the firſt moments ſome ebullition is perceived, and the whole maſs is afterwards reduced to powder. Hence Mr. Bergman concludes, that this agate hath been produced by an exceſſive fire out of the black lava formerly mentioned.

In the Iceland pumice-ſtone, quartz and cryſtals are often found, particularly in the black and reddiſh-brown kind. The ſtones thrown out of the volcano, whether grey, or burnt brown, ſeemed to conſiſt of a hardened clay, mixed with a ſiliceous earth. They were ſprinkled with rays and grains reſembling quartz, and ſome few flakes of mica. They fuſed with great difficulty in the fire; with ſal ſodæ they ſhewed ſome effervescence at firſt, but which ceaſed in a ſhort time. The parts reſembling quartz produced no motion at all; from whence Mr. Bergman concludes, that the black lava already mentioned proceeds principally from this maſs. Several other ſtones which were ſent him from Iceland, Mr. Bergman ſuppoſed to have no connection with the eruptions, but to have been produced in ſome other way.

In Mr. Ferber's travels through Italy, we are informed, that he has ſeen a ſpecies of lava ſo exactly reſembling blue iron flags, that it was not to be diſtinguiſhed from them but with great difficulty. The ſame author tells us likewiſe, that the Vicentine and Veroneſe lavas and volcanic aſhes contain incloſed ſeveral ſorts of fire-ſtriking and flint-horn ſtones, of a red, black, white, green, and variegated colour, ſuch as jaſpers and agates; that hyacinths, cryſolites and

pietre

pietre obsidiane, described by Mr. Arduini in his *Giornale d'Italia*, are found at Leonedo; and that chalcedony or opal pebbles, and noduli with inclosed water-drops, are dug out of the volcanic cineritious hills near Vicenza.

M. Dolomieu considers the chemical analysis of lava as but of little account. When subjected to the force of fire a second time, they are all of them reducible to the same kind of glass; from which it has been concluded, that all volcanic products have been formed of the same kind of materials, and that the subterraneous fire has always acted on and variously modified the same kind of stone. But an analysis by fire, he justly observes, is of all others the most falacious. The substances are all fusible, and we have no proper methods of measuring the intensity of our fire; so that the same substance which to-day may come out of our furnaces untouched, may to-morrow be found completely altered, even though the fire employed should not appear to us any more violent than the former. Analyses by different menstrua have not been more successful. Mr. Bergman has indeed analysed some lavas with acids, and gives with astonishing precision the following result, viz. that an hundred parts of lava contain forty-nine of siliceous earth, thirty-five of argillaceous earth, four of calcareous earth, and twelve of iron. These experiments, however, our author observes, give us no information with regard to lavas in general. They only shew the composition of the particular specimens that he tried; and, even after the descriptions that he has given, we are a good deal at a loss to discover the species of lava which he subjected to analysis. "It would be as ridiculous (says Mr. Dolomieu) to apply this analysis to every volcanic product, as it would be to believe that the component parts of a fissile rock were the same with those of every rock composed of laminæ or thin strata." For these reasons he is of opinion, that, in order to understand the nature of lavas, we should consider not only that of volcanoes themselves, but of the bases on which they rest. Had this been done, we should have found that the volcanic fires generally exist in beds of argillaceous schistus and horn-stone; frequently in a species of porphyry, the gluten of which is intermediate betwixt horn-stone and potrosilex; containing a large quantity of schorl, feldt-spar, and greenish quartz or chrysolite, in little rounded nodules. These substances, he tells us, would have been found in those mountains which are called primitive, and in strata buried under beds of calcareous stone; and, among other things, would have convinced us, that the fluidity of lavas does not make them lose the distinctive characters of their bases. In the mountains called Primitive, those rocks which are assigned as the bases of the more common lavas are found intermixed with micaceous ones, with gneiss, granite, &c. and they generally rest on masses of granite. Hence lavas must consist of all these matters, and the fire must act upon them all whenever it meets with them. Our author has constantly observed, that volcanoes situated at the greatest distance from the centre of the chain, or group of mountains on which they are established, produce lavas of a more homogeneous composition, and less varied, and which contain most iron and argillaceous earth. Those, on the contrary, placed nearer the centre, are more diversified in their products; containing substances of an infinite variety of different kinds. The seat of the fire, however, he observes, does not long continue among the granites,

the inflammation being either extinguished, or returning to the centre of the schistus rocks in its neighbourhood.

From this knowledge of the materials of which lavas are composed, we acquire also a considerable knowledge of the matters that are found in greatest quantity in the bowels of the earth. The excavations made by mines, &c. on the surface of the earth, are mere scratches in comparison of the depths of volcanic fires; and as he considers the mountains themselves as the productions of those fires, it thence follows, that by attentively examining the materials of which they are composed, we may thence determine what kind of substances are most common to these great depths in the earth.

Thus our author thinks it probable, that schorls and porphyries, though rare on the surface, are very common in the internal parts of the earth. As an instance of the truth of his observations, our author informs us, that he was convinced, from no other circumstance but merely inspecting the lavas of Mount Etna, that, in some parts of the Island of Sicily, there existed granites, porphyries, with schistus and argillaceous horn-stones. In this opinion he persisted, notwithstanding the generally opposite sentiments of the inhabitants themselves. He searched in vain three-fourths of the island; and at last found that all the mountains, forming the point of Sicily, called Pelorus, contain rocks of the kind above-mentioned. He then saw that the base of these mountains was produced under Mount Etna on the one side, and under the Lipari islands on the other. "We must, therefore, believe, that these mountains have furnished the materials on which the volcanoes have, for thousands of years, exerted their power."

By travelling among those elevations called the Neptunian Mountains, or Mons Pelorus, he was enabled to discover the reason why the products of Etna and the Lipari islands differ from one another. This, he says, is the unequal distribution of the granite and schistus rocks among them. The islands rest almost immediately on the granite, or are separated from it by a very thin stratum of argillaceous rock which contains porphyry; but the Sicilian volcano is situated on the prolongation of the schistus rock, which it must pierce before it reaches the granite; and accordingly very little of its lava seems to have granite for its basis. If the seat of the fire was still more distant from the centre of the mountains, their lavas would be more homogeneous; because the schist, which succeeds to the horn-stone, is less various, and hardly includes any bodies foreign to its own substance. Thus the lavas in the extinguished volcanoes of the Val di Noto, which lie fifteen leagues to the south-east of Etna, contain neither granite nor porphyry; but have for their basis simple rocks with particles of chrysolite and some schorls.

To the granites which extend to Metazzo, opposite to Lipari, he ascribes the formation of pumice; as they contain an immense quantity of scaly and micaceous rocks, black and white, with fossile granites or gneiss, the basis of which is a very fusible feldt-spar; and and these he supposes to be the proper materials of the pumice, having found pieces of them almost untouched in pumice-stones. There are beds of almost pure feldt-spar; to the semivitrification of which he ascribes an opaque enamel-like lava mentioned in other parts of his works. Few porphyries, however, he acknowledges, are to be met with among the Neptunian mountains, though these stones abound in the lavas

lavas of Etna. "They are not diſtant (ſays he) from the granites; and thoſe I have found have neither the hardneſs nor perfection of thoſe pieces which I gathered in the gullies, and which had been apparently waſhed out of the anterior parts of the mountain by water. But, though the porphyries I ſaw here bear no proportion to thoſe in the products of Etna, I was ſufficiently convinced of their exiſtence, and their analogy with thoſe of volcanoes, by diſcovering that the centre of theſe mountains contains a great number of them. Porphyries, in general, are very rare on the ſurface of the earth. Nature generally conceals them from us, by burying them under calcareous ſtrata, or by incloſing them in ſchiſtus rocks with which they are almoſt always mixed: but we are indebted to the labour of volcanoes for informing us that they are among the moſt common ſubſtances in the bowels of the earth; and they are never ſo much diſguiſed by the ſubterranean fire as to be miſtaken in the lavas of which they form the baſis."

The quantity of matter thrown out from volcanoes under the name of lava is prodigious. After the great eruption of Etna in 1669, Borelli went from Piſa to Sicily to obſerve the effects of it. The matter thrown out at that time amounted to 93,830,750 cubical paces; ſo that, had it been extended in length upon the ſurface of the earth, it would have reached more than four times round the whole earth. All this matter, however, was not lava, but conſiſted alſo of ſand, ſtone, gravel, &c. The lava he computed at 6,300,000 paces, which formed a river, according to our author, ſometimes two miles broad; but according to others it was ſix or ſeven miles broad, and ſometimes twenty or thirty yards in depth. Sir William Hamilton informs us, that the lavas of Etna are very commonly fifteen or twenty miles in length, ſix or ſeven in breath, and fifty feet deep. The moſt conſiderable is ſcarcely leſs than thirty miles long and fifteen broad. The moſt conſiderable lavas of Veſuvius do not exceed ſeven miles in length. The ſame author, however, tells us, that the lava which iſſued from Veſuvius in 1767, was ſix miles long, two in breadth, and in moſt places ſixty or ſeventy feet deep. In one place it had run along a hollow-way made by currents of rain not leſs than two hundred feet deep, and one hundred wide; and this vaſt hollow it had in one place filled up. He ſays, he could not have believed that ſo great a quantity of matter could have been thrown out in ſuch a ſhort time, if he had not examined the whole courſe of it himſelf. Even this quantity, however, great as it is, appears very trifling in compariſon of that thrown out in Iceland in the year 1783, which covered a ſpace of ground ninety miles in length and forty-two in breadth, to the depth of more than one hundred feet. Dr. Van Troil, in his Letters on Iceland, tells us, that he and his companions travelled over a tract of lava upwards of three hundred miles in length: and in 1728, we are told that an eruption of lava took place, which continued for two years to run into a great lake, which it almoſt filled up.

As the lavas are thrown out from the volcanoes in the higheſt degree of ignition, it may eaſily be ſuppoſed that ſuch vaſt bodies will retain their heat for a long time. It would indeed be well worth obſerving, what length of time it required to cool a lava perfectly; as from thence we might in ſome meaſure judge how far thoſe philoſophers are in the right, who argue concerning the length of time required

required to cool an ignited globe of the size of our earth or larger. Sir William Hamilton tells us, that in the month of April 1771, he thrust sticks into some of the crevices of the lava which had issued from Vesuvius in October 1767, and they immediately took fire. On Mount Etna, in 1769, he observed the lava that had been disgorged three years before to smoke in many parts. No particular observation, however, hath been made in what proportion the heat of lavas is gradually lost.

Sir William Hamilton informs us of a curious fact relating to a lava in the island called Lacco. Here is a cavern shut up with a door; and this cavern is made use of to cool liquors and fruit, which it does in a short time as effectually as ice. Before the door was opened, he felt the cold on his legs very sensibly; but when it was opened, the cold rushed out so as to give him pain; and within the grotto it was intolerable. He was not sensible of wind attending this cold; though, upon Mount Etna and Vesuvius, where there are caverns of this kind, the cold is evidently occasioned by a subterraneous wind. The natives call such places *ventaroli*. From old lavas there frequently happens an eruption of noxious vapours called *mofetes*. These likewise break out from wells and subterraneous places in the neighbourhood of a volcano before an eruption. Our author tells us, that the vapour affects the nostrils, throat, and stomach, just as the spirit of hartshorn or any strong volatile salt; and would soon prove fatal if you did not immediately withdraw from it. These mofetes, he says, are at all times to be met with under the ancient lavas of Vesuvius, particularly the great eruption of 1631.

Sir William Hamilton informs us, that the lavas of Etna and Vesuvius are much the same, but those of Etna rather blacker and more porous than those of Vesuvius. Some kinds of lava take a fine polish, and are frequently manufactured into boxes, tables, &c. In Naples, the inhabitants commonly make use of it for paving the streets, and even the subterraneous cities of Pompeii and Herculaneum have been paved with the same substance. A fine large cubic piece of lava is preserved in the hall of the British Museum.

OF THE HYDROPHOBIA, OR DISEASE CONSEQUENT ON THE BITE OF A MAD DOG.

IT is the opinion of some, that Dr. Cullen has done wrong in employing the term *hydrophobia* as a generic name, under which canine madness is included: and it must be allowed, that the dread of water, while it is not universal, is also a symptom occurring only late in the disease, at least in the greater part of cases. Perhaps his arrangement would have been less exceptionable, if, following Linnæus, he had adopted *rabies* as a generic term, and had distinguished this particular species by the epithet of *canina*, *contagiosa*, or the like. Disputes, however, about names, are in general not very important; and it is sufficient to observe, the affection now to be treated of is canine madness, or that desease which arises from the bite of a mad animal.

This disease commonly does not make its attack till a considerable time after the bite. In some few instances it has commenced in seven or eight days from the accident; but generally the patient continues

tinues in health for twenty, thirty, or forty days, or even much longer. The bite, if not prevented, will in general be healed long before that time, frequently with the greatest ease; though sometimes it resists all kinds of healing applications, and forms a running ulcer which discharges a quantity of matter for many days. It has been said, that the nearer the wounded place is to the salivary glands, the sooner the symptoms of hydrophobia appear. The approach of the disease is known by the cicatrix of the wound becoming high, hard, and elevated, and by a peculiar sense of prickling at the part; pains shoot from it towards the throat: sometimes it is surrounded with livid or red streaks, and seems to be in a state of inflammation; though frequently there is nothing remarkable to be observed about it. The patient becomes melancholy, loves solitude, and has sickness at stomach. Sometimes the peculiar symptom of the disease, the dread of water, comes on all at once. We have an instance of one who, having taken a vomit of ipecacuanha for the sickness he felt at his stomach, was seized with the hydrophobia in the time he was drinking the warm water. Sometimes the disease begins like a common sore throat; and, the soreness daily increasing, the hydrophobic symptoms shew themselves like a convulsive spasm of the muscles of the fauces. In others, the mind seems to be primarily affected, and they have a real dread of water or any liquid before they try whether they can swallow it or not. Dr. James, in his Treatise on Canine Madness, mentions a boy sent out to fill two bottles with water, who was so terrified by the noise of the liquid running into them, that he fled into the house crying out that he was bewitched. He mentions also the case of a farmer, who, going to draw some ale from a cask, was terrified to such a degree at its running into the vessel, that he ran out in a great haste with the spigot in his hand. But, in whatever manner this symptom comes on, it is certain that the most painful sensations accompany every attempt to swallow liquids. Nay, the bare sight of water, of a looking-glass, of any thing clear or pellucid, will give the utmost uneasiness, or even throws the patient into convulsions.

With regard to the affection of the mind itself in this disease, it does not appear that the patients are deprived of reason. Some have, merely by the dint of resolution, conquered the dread of water, though they never could conquer the convulsive motions which the contact of liquids occasioned: while this resolution has been of no avail; for the convulsions and other symptoms, increasing, have almost always destroyed the unhappy patients.

In this disease there seems to be an extreme sensibility and irritability of the nervous system. The eyes cannot bear the light, or the sight of any thing white; the least touch or motion offends them, and they want to be kept as quiet and in as dark a place as possible. Some complain of the coldness of the air, frequently when it is really warm. Others complain of violent heat; and have a great desire for cold air, which yet never fails to increase the symptoms. In all there is a great flow of viscid saliva into the mouth; which is exceedingly troublesome to the patients, as it has the same effect upon their fauces that other liquids have. This therefore they perpetually blow off with violence, which in a patient of Dr. Fothergill's occasioned a noise not unlike the hollow barking of a dog, and which he conjectures might have given rise to the common notion that

that hydrophobous patients bark like dogs. They have an insatiable thirst; but are unable to get down any drink, except with the utmost difficulty; though sometimes they can swallow bread soaked in liquids, slices of oranges, or other fruits. There is a pain under the scrobiculous cordis, as in the tetanus; and the patients mournfully point to that place as the seat of the disease. Dr. Vaughan is of opinion that it is this pain, rather than any difficulty in swallowing, which distresses the patient on every attempt to drink. The voice is commonly plaintive and mournful; but Dr. Vaughan tells us there is a mixture of fierceness and timidity in the countenance which he cannot describe, but by which he could know a hydrophobous person without asking any questions.

In this distemper, indeed, the symptoms are so various, that they cannot be enumerated; for we shall seldom read two cases of hydrophobia which do not differ very remarkably in this respect. Some seem to have at times a furious delirium, and an inclination to spit at or bite the bystanders; while others shew no such inclination, but will even suffer people to wipe the inside of their mouths with the corner of a handkerchief in order to clear away the viscid saliva which is ready to suffocate them. In some male patients there is an involuntary erection of the penis, and emission of the semen; and the urine is forced away by the frequent return of the spasms. In a letter from Dr. Wolf of Warsaw to Henry Baker, F. R. S. dated Warsaw Sept. 26th, 1767, we have the following melancholy account of the cases of five persons who died of the hydrophodia: "None of them quite lost their right senses; but they were all talking without intermission, praying, lamenting, despairing, cursing, sighing, spitting a frothy saliva, screeching, sometimes belching, and retching, but rarely vomiting. Every member is convulsed by fits, but most violently from the navel up to the breast and œsophagus. The fit comes on every quarter of an hour; the fauces are not red, nor the tongue dry. The pulse is not at all feverish; and when the fit is over nearly like a sound pulse. The face grows pale, then brown, and during the fit almost black; the lips livid; the head is drowsy, and the ears tingling; the urine limpid. At last they grow weary; the fits are less violent, and cease towards the end; the pulse becomes weak, intermittent, and not very quick; they sweat, and at last the whole body becomes cold. They compose themselves quietly as if to get sleep, and so they expire. The blood drawn a few hours before death appears good in every respect. A general observation was, that the lint and dressings of the wounds, even when dry, were always black, and that when the pus was very good in colour and appearance." In one of Dr. Wolf's patients who recovered, the blood stank intolerably as it was drawn from a vein; and one of Mr. Vaughan's patients complained of an intolerable fetid smell proceeding from the wounded part, though nobody but himself could perceive it. In general, the violent convulsions cease a short time before death; and even the hydrophobia goes off, so that the patients can drink freely. But this does not always happen; for Mr. Vaughan mentions the case of a patient, in whom, "when he had in appearance ceased to breathe, the spasmus cynicus was observable, with an odd convulsive motion in the muscles of the face; and the strange contrariety which took place in the action of these produced the most horrid assemblage of

of features that can well be conceived. Of this patient alſo it was remarkable, that in the laſt hours of his life he ceaſed to call for drink, which had been his conſtant requeſt; but was perpetually aſking for ſomething to eat."

The hydrophobia ſeems to be a ſymptom peculiar to the human race; for the mad animals which communicate the infection do not ſeem to have any dread of water. Dr. Wolf, in the letter above quoted, ſays in general, that cattle bit at the ſame time and by the ſame animal (a mad wolf) which bit the perſons whoſe caſes he related, died nearly with the ſame frightful raging as the men; but ſays nothing of their having any hydrophobia: nay, Dr. James and ſome others aſſert, that the hydrophobia is not always an attendant on rabies canina in the human race; and indeed it is certain that the diſeaſe has proved mortal after this terrible ſymptom has been removed. With regard to the ſymptoms of madneſs in dogs, they are very equivocal; and thoſe particularly enumerated by ſome authors, are only ſuch as might be expected in dogs much heated or agitated by being violently purſued and ſtruck. One ſymptom indeed, if it could be depended upon, would determine the matter; namely, that all other dogs avoid and run away from one that is mad; and even large dogs will not attack one of the ſmalleſt ſize who is infected with this diſeaſe. Upon this ſuppoſition they point out a method of diſcovering whether a dog who hath been killed was really mad or not; namely, by rubbing a piece of meat along the inſide of his mouth, and then offering it to a ſound dog. If the latter eats it, it is a ſign the dog was not mad; but if the other rejects it with a kind of howling noiſe, it is certain that he was. Dr. James tells us, that among dogs the diſeaſe is infectious by ſtaying in the ſame place; and that, after a kennel has been once infected, the dogs put into it will be for a conſiderable time afterwards in danger of going mad alſo. A remedy for this, he ſays, is, to keep geeſe for ſome time in the kennel. He rejects as falſe the opinion that dogs when going mad will not bark; though he owns that there is a very conſiderable change in their bark, which becomes hoarſe and hollow.

In no diſeaſe whatever are we more at a loſs to diſcover the cauſes than in the hydrophobia. In dogs, foxes, and wolves, it ſeems to come on ſpontaneouſly; though this is conteſted by ſome authors. It is ſaid, that the cauſes commonly aſſigned, viz. heat, feeding upon putrid fleſh, want of water, &c. are not ſufficient for producing the diſtemper. It does not appear that madneſs is more frequent among dogs in the warm than in the cold climates; nay, in the iſland of Antigua, where the climate is very hot, and the water very ſcarce, this diſtemper has never, it is ſaid, been obſerved. As to putrid aliment, it ſeems natural for dogs to prefer this to any other, and they have been known to ſubſiſt upon it for a long time without any detriment. For theſe reaſons, they think the diſeaſe ariſes from a ſpecific contagion, like the ſmall-pox and meaſles among the human race, which, being once produced by cauſes unknown, continues to be propagated by the intercourſe which dogs have with each other, as the diſeaſes juſt mentioned continue to be propagated among the human race by means of the intercourſe which they have with one another.

With regard to the immediate cauſe among mankind, there is not the leaſt doubt that the hydrophobia is occaſioned by the ſaliva of the

mad animal being mixed with the blood. It does not appear that this can operate through the cuticula; but, when that is rubbed off, the smallest quantity is sufficient to communicate the disease, and a slight scratch with the teeth of a mad animal has been found as pernicious as a large wound. It is certain also, that the infection has been communicated by the bites of dogs, cats, wolves, foxes, weasels, swine, and even cocks and hens, when in a state of madness. But it does not appear that the distemper is communicable from one hydrophobous person to another, by means of the bite, or any other way. Dr. Vaughan inoculated a dog with the saliva of a hydrophobous child, but the animal continued free from disease for two months; and, though the doctor promised to inform the public if it should happen to occur afterwards, nothing has hitherto appeared on that subject. A nurse also frequently kissed the child during this time of his disorder, but no bad consequence ensued.

When we attempt to investigate the nature of the cause of the hydrophobia by dissections, our inquiries are commonly disappointed. In two bodies opened by Dr. Vaughan, there was not the least morbid appearance; in the very fauces, where we might have expected that the disease would have shewn itself most evidently, there was not the least appearance even of inflammation. The stomach, intestines, diaphragm, œsophagus, &c. were all in a natural state: neither do we find in authors of credit any certain accounts of morbid appearances in the bodies of hydrophobous persons after death. Dr. Vaughan therefore concludes, that the poison acts upon the nervous system; and is so wholly confined to it, that it may be doubted whether the qualities of the blood are altered by it or not; and that it acts upon the nerves by impairing and disturbing their functions to such a degree as speedily to end in a total extinction of the vital principle. As to the difficulty in swallowing generally believed to accompany dread of the water, he treats it as a misrepresentation, as well as that the œsophagus with the muscles subservient to deglutition are especially concerned in this disease. The principal foundation of the evil, he thinks, rests on a morbid sensibility both of the external and internal fauces. For the sight of a liquid, or the application of any substance to the internal fauces, but more especially of a fluid, instantly excites the most painful feelings. Nay, the same symptoms are produced by touching the external fauces with a fluid, or by the contact of cold air with these parts; and nearly in as great a degree. But, a solid or a fluid substance being conveyed into the œsophagus, the transit into the stomach is accomplished with little or no impediment; so that in fact the difficulty is surmounted before the patient be engaged in the action of swallowing. Nor is the excruciating pain, which never fails to be the companion of every attempt to drink, felt in the *fauces* and *throat*: it is, he says, at the *scrobiculus cordis*; to which the sufferer applies his hand. From this last circumstance, therefore, from the presence of the *risus sardonius*, from the muscles of the abdomen being forcibly contracted, and from the sense of suffocation which seems to threaten the patient with immediate death, Dr. Vaughan has been led to think that in the hydrophobia a new sympathy was established between the fauces, the diaphragm, and the abdominal muscles.

When a person is bit, the prognosis with regard to the ensuing hydrophobia is very uncertain. All those who are bit do not fall into the

the diſeaſe; nay, Dr. Vaughan relates that, out of thirty bit by a mad dog, only one was ſeized with the hydrophobia. During the interval betwixt the bite and the time the diſeaſe comes on, there are no ſymptoms by which we can certainly judge whether it will appear or not. When once it hath made its appearance, the prognoſis is exceedingly fatal.

It has been generally allowed by practitioners, that, though the hydrophobia may be prevented, yet it can ſeldom if ever be cured after it has made its appearance. The moſt eſſential part of the treatment therefore depends on the proper uſe of means of prevention. The great objects to be aimed at in prevention, are, in the firſt place, the complete removal of the contagious matter as ſoon as poſſible; or, ſecondly, means of deſtroying it at the part, where there is even the ſlighteſt reaſon to believe that it has not been completely removed. Of all the means of removal, the complete cutting out the part to which the tooth has been applied, is unqueſtionably the moſt to be depended upon. This practice, therefore, ſhould be had recourſe to as ſoon as poſſile. The ſooner it can be accompliſhed, the better. But as it has been obſerved, that a peculiar ſenſation at the part affected always precedes the acceſſion of the diſeaſe, even when it takes place at a late period after the bite, there is good ground for believing the removal of the part may be of advantage even after a conſiderable interval. But beſides the removal of the contagious matter, by cutting away the part to which it is attached, this ſhould alſo be done by careful and long-continued waſhing. This may be done, in moſt inſtances, before a proper opportunity can be had of having recourſe to the knife. Cold water ſhould particularly be poured upon the wound from a conſiderable height, that the matter may be waſhed away with ſome force. Even after removal by the knife, careful waſhing is ſtill a neceſſary and proper precaution. And after both theſe, to prevent as far as can be the poſſibility of any contagious matter lurking about the wounded part, it ſhould not be allowed to heal, but a diſcharge of matter ſhould be ſupported for the ſpace of ſeveral weeks, by ointment with cantharides, or ſimilar applications. By theſe means there is at leaſt the beſt chance of removing the matter at a ſufficiently early period. And this mode of prevention ſeems to be of more conſequence than all others put together which have hitherto been diſcovered. But beſides removal, prevention may alſo be obtained by the deſtruction of the contagious matter at the part; and, where there is the leaſt reaſon to think that a complete removal has not been obtained, theſe ſhould always be had recourſe to. With this intention the actual cautery and burning with gun-powder have been employed; and the action of fire is probably one of the moſt powerful agents that can be uſed for this purpoſe. But recourſe has alſo been had to waſhing both with acids and with alkalies. Of the former kind, vinegar has been chiefly uſed, but more may probably be expected from the latter; and particularly from the cauſtic alkali, ſo far diluted that it can be applied with ſafety: for from its influence as a ſolvent of animal mucus, it gives a better chance of a complete removal of the matter, independent of any influence in changing its nature. It has been thought alſo, that oil applied to the part may be of ſervice. But if recourſe be had to it, more active meaſures ſhould at leaſt be previouſly em-

ployed; and even then, some are of opinion that it is of advantage to increase the activity of the unctuous matter by combining it with mercury.

On these grounds, and by these means, we are inclined to think that the action of this contagion on the system, after it has been applied by the bite of a rabid animal, may be most effectually prevented. But, after this action has once taken place, no remedy has yet been discovered on which much dependence can be put. A very great variety of articles indeed have at different periods been held forth as infallible, both in the prevention and cure of this affection; but their reputation has, perhaps, universally been founded on their being given to people, who, though really bit by a mad dog, were yet not infected with the contagion. And this happily, either from the tooth being cleaned in making the bite, or not being covered with contagious matter, is by no means an unfrequent occurrence. Mankind, however, even from the earliest ages, have never been without some boasted specific, which has been held forth as an infallible remedy for this affection till fatal experience demonstrated the contrary. Dr. Boerhaave has given a pretty full catalogue of those specifics from the days of Galen to his own time; and concludes, that no dependence is to be put in any of them. It is now, therefore, altogether unnecessary to take notice of burnt crabs, the hyæna's skin, mithridate with tin, liver of the rabid animal, or a variety of other pretended remedies for this disease, proved by experience to be totally inefficacious. But, although no greater confidence is perhaps to be put on specifics of modern date, it will be proper that these should be mentioned.

Bathing in cold water, especially in the sea, and drinking sea-water for a certain time, have been prescribed, and by some accounted a certain preventive. When this was known to fail, a long course of antiphlogistic regimen, violent submersion in water, even to danger of drowning, and keeping the wounded place open with cauteries, were recommended.—To this extreme severity Dr. Mead objected; and in his treatise on this subject endeavours to shew, that in all ages the greatest success has been reaped from diuretics, for which reason he proposes the following powder: "Take ash-coloured ground-liverwort, half an ounce; black-pepper, two drachms: reduce them separately to powder, then mix them together." This powder was first published in the Philosophical Transactions, by Mr. Dampier, in whose family it had been kept as a secret for many years. But this medicine, which was inserted in former editions of the London and Edinburgh Pharmacopœias, under the name of *Pulvis Antilyssus*, has long lost its credit.

There is a famous East-India medicine, composed of twenty-four grains of native and as much factitious cinnabar, made into a powder with sixteen grains of musk. This is called the *Tonquin* medicine, and must be taken in a tea-cupful of arrack or brandy; and is said to secure the patient for thirty days, at the expiration of which it is to be repeated; but, if he has any symptoms of the disease, it must be repeated in three hours, which is said to be sufficient for a cure. The first dose is to be taken as soon after the bite as possible.

Another celebrated remedy is Palmarius's powder, composed of the leaves of rue, vervain, sage, polypody, wormwood, mint, mugwort, balm, betony, St. John's-wort, and smaller centaury. These herbs

herbs must be gathered in their prime, dried separately in the shade, and then powdered. The dose is a drachm, or a drachm and an half, taken every day.

A remedy which might promise to be more efficacious than any of those hitherto mentioned is mercury. This hath been recommended in frictions, and to be taken inwardly in the form of calomel and turbith-mineral, in order if possible to raise a slight salivation, on which the efficacy was thought to depend. Besides this, venesection, opium, the bark, and camphor, have been tried in very large quantities; the warm bath; and, in short, every thing which human invention could suggest; but with what success, can best be judged from the following well-authenticated cases.

In the beginning of December 1728, a young gentleman, aged seventeen, was bit by a dog in the middle-finger of the right-hand about the middle of the nail. In the beginning of January 1729, he complained of pain in that finger reaching along the back of the hand to the elbow. In the night between the sixth and seventh days of that month, he became hot and restless: emollient and anodyne fomentations were applied; but the pain became very sharp, and the hydrophobia came on in the night-time. He was blooded; but became worse every hour, and at last quite furious and outrageous. The bandage was thrown off from his arm, and he lost about twenty ounces of blood besides what had formerly been taken from him. This, however, made no abatement of the symptoms, and he died the same night.

In 1753, a woman, seized with the hydrophobia in consequence of the bite of a dog supposed to be mad, was treated in the following manner by Dr. Nugent. First she was blooded to about fifteen ounces; she took fifteen grains of musk in powder, and along with it a pill of two grains of pure opium, every three hours. A plaster of galbanum, with half an ounce of pure opium, was laid to her neck and throat. She began to take these medicines on a Saturday morning, an hour or two after the dread of water had commenced. In the evening she was a little easier at intervals. The musk and opium pill were continued as before, and the hand that was bit was ordered to be chafed with warm salad oil several times a day. Only two papers of powder and two pills were taken in the night, for the last made her sick and vomit. She had little or no sleep, but lay pretty quiet. On Sunday, twenty ounces of blood were taken away, and a clyster with antimonial wine injected: the pills and powders were continued as before. On Sunday evening she could swallow liquids a little better, and she lay quiet most of the night. On Monday her swallowing was greatly better. The musk and opium were continued, and twelve ounces more of blood were taken from her; the plaster was renewed with only two drachms of opium, and the oil was used as before. At night she was better; her hand easy; and by a continuance of these remedies she recovered.—This was the case which chiefly brought opium into reputation.

The following cases published by M. Dessault, a Frenchman, first brought mercury into reputation.—Four men were bitten by the same wolf, on the same day, at the same hour. They were dipped in salt-water, and came back persuaded that they had nothing to fear. Some days after, one of them felt a numbed pain about his scars, while the scars themselves grew hard and rose like

an embroidery: he was soon after seized with the usual symptoms, as was also another. The son of the former likewise began to feel a pain about the cicatrices, and a swelling with hardness; as did also the fourth. They were ordered to rub a drachm and a half of the mercurial or blue ointment upon the cicatrices and about the whole arm. This was repeated three days successively, and then every other day: after the fifth friction, he allowed an interval of two days. Besides this, they took every day a drachm and an half of Palmarius's powder. After the third friction the cicatrices grew flat and soft, the pain went off, their courage returned, and their mind resumed its former tranquillity.

But how far mercury, or indeed any thing else, is from being a specific in the hydrophobia, will appear from the following account of Dr. Wolf's patients.—In the middle of April 1767, seventeen people and a great number of cattle were bitten in the neighbourhood of Warsaw by a mad wolf. One of these, an officer, was brought into the city that same day, and had the best advice of the surgeons and physicians in that place; besides which, he took the bark very copiously with camphor. He continued well till the seventh week, when he became hydrophobous, and died.

Eleven of the others applied to Dr. Wolf on the ninth day. Their wounds were all deeply scarified; diligently washed and fomented with vinegar, salt, and theriaca; and kept open till the 80th day, in those who lived so long. Every two weeks they were blooded largely, and were purged every week with salts and jalap. Their diet was mostly vegetable, and their drink whey and water. They all ate as much as could be got of the herbs *matrisylva* and *anagallis flore puniceo*; and they all took often of the *pulvis Palmarii*. The *muscus cinereus terrestris* could not be got, or it would also have been prescribed. Besides the general treatment, two were rubbed daily with a drachm of mercurial ointment, and had their purges with calomel. Two took every day four ounces of vinegar, three drachms of tincture of poppies, and half an ounce of *rob sambuci* every night. One took every day sixteen grains of camphor, with four scruples of saltpetre, and at night half an ounce of *rob sambuci*.—Two took twenty-four grains of musk, with fifty grains of cinnabar. Other two took from forty to sixty drops of spirit of sal-ammoniac, prepared with quicklime; and the last took a scruple of crystallized salt of tartar made by the mixture of a little spirit of sal-ammoniac with a solution of that salt.

One of the first who used the mercurial ointment was seized with the hydrophobia on the 22d day, immediately after being well purged with calomel. He was blooded copiously, plunged abundantly in cold water, and had several clysters administered, without effect. Two pounds of oil, and as much of drink, were poured down by force; also a drachm of salt of tartar and half a drachm of musk were given in three doses. He then began to drink freely, but died the third day. His companion then left off the use of mercury, and took eighty drops a-day of Dippel's animal oil, till he had taken six drachms of it; after which he went on with one hundred drops daily of spirit of sal-ammoniac made with alkali.

One of those who took the vinegar fell sick the 33d day. He was immediately blooded, and vomited with ipecacuanha. This man was too strong to make experiments on by force: he refused every thing,

thing, and died the third day. His companion, an old man, began to be seized in the same manner: he was purged with salts, took the *morsulæ balsami Peruviani*, and drank lemonade. He recovered, and used afterwards one hundred drops of spirit of sal-ammoniac daily. This was the patient formerly mentioned, whose blood had the fetid smell.

The man who used the camphor fell sick the 33d day. He was thrice copiously blooded, was plunged forcibly into the coldest water for the space of two hours, and was nearly drowned. He was clystered with effect. He himself forced down, with incredible aversion and labour, a great quantity of drink; by which he vomited more than fifty times abundance of frothy slime. He took several ounces of oil, and several boluses of castor and opium, of each four grains, without effect; and died the fourth day.

A girl who used the musk with cinnabar, fell ill the 62d day, and died the third day after. No farther attempt was made to save her life, she being then at a distance. Her companion, a pregnant woman, then left off the musk, and took in its stead spirit of sal-ammoniac.

A woman who had taken nothing fell ill on the 40th day. She suffered terribly in the night, but less in the day-time. Besides the usual symptoms, she had great pain and swelling in her belly. In the space of two days she drank about two bottles of brandy, but would taste no other liquor. The doctor ordered her to mix an equal quantity of oil with her brandy, and to take every day two boluses of castor and opium.—She recovered: and at last took two doses of turbith-mineral, by which she was vomited and purged.

After the 80th day, all the surviving people took thrice the turbith-mineral, except the pregnant woman; and they afterwards continued their alkaline medicines to the 100th day.

On these cases Dr. Wolf makes the following observations—"Thus we see, that the bark, the mercury, the acids, the musk, the feeding on the most famous herbs, the sweating, the *cura antiphlogistica*, are no specifics. I don't know what to say to the alkalies: the danger is not yet over; and there are still four people who used nothing, in as good health as my patients."

The following case by Dr. Raymond of Marseilles, shews the inefficacy of mercury even as a preventive.—On the 19th of July 1765, Mr. Boyer, aged twenty-five, of a bloated cachectic habit, was bit by a mad dog in the interior part of the leg: the wound extended half-way round, bled freely, and was like a great scratch. The patient's leg had been swelled for a considerable time before the accident; and there were also two ulcers in the other leg. Some hours after the accident, the actual cautery was applied to the wound. The doctor was not present at this operation; but the part around the bite was rubbed with mercurial ointment immediately after, and the eschar was dressed with the same ointment. The eschar was separated on the first day, but the dressing was continued till the wound was cicatrised. The second day a bolus of four grains of turbith and eight grains of camphor was exhibited. This procured a considerable evacuation both by vomit and stool, and a spitting also came on. The third day the bitten leg was rubbed with mercurial ointment: in the space of a month the frictions were repeated five times on both legs, three drachms of mercurial ointment being used in each friction. During the same time the bolus was five times repeated;

peated; and this treatment kept up a slight salivation to the 40th day. The evening of the third day he took the *Tonquin medicine*, called also *Sir George Cobb's powder*, in a bolus; which vomited him briskly. This powder was repeated seven or eight times in the month, generally with the same effect. During the first seven or eight days he got four times, in the morning, a drachm of the *anagallis flore puniceo*, fresh gathered and powdered. The 41st day, the turbith bolus was prescribed for the seventh time; he was bathed in the sea, and continued the bathing for two days more. On the 74th he was seized with the distemper; and died on the 76th, seemingly suffocated or strangled, his mouth covered with slaver, and his face bloated. He lost his senses not above half a quarter of an hour before his death. The pulse was quiet the whole time. The doctor says he has reason to suspect the wound was not well cauterized.

Another instance is mentioned by the same author, of a pregnant woman bit by the same dog and on the same day with Mr. Boyer, who was never seized with the distemper. She was treated in much the same manner with him, and salivated a little more. But she was bit through a shamoy leather shoe, which must necessarily have cleaned the animal's teeth of the poisonous saliva before they reached her skin, and to this we are naturally led to ascribe her safety. One of Dr. Wolf's patients also was a pregnant woman, and was not seized with the distemper. Perhaps women in a state of pregnancy may be less liable to this distemper than others; but it is more probable that the contagion was not communicated.

The same author tells us, "There are many examples of the inefficacy of mercurial frictions. A surgeon of Marseilles treated a girl about twelve years of age, bit by a mad dog, with mercurial frictions; applying them as in the *lues venerea*: yet she died of the hydrophobia on the 55th day. Her wound was not cauterized."

In the following case all the most powerful remedies were tried.—In the afternoon of the 29th of Aug. 1778, Dr. Vaughan was called to a boy of eight years of age labouring under a hydrophobia. He had been bit on the wrist by a cat about a month before; of which the marks remained, but without any ulcer, or even the smallest appearance of inflammation. About the middle of the day before Dr. Vaughan saw him, he began to complain of a pain in the part bitten, which ascended up the arm, and affected the temple on that side; soon after which he swallowed liquids with reluctance and difficulty. He was put into the warm bath for three quarters of an hour, during which time he was easier: he had a clyster of five ounces of fresh broth, and thirty drops of laudanum, injected immediately after his coming out of it; a liniment consisting of three drachms of strong mercurial ointment, with the same quantity of oil of amber, was rubbed upon the shoulders and back; two pills of a grain of flowers of zinc, and half a grain of *cuprum ammoniacum*, were taken every three or four hours; and a medicated atmosphere was prepared for him, by burning gum-ammoniac in his room. As these remedies were not attended with any good effect, each dose of pills was ordered to contain two grains of *cuprum ammoniacum*, the same quantity of opium, three grains of flowers of zinc, and ten grains of asafœtida; whilst a solution of that fetid gum, with a drachm of laudanum, was administered as a clyster. These pills, though repeated every four hours, afforded not the smallest relief, nor did they shew the least action on the

the frame. At last the doctor resolved to put in practice the desperate remedy mentioned by Van Helmont, of throwing the patient into cold water, and keeping him there till he is almost drowned. With this view a large tub of cold water, well saturated with common salt, was prepared, into which the poor boy was plunged over head and ears, and there held until he ceased to struggle. He was then taken out again, and the same operation repeated until he became so quiet that the doctor was under apprehensions that a total extinction of life would take place. He was then wrapped up in a blanket and put to bed, and he remained more quiet than he had formerly been; but all his former restlessness soon returned, his pulse sunk, and he died about two o'clock in the morning.

Another celebrated antidote against the poison of a mad dog hath been known for some years by the name of the *Ormskirk medicine*. The true composition of this is kept a secret by the proprietors: however, it has been analysed, and the following composition published by Dr. Heysham as perfectly similar to it in all respects.

"Take half an ounce of chalk, three drachms of Armenian bole, ten grains of alum, one drachm of elecampane in powder; mix them all together, and add six drops of oil of anise."

They must certainly be very credulous who can put confidence in such an insignificant medicine as a preservative against the hydrophobia: however, there is a possibility that there may be some unknown ingredient in the genuine powder; for it is difficult to analyse powders after the ingredients are thoroughly mixed together. The efficacy of the medicine therefore must depend on the virtues of that unknown ingredient, if any such there be. The following cases, however, too well determine that it is not infallible, as was at first pretended. In all probability, as well as many others, its reputation also is solely rested on its being exhibited in many cases where no contagion was communicated to the person bit, and while of course no disease could take place.

On the 14th of February 1774, Mr. Bellamy of Holborn, aged forty, was bit by a cat, which was killed the same morning. The following day he took the celebrated Ormskirk medicine, sold by Hill and Berry, in Hill-street, Berkeley-square, and conformed in every respect to the directions given by the vender. A servant-maid, who was bitten in the leg before her master was bitten, likewise took the same remedy. About the middle of April Mr. Bellamy complained of a pain in his right knee, which he supposed to be rheumatic, and which continued and increased till the 7th of June, when he got some pills of calomel, ipecacuanha, and *pil. sapon.* from an apothecary, with Huxham's tincture of the bark in small doses. In six days more he had a titillation in the urethra, a contraction of the scrotum and penis to a degree of pain, and an emission of semen after making water, to which he had frequent calls. The medicines were discontinued; and on the 16th of that month the hydrophobia came on, and Dr. Fothergill was called. Six ounces of blood were taken from his arm, and a bolus of a scruple of native cinnabar and half a scruple of musk was given every four hours. The distemper manifestly increased through the day. In the evening a clyster was injected, and several times repeated during the night; he had been put into the warm bath, and two drachms strong mercurial ointment rubbed into his legs and thighs by himself.

He was greatly relieved by the warm bath while he continued in it, but the ſymptoms returned with increaſed violence in the night. The next day, being greatly worſe, he was blooded to as large a quantity as he could bear, had the warm bath and clyſters repeated, and half an ounce of mercurial ointment rubbed into his thighs and legs. Pills of opium were preſcribed, but he did not take them. He died the ſame night, at half an hour after twelve. This patient was a man of great reſolution, and could in part conquer his averſion at water. He ſeemed to have totally forgot the accident of the bite: and caſually ſaid, that he thought this diſorder reſembled the hydrophobia, without ſuppoſing that he was afflicted with that diſtemper at the time.—The bite on the girl's leg refuſed to heal, baffled the art of a young ſurgeon who attempted to cure it, and continued a running ulcer for a long time. She did not fall into the hydrophobia. Hence Dr. Fothergill thinks it probable, that keeping the wounds made by the teeth of mad animals open for a long time, would probably be of ſervice as a preventive; but in ſome of Dr. Wolf's patients, theſe artificial drains appear not to have been attended with ſucceſs.

On the 16th of November 1773, Thomas Nourſe, a ſtrong healthy boy of fourteen, was admitted into the Leiceſter infirmary; having been that day month bitten by a mad fox-hound. The wound was a large lacerated one on the cheek, and bled very freely on being inflicted. The day after he was bit he went to the ſea, where he was dipped with all the ſeverity uſually practiſed under ſo diſagreeable an operation. The *Ormſkirk medicine* was alſo adminiſtered with all due care. It was bought of the perſon in Leiceſter who is deputed by the proprietor to ſell it for him. A common adheſive plaſter was applied to the part after ſea-bathing; and in the courſe of a month, without any further trouble, the wound was healed; excepting a ſmall portion, ſomewhat more than an inch in length, and in breadth about one-tenth. This yielded no diſcharge, and was quite in a cicatrizing ſtate. Five days before his admiſſion into the infirmary, he began to complain of a tightneſs over his temples, and a pain in his head: in two days the hydrophobia began to appear; and at its commencement he complained of a boiling heat in his ſtomach, which was continually aſcending to the fauces. The diſeaſe was pretty ſtrong when he came to the infirmary. He got a bolus of a ſcruple of muſk with two grains of opium; then a compoſition of fifteen grains of muſk, one of turbith-mineral, and five grains of opium, was directed to be taken every third hour; an ounce of the ſtronger mercurial ointment was to be rubbed on the cervical vertebræ and ſhoulders, and an embrocation of two ounces of laudanum, and half an ounce of *acetum ſaturninum*, was directed to be applied to the throat. But by this laſt he was thrown into convulſions, and the ſame effect followed though his eyes were firſt covered with a napkin. The embrocation was therefore changed for a plaſter of three drachms of powdered camphor, half an ounce of opium, and ſix drachms *confectio Damocritis*. By theſe medicines the diſeaſe ſeemed to be ſomewhat ſuſpended, but the ſymptoms returned with violence in the evening. His medicine was repeated at ſeven; and at eight five grains of opium were exhibited without muſk or turbith. At nine, another ounce of mercurial ointment

was

was rubbed upon the shoulders, and half an ounce of laudanum with six ounces of mutton-broth was injected into the intestines, but to no purpose. A large dose of opium was then given, but with as little effect as the former, and he died the same night.

In the month of September 1774, a farmer, aged twenty-five, was bit by a mad dog, whose teeth made a slight wound in the fore-finger of the left hand. He was dipped, as usual, in the sea; and drank the sea-water for some time on the spot, which operated briskly as a purge. He continued well till the 6th of June following, when he first felt a pain in that hand and arm; for which he bathed in a river that evening, supposing that it had been a rheumatic complaint. The next day he was sick; and in the evening was seized with a violent vomiting, which continued all that night and till the middle of the next day, when it was succeeded by the hydrophobia. He was treated with the warm bath; had a purgative clyster injected; and, as soon as it had operated, a second was given, consisting of four ounces of oil and half an ounce of laudanum: half an ounce of strong mercurial ointment was rubbed on the fauces, and the part was afterwards covered with the *cataplasma e cymino*, to which was added an ounce of opium. An embrocation was applied to the region of the stomach with continued friction, consisting of half an ounce of spirit of sal-ammoniac, ten drachms of oil olive, six drachms of oil of amber, and ten drachms of laudanum. Two ounces of strong mercurial ointment were rubbed upon the shoulders and back; and, as a further means of kindling a ptyalism speedily, he received the smoke of cinnabar into the mouth by throwing a drachm of that substance now and then upon a hot iron: he was also directed to take every four hours a bolus of fifteen grains of musk, three grains of turbith-mineral, and four grains of opium. He was easier while in the warm bath, and during the application of the ointment; but died the same night about two o'clock.

Many other instances might be adduced of the inefficacy of this pretended specific: the danger of acquiescing in which, will, it is hoped, create a due degree of caution in those to whom they who are so unfortunate as to be bit by a mad animal may commit themselves. Another remedy may also be mentioned as having had the reputation of being sometimes successful in this disease; which is chiefly employed in different parts of India, particularly in the territory of Tanjore. The medicine to which we now allude contains indeed several articles which are altogether unknown in our materia medica: but it contains at least one very powerful substance well known to us, viz. arsenic. This medicine, known by the name of the Snake Pills, as being principally employed against the bite of the most venomous snakes, is directed to be prepared in the following manner:

Take white arsenic, of the roots of nelli navi, of nevi visham, of the kernels of the ner valum, of pepper of quicksilver, each an equal quantity. The quicksilver is to be rubbed with the juice of the wild cotton till the globules are perfectly extinguished. The arsenic being first levigated, the other ingredients, reduced to a powder, are then to be added, and the whole beat together with the juice of the wild cotton to a consistence fit to be divided into pills.

Though these pills are principally used against the bite of the cobra de capello, yet they are said also to be successful in the cure of

other venomous bites; and, for the prevention of rabies canina, one is taken every morning for some length of time. Of this remedy European practitioners have, we believe, as yet no experience; and, if, in the accounts transmitted by East-India practitioners, it cannot be said that we have authentic evidence of its want of success, it can as little be pretended that there is indubitable evidence of its efficacy in any instance; and it is by no means improbable, that it will be found equally inefficacious with others at one time considered as infallible.

Of the great variety of remedies which have had their day of reputation, there is not one which has not possessed the credit, some time or other, of preventing the noxious effects arising from the bite of a mad dog. A more adequate experience has with all of them discovered the deception. It was above observed, that the hydrophobia is by no means the infallible consequence of being bit by a mad animal; and that of between twenty and thirty persons who were bit by the dog which gave the fatal wound to one of Dr. Vaughan's patients, not one felt the least ill effect but himself. "In the above number (says the doctor) were some who took the Ormskirk medicine; others went to the salt-water; and a part of them used no remedy, who yet fared equally well with the most attentive to their injury. The same thing has often happened before; and much merit, I doubt not, has been attributed to the medicine taken, from that celebrated one of Sir George Cobb down to the infallible one which my good Lady Bountiful's receipt-book furnishes."

From all that has been said, the reader will judge how far the hydrophobia is capable of being subdued by any of the medicinal powers which have yet been tried. Some eminent physicians assert that it is totally incurable; and allege that the instances recorded by different authors of its cure have not been the genuine kind, but that which comes on spontaneously, and which is by no means so dangerous. Indeed two of Dr. Wolf's patients recovered, where the disease seems to have been perfectly genuine: but in these the poison seemed to vent itself partly on some other place besides the nervous system. In one the blood was evidently infected, as it had an abominable fœtor; and the other had a violent pain and swelling in the belly. In all the others, it seemed to have attacked only the nervous system; which perhaps has not the same ability to throw off any offending matter as the vascular system.

There is, however, a possibility that the prodigious affections of the nerves may arise only from a vitiated state of the gastric juices; for it is well known, that the most terrible convulsions, nay the hydrophobia itself, will arise from an affection of the stomach, without any bite of a mad animal. This seems to be somewhat confirmed from one of Dr. Wolf's patients, who, though he vomited more than fifty times, yet still threw up a frothy matter, which was therefore evidently secreted in the stomach, just as a continual vomiting of bilious matter shews a continual and extraordinary secretion of bile. Dr. Wolf himself adopts this hypothesis so far as to say, that perhaps the serum may become frothy; but in blood drawn from a vein not the least fault appears either in the serum or crassamentum. He affirms, however, that the duodenum appears to be one of the parts first and principally affected; and, as it is not inflamed, it would seem that

that the affection it ſuſtains muſt ariſe from the vitiated ſtate of its juices.

Be this as it will, however, in the hydrophobia, the ſtomach ſeems totally, or in a great meaſure, to loſe the power which at other times it poſſeſſes. Two grains of *cuprum ammoniacum* were repeatedly given to a child of eight years of age without effect; but this doſe would occaſion violent vomiting in a ſtrong healthy man. Something or other therefore muſt have prevented this ſubſtance from acting on the nervous coat of the ſtomach; and this we can only ſuppoſe to have been the exceedingly diſordered ſtate of the gaſtric juice, which occaſioned ſuch violent irritation through the whole body, that the weaker ſtimulus of the medicine was entirely loſt. It would ſeem proper therefore to conſider the ſtomach in hydrophobic caſes as really containing a poiſonous matter, which could not be expelled by vomiting, becauſe it is renewed as faſt as evacuated. The indication therefore muſt be, to change its nature by ſuch medicines as are certainly more powerful than the poiſon; and this indication will naturally lead us to think of large doſes of alkaline ſalts. Theſe, it is certain, will deſtroy any animal-ſubſtance with which they come in contact, and render even the poiſon of ſerpents inactive. By exhibiting a few doſes of them, larger no doubt than what could be ſafely done on other occaſions, we ſhould be certain to change the ſtate of the ſtomachic juices; and thus might free the patient from thoſe intolerable ſpaſms which always occaſion death in ſuch a ſhort time. Dr. Wolf ſeems inclined to think that volatile alkalies were of ſervice; but the above hypotheſis would incline us to uſe rather the fixed kind. At any rate, it ſeems vain for phyſicians to truſt much to the power of opium, mercury, muſk, or cinnabar, either ſingly or combined in any poſſible way. The bark has alſo failed, and the moſt celebrated ſpecifics have been found ineffectual. Alkalies are the next moſt powerful remedies which the *materia medica* affords, and they cannot be more unſucceſsful than the others have generally been.

Another remedy which ſeems adapted to change the nature of the gaſtric juices is ſpirits. In one of Dr. Wolf's patients two bottles of brandy ſeem to have effected a cure. The oil mixed with it was of no efficacy in other caſes, and the opium and turbith ſeem not to have been exhibited till the worſt was paſt. In this caſe the diſeaſe ſeems to have attacked the vaſcular as well as the nervous ſyſtem.

In all the patients the warm bath ſeems to have been a palliative, and a very powerful one, and as ſuch it ought never to be omitted, though we can by no means truſt to it as a radical cure; and the above hiſtories abundantly ſhew, that, though the warm bath and opium may palliate for a ſhort time, the cauſe on which the ſpaſms depend is ſtill going on and increaſing, till at laſt the ſymptoms become too ſtrong to be palliated even for a moment by any medicine however powerful. At any rate, the above-mentioned hypotheſis ſuggeſts a new indication, which, if attended to, may perhaps lead to uſeful diſcoveries. In caſes where putreſcent bile is abundantly ſecreted, columbo-root and vegetable acids are recommended, to change the nature of the poiſon which the body is perpetually producing in itſelf. Where corroſive mercury hath been ſwallowed, alkaline ſalt is recommended to deſtroy the poiſon which nature cannot expel by vomiting; and why ſhould not ſomething be attempted

to

to destroy the poison which the stomach seems to secrete in the hydrophobia, and which nature attempts to expel, though in vain, by violent efforts to vomit?

But whatever plan may be pursued in the hopes of curing this dreadful malady after any of the symptoms have made their appearance, we ought, in every instance of the accident that gives rise to it, to direct our immediate care to prevention, as being perhaps the only real ground of hope:—And the most certain and efficacious way of preventing the ill consequences, is instantly (if it may be done) to cut out the piece in the place that happens to be bitten. Dr. James, indeed, says, that he would have little opinion of cutting or cauterising, if ten minutes were suffered to elapse from the receiving of the bite before the operation was performed. But, in an inaugural dissertation lately published at Edinburgh by Dr. Parry, the author is of opinion that excision will be of use a considerable time after the bite is received. He adopts this opinion from what happens in the small-pox, where the blood does not seem to receive the infection till some days after inoculation has been performed. A second inflammation, he tells us, then takes place, and the infection is conveyed into the blood. In like manner, when the hydrophobous infection is about to be conveyed into the blood, according to him, the wound, or its cicatrix, begins again to be inflamed; and it is this second inflammation which does all the mischief. Excision, or the cautery, will therefore be effectual any time betwixt the bite and the second inflammation of the wound. Without implicitly trusting to this doctrine, however, or considering it as in any degree ascertained in what manner the poison diffuses itself, by what marks its progress may be known, or how soon the system may be irremediably tainted with its malignity, it is undoubtedly safest not to lose unnecessarily a moment's time in applying the knife. This, or a dilation of the wound if it be small, Dr. Vaughan considers as the only prophylactics that can be depended upon. In the latter case, he directs to fill the wound with gun-powder, and set fire to it; which would produce a laceration of the part, and possibly the action of ignited powder upon the poison may have its use. In all cases, likewise, after these practices have been employed, the wound should be prevented from healing for some length of time.—A new remedy for this shocking malady, called the Solar Tincture, is now recommended, the efficacy and powers of which may be seen in a book lately published, entitled The Medical Mirror.

THE SHIPWRECKED BROTHERS.

IN the beginning of the sixteenth century, the Portuguese carracks sailed from Lisbon to Goa, a very great, rich, and flourishing colony of that nation in the East-Indies. There were no less than twelve hundred souls, mariners, passengers, priests, and friars, on-board one of these vessels. The beginning of their voyage was prosperous; they had doubled the southern extremity of the great continent of Africa, called the Cape of Good Hope, and were steering their course north-east, to the great continent of India, when some gentlemen on-board, who, having studied geography and navigation, (arts which reflect honour on the possessors,) found in the latitude in which they were then sailing a large ridge of rocks

laid

laid down in their sea-charts. They no sooner made this discovery, than they acquainted the captain of the ship with the affair, desiring him to communicate the same to the pilot; which request he immediately granted, recommending him to lie by in the night, and slacken sail by day, until they should be past the danger. It is a custom always among the Portuguese absolutely to commit the sailing part, or the navigation of the vessel, to the pilot, who is answerable with his head for the safe conduct or carriage of the king's ships, or those belonging to private traders; and he is under no manner of direction from the captain, who commands in every other respect.

The pilot, being one of those self-sufficient men who think every hint given them from others in the way of their profession derogatory from their understandings, took it as an affront to be taught his art, and, instead of complying with the captain's request, actually crowded more sail than the vessel had carried before. They had not sailed many hours, but just about the dawn of day, a terrible disaster befel them, which would have been prevented if they had lain by. The ship struck upon a rock. I leave to the reader's imagination, what a scene of horror this dreadful accident must occasion among twelve hundred persons, all in the same inevitable danger, beholding with fearful astonishment that instantaneous death which now stared them in the face!

In this distress, the captain ordered the pinnace to be launched, into which having tossed a small quantity of biscuit, and some boxes of marmalade, he jumped in himself with nineteen others, who with their swords prevented the coming in of any more, lest the boat should sink. In this condition they put off into the great Indian ocean, without a compass to steer by, or any fresh water but what might happen to fall from the heavens, whose mercy alone could deliver them. After they had rowed to and fro four days in this miserable condition, the captain, who had been for some time very sick and weak, died: this added, if possible, to their misery, for, as they now fell into confusion, every one would govern, and none obey. This obliged them to elect one of their own company to command them, whose orders they implicitly agreed to follow. This person proposed to the company to draw lots, and to cast every fourth man over-board; as their small stock of provisions was so far spent, as not to be able at a very short allowance to sustain life above three days longer. They were now nineteen persons in all: in this number were a friar and a carpenter, both of whom they would exempt, as the one was useful to absolve and comfort them in their last extremity, and the other to repair the pinnace in case of a leak or other accident. The same compliment they paid to their new captain, he being the odd man, and his life of much consequence. He refused their indulgence a great while; but at last they obliged him to acquiesce, so that there were four to die out of the sixteen remaining persons.

The three first, after having confessed and received absolution, submitted to their fate. The fourth, whom fortune condemned, was a Portuguese gentleman that had a younger brother in the boat, who, seeing him about to be thrown over-board, most tenderly embraced him, and with tears in his eyes besought him to let him die in his room, enforcing his arguments by telling him that he was a

married

married man, and had a wife and children at Goa, besides the care of three sisters, who absolutely depended upon him; that, as for himself, he was single, and his life of no great importance: he therefore conjured him to suffer him to supply his place. The elder brother, astonished, and melting with this generosity, replied, that, since the divine Providence had appointed him to suffer, it would be wicked and unjust to permit any other to die for him, especially a brother, to whom he was so infinitely obliged. The younger, persisting in his purpose, would take no denial; but throwing himself on his knees, held his brother so fast, that the company could not disengage them. Thus they disputed for a while, the elder brother bidding him to be a father to his children, and recommended his wife to his protection, and, as he would inherit his estate, to take care of their common sisters; but all he could say could not make the younger desist. This was a scene of tenderness that must fill every breast susceptible of generous impressions with pity. At last the constancy of the elder brother yielded to the piety of the other. He acquiesced, and suffered the gallant youth to supply his place, who being cast into the sea, and a good swimmer, soon got to the stern of the pinnace, and laid hold of the rudder with his right hand, which being perceived by one of sailors, he cut off the hand with his sword; then, dropping into the sea, he presently caught hold again with his left, which received the same fate by a second blow; thus dismembered of both hands, he made a shift notwithstanding to keep himself above water with his feet and two stumps, which he held bleeding upwards.

This moving spectacle so raised the pity of the whole company, that they cried out, He is but one man, let us endeavour to save his life; and he was accordingly taken into the boat, where he had his hands bound up as well as the place and circumstances could permit. They rowed all that night and the next morning: when the sun arose, as if heaven would reward the gallantry and piety of this young man, they descried land, which proved to be the mountains Mozambique, in Africa, not far from a Portuguese colony. Thither they all safely arrived, where they remained until the next ship from Lisbon passed by and carried them to Goa.

At that city, Linschoten, a writer of good credit and esteem, assures us, that he himself saw them land, supped with the two brothers that very night, beheld the younger with his stumps, and had the story from both their mouths as well as from the rest of the company.

CAUSES AND CURE OF THE PLAGUE.

THE plague is a sort of pestilential fever, very acute, malignant, and contagious; being a putrid fever of the worst kind, and seldom failing to prove mortal. Though it is generally defined a malignant fever, Diemerbroek thinks they ought to be distinguished, since the fever is not the essence of the disease, but merely a symptom or effect of it.

The plague, as is generally agreed, is never bred or propagated in Britain, but always imported from abroad, especially from the Levant, Lesser Asia, Egypt, &c. where it is very common. Sydenham

ham has remarked that it rarely infests this country oftener than once in forty years, and happily we have been free of it for a much longer period.

Authors are not as yet agreed concerning the nature of this dreadful distemper. Some think that insects are the cause of it, in the same way that they are the cause of blights, being brought in swarms from other climates by the wind, when they are taken into the lungs in respiration; the consequence of which is, that they mix with the blood and juices, and attack and corrode the viscera. Mr. Boyle, on the other hand, thinks it originates from the effluvia or exhalations breathed into the atmosphere from noxious minerals, to which may be added stagnant waters and putrid bodies of every kind.

Mr. Gibbon thinks that the plague is derived from damp, hot, and stagnating, air, and the putrefaction of animal substances, especially locusts.

The Mahometans believe that the plague proceeds from certain spirits, or goblins, armed with bows and arrows, sent by God to punish men for their sins; and that, when the wounds are given by spectres of a black colour, they certainly prove fatal, but not so when shot by those that appear white. They therefore take no precaution to guard themselves against it. The wiser professors of this religion, however, at present act otherwise; for we find a receipt recommended by Sidy Mohammed Zerroke, one of the most celebrated Marabouts, prefaced with these very remarkable words: "The lives of us all are in the hands of God, when it is we must die. However, it hath pleased him to save many persons from the plague, by taking every morning while the infection rages one pill or two of the following composition, viz. of myrrh two parts, saffron one part, of aloes two parts, of syrup of myrtle-berries, *q. s.*" But this remedy is confined to the more enlightened; for the bigotry of the lower sort is so extreme as to make them despise all precautions which people of other nations use. Of this extreme and foolish prejudice Dr. Chandler gives an interesting account when speaking of the plague at Smyrna. This learned author is of opinion that the disease arises from animalcules, which he supposes to be invisible.

It is a remarkable fact, that plagues are sometimes partial, and that they only attack particular animals, or a particular description of persons, avoiding others altogether, or attacking them but slightly. Thus Fernelius informs us of a plague or murrain, in 1514, which invaded only cats. Dionysius Halicarnasseus mentions a plague which attacked none but maids; and that which raged in the time of Gentilis, killed scarcely any women, and very few but lusty men. Boterus mentions another plague, which assaulted none but the younger sort; and Cardan speaks of a plague at Basil, with which the Switzers were infected, and the Italians, Germans, or French, exempted: and John Utenhovius takes notice of a dreadful one at Copenhagen, which, though it raged among the Danes, spared the Germans, Dutch, and English, who went with all freedom, and without the least danger, to the houses of the infected. During the plague which ravaged Syria in 1760, it was observed that people of the soundest constitutions were the most liable to it, and that the weak and delicate were either spared or easily cured. It was most fatal to the Moors; and when it attacked them it was generally incurable.

When the plague raged in Holland in 1636, a young girl was seized with it, had three carbuncles, and was removed to a garden, where her lover, who was betrothed to her, attended her as a nurse, and slept with her as his wife. He remained uninfected, and she recovered, and was married to him. The story is related by Vinc. Fabricius in the Misc. Cur. Ann. II. Obs. 188.

Many methods have been adopted in different countries to prevent the importation of this dreadful scourge of the human race, and to stop the progress of infection after it has been imported. In England, mayors, bailiffs, head officers of corporations, and justices of peace, have power to tax inhabitants, houses, and lands, &c. within their precincts, for the relief of persons infected with the plague; and justices of the county may tax persons within five miles round, on a parish's inability; the tax to be levied by distress and sale of goods, or in default thereof by imprisonment. Infected persons going abroad, after being commanded to keep house for avoiding farther infection, may be resisted by watchmen, &c. and punished as vagrants, if they have no sores upon them; and if they have infectious sores on them it is felony. Justices of peace, &c. are to appoint searchers, examiners, and buriers of the dead, in places infected, and to administer oaths to them for the performance of their duties, &c. stat. 1 Jac. I. cap. 31.

The commission at Moscow having, in the year 1770, invented a fumigation powder, which, from several smaller experiments, had proved efficacious in preventing the infection of the plague; in order more fully to ascertain its virtues in that respect, it was determined, towards the end of the year, that ten malefactors under sentence of death should, without undergoing any other precautions than the fumigations, be confined three weeks in a lazaretto, be laid upon the beds, and dressed in the clothes, which had been used by persons sick, dying, and even dead, of the plague in the hospital. The experiment was accordingly tried, and none of the ten malefactors were then infected, or have been since ill. The fumigation-powder is prepared as follows:

Powder of the first strength. Take leaves of juniper, juniper-berries pounded, ears of wheat, guaiacum-wood pounded, of each six pounds; common saltpetre pounded, eight pounds; sulphur pounded, six pounds; Smyrna tar, or myrrh, two pounds; mix all the above ingredients together which will produce a pood of the powder of fumigation of the first strength. [N. B. A pood is forty pounds Russian, which are equal to thirty-five pounds and a half or thirty-six pounds English avoirdupoise.]

Powder of the second strength. Take southernwood cut into small pieces, four pounds; juniper-berries pounded, three pounds; common saltpetre pounded, four pounds; sulphur pounded, two pounds and a half; Smyrna tar, or myrrh, one pound and a half: mix the above together, which will produce half a pood of the powder of fumigation of the second strength.

Odoriferous powder. Take the root called kalmus cut into small pieces, three pounds; leaves of juniper cut into small pieces, four pounds; frankincense pounded grossly, one pound; storax pounded, and rose-flowers, half a pound; yellow amber pounded, one pound; common saltpetre pounded, one pound and a half; sulphur, a quarter of a pound: mix all the above together, which will produce nine pounds and three quarters of the odoriferous powder.

Remark

Remark on the powder of fumigation. If guaiacum cannot be had, the cones of pines or firs may be used in its stead; likewise the common tar of pines or firs may be used instead of the Smyrna tar, or myrrh; and mugwort may supply the place of southernwood.

Thucydides, who was himself infected, lib. ii. gives us an account of a dreadful plague which happened at Athens about the year before Christ 430, while the Peloponnesians under the command of Archidamus wasted all her territory abroad; but of these two enemies the plague was by far the most dreadful and severe.

The most dreadful plague that ever raged at Rome was in the reign of Titus, A. D. 80. The emperor left no remedy unattempted to abate the malignity of the distemper, acting during its continuance like a father to his people. The same fatal disease raged in all the provinces of the Roman empire in the reign of M. Aurelius, A. D. 167, and was followed by a dreadful famine, by earthquakes, inundations, and other calamities. The Romans believed that Æsculapius sometimes entered into a serpent and cured the plague.

About the year 430 the plague visited Britain, just after the Picts and Scots and made a formidable invasion of the southern part of the island. The plague raged with uncommon fury, and swept away most of those whom the sword and famine had spared, so that the living were scarcely sufficient to bury the dead.

About the year 1348 the plague became almost general over Europe. A great many authors give an account of this plague, which is said to have appeared first in the kingdom of Kathay in the year 1346, and to have proceeded gradually westward to Constantinople and Egypt. From Constantinople it passed into Greece, Italy, France, and Africa, and by degrees along the coasts of the ocean into Britain and Ireland, and afterwards into Germany, Hungary, Poland, Denmark, and the other northern kingdoms. According to Antoninus archbishop of Florence the distemper carried off 60,000 people in that city, among whom was the historian John Villani.

In the year 1656 the plague was brought from Sardinia to Naples, being introduced into the city by a transport with soldiers on-board. It raged with excessive violence, carrying off in less than six months 400,000 of the inhabitants. The distemper was at first called by the physicians a malignant fever; but one of them affirming it to be pestilential, the viceroy, who was apprehensive lest such a report would occasion all communication with Naples to be broken off, was offended with this declaration, and ordered him to be imprisoned. As a favour, however, he allowed him to return and die in his own house. By this proceeding of the viceroy, the distemper, being neglected, made a most rapid and furious progress, and filled the whole city with consternation. The streets were crowded with confused processions, which served to spread the infection through all quarters. The terror of the people increased their superstition; and, it being reported that a certain nun had prophesied that the pestilence would cease upon building a hermitage for her sister-nuns upon the hill of St. Martin's, the edifice was immediately begun with the most ardent zeal. Persons of the highest quality strove who should perform the meanest offices; some loading themselves with beams, and others carrying baskets full of lime and nails, while persons of all ranks stripped themselves of the most valuable effects, which they threw into empty hogsheads placed in the streets to receive the charitable contributions. Their

violent agitation, however, and the increasing heats, diffused the malady through the whole city, and the streets and the stairs of the churches were filled with the dead; the number of whom, for some time of the month of July, amounted daily to 15,000.

The viceroy now used all possible precaution to abate the fury of the distemper, and to prevent its spreading to the provinces. The infection, however, desolated the whole kingdom, excepting the provinces of Otranto and the Farther Calabria, and the cities of Gaeta, Sorrento, Paolo, and Belvedere. The general calamity was increased in Naples by malecontents, who insinuated that the distemper had been designedly introduced by the Spaniards, and that there were people in disguise who went through the city sowing poisoned dust. This idle rumour enraged the populace, who began to insult the Spanish soldiers, and threaten a sedition; so that the viceroy, to pacify the mob, caused a criminal to be broke upon the wheel, under pretence that he was a disperser of the dust. A violent and plentiful rain falling about the middle of August, the distemper began to abate; and on the eighth of December the physicians made a solemn declaration that the city was entirely free from infection.

In 1665, London was ravaged by the most violent plague ever known in Britain. The whole summer had been remarkably still and warm, so that the weather was sometimes suffocating even to persons in perfect health; and by this unusual heat and sultry atmosphere, people were undoubtedly prepared for receiving the infection, which appeared with violence in the months of July, August, and September. A violent plague had raged in Holland in the year 1663; on which account the importation of merchandise from that country was prohibited by the British legislature in 1664. Notwithstanding this prohibition, however, it seems the plague had actually been imported; for in the close of the year 1664, two or three persons died suddenly in Westminster, with marks of the plague on their bodies. Some of their neighbours, terrified at the thoughts of their danger, removed into the city; but their removal proved too late for themselves, and fatal to those among whom they came to reside. They soon died of the plague; and communicated the infection to so many others, that it became impossible to extinguish the seeds of it by separating those that were infected from such as were not. It was confined, however, through a hard frosty winter, till the middle of February, when it again appeared in the parish of St. Giles's, to which it had been originally brought; and after another long rest till April, shewed its malignant force afresh, as soon as the warmth of the spring gave it opportunity.—At first, it took off one here and there, without any certain proof of their having infected each other; and houses began to be shut up, with a design to prevent its spreading. But it was now too late; the infection gained ground every day, and the shutting up of houses only made the disease spread wider. People, afraid of being shut up, and sequestered from all communications with society, concealed their illness, or found means to escape from their places of confinement; while numbers expired in the greatest torments, destitute of every assistance; and many died, both of the plague and other diseases, who would in all probability have recovered, had they been allowed their liberty, with proper exercise and air.—A house was shut up on account of a maid-servant, who had only spots and not the gangrenous plague-blotches upon her, so that her

her distemper was probably a petechial fever. She recovered; but the people of the house obtained no liberty to stir, either for air or exercise, for forty days. The bad air, fear, anger, and vexation, attending this injurious treatment, cast the mistress of the family into a fever. The visitors appointed to search the houses said it was the plague, though the physicians were of a different opinion: the family, however, were obliged to begin their quarantine anew, though it had almost expired before; and this second confinement affected them so much, that most of the family fell sick, some of one distemper and some of another. Every illness that appeared in the family produced a fresh prolongation of their confinement; till at last the plague was actually brought in by some of those who came to inquire into the health of the family, and almost every person in the house died. Many examples of a similar kind happened, and this was one of the worst consequences of shutting up houses. All means of putting a stop to the infection were evidently ineffectual. Multitudes fled into the country; many merchants, owners of ships, &c. shut themselves up on-board their vessels, being supplied with provisions from Greenwich, Woolwich, and single farm-houses on the Kentish side. Here, however, they were safe; for the infection never reached below Deptford, though the people went frequently on-shore to the country-towns, villages, and farm-houses, to buy fresh provisions. As the violence of the plague increased, the ships which had families on-board removed farther off; some went quite out to sea, and then put into such harbours and roads as they could best get at.

In the mean time, the distemper made the most rapid advances within the city. In the last week of July, the number of burials amounted to 2010; but the first week of August it rose to 3817; thence to 3880; then to 4237; the next week, to 6102; and at last to 7000 and 8000 weekly. In the last week of September, however, the fury of the disease began to abate; though vast numbers were sick, yet the number of burials decreased from 7155 to 5538; the next week there was a further decrease to 4929, then to 4327, next to 2665, then to 1421, and the next week to 1031.

All this while, the poor people had been reduced to the greatest distresses, by reason of the stagnation of trade, and the sicknesses to which they were particularly liable on account of their manner of living. The rich, however, contributed to their subsistence in a most liberal manner. The sums collected on this occasion, are indeed almost incredible; being said to amount to 100,000l. per week. The king is reported to have contributed 1000l. weekly; and in the parish of Cripplegate alone 17,000l. was distributed weekly among the poor inhabitants.—By the vigilance also of the magistrates, provisions continued remarkably cheap throughout the whole time of this dreadful calamity, so that all riots and tumults on that account were prevented; and, at last, on the cessation of the disease in the winter of 1665, the inhabitants who had fled returned to their habitations, and London to appearance became as populous as ever, though it was computed that 100,000 persons had been carried off by the plague.

In 1720 the city of Marseilles was visited with this destructive disease, brought in a ship from the Levant; and in seven months, during which time it continued, it carried off not less than 60,000 people. This desolation is not yet obliterated from the minds of the inhabitants; some survivors remained alive but a few years ago to transmit

transmit a traditional account of it to after-ages. There are two fine pictures painted by Puget representing some of the horrid scenes of that time. "They are (says Lady Craven) only too well executed. I saw several dying figures taking leave of their friends, and looking their last, anxious, kind, and wishful, prayers on their sick infants, that made the tears flow down my cheeks. I was told the physicians and noblemen who were assisting the sick and dying, were all portraits: I can easily conceive it; for in some faces there is a look of reflection and concern which could only be drawn from the life." This fatal event has caused the laws of quarantine to be very strictly enforced in the Lazaretto here, which is an extensive insulated building.

The ravages of this disease have been dreadful wherever it has made its appearance. On the first arrival of the Europeans at the island of Gran Canaria, it contained fourteen thousand fighting men, soon after which, two thirds of the whole inhabitants fell a sacrifice to the plague, which had doubtless been introduced by their new visitors. The destruction it has made in Turkey in Europe, and particularly in Constantinople, must be known to every reader; and its fatal effects have been particularly heightened there by that firm belief which prevails among the people of predestination.

DESCRIPTION OF THE YELLOW FEVER, AND MODE OF CURE.

THIS is one of the most fatal diseases to which the inhabitants of warm climates are subject, and is the same with that called, from one of its worst symptoms, the black vomit, which is so terribly destructive in the West Indies, and in the warm parts of America. According to Dr. Hillary, the yellow or putrid bilious fever most commonly seizes the patient at first with a faintness, then with a sickness at stomach, accompanied mostly with a giddiness of the head; soon after with a slight chillness and horror, very rarely with a rigor, which is soon followed by a violent heat and high fever, attended with acute darting pains in the head and back. A flushing in the face, with an inflamed redness and a burning heat in the eyes, great anxiety and oppression about the præcordia, are the pathognomonic signs of the distemper; especially when attended with sickness at stomach, violent retchings, and bilious yellow vomitings, with frequent sighing. The pulse is now generally very quick, high, soft, and sometimes throbbing, but never hard: in some it is very quick, soft, low, and oppressed; the respiration quick, full, and sometimes difficult; the skin very hot, and sometimes dry, though more frequently moist. Blood taken from the patient, even at the very beginning of the disease, is often of an exceeding florid red colour; much rarefied and thin, and without the least appearance of size; and the crassamentum, when it has stood till it is cold, will scarcely cohere, but fluctuates; the serum is very yellow.

Most of the above-mentioned symptoms continually increase, and are much aggravated: the retching and vomiting become almost incessant; the anxiety great, and sighing frequent; great restlessness; continual tossing; no ease in any posture; little sleep, and that disturbed and uneasy, and without any refreshment to the sick: and when they are fainting, they turn yellow about the face

face and neck, instead of turning pale; and as the fainting goes off they recover their natural colour. These symptoms generally continue to the third day, though sometimes not longer than the first or second, in others to the end of the fourth: the first shews the greater dissolution of the blood, and the greater malignity of the disease; the last, the contrary; which the improper manner of treating the disease sometimes hastens and increases, or the proper method retards. This may be called the first stadium of the disease, and generally ends on the third day.

Blood taken from the sick on the second or third day is much more dissolved, the serum more yellow, and the crassamentum florid, loose, scarcely cohering, but undulates like sizy water when shaken, and sometimes has dark blackish spots on its surface, shewing a strong gangrenescent diathesis.

About the third day, the pulse, which was quick and full before, now generally sinks greatly, and becomes very low: though sometimes it remains very quick, yet in others it is not much quicker than when the patient is in health, but is always low; the vomiting becomes almost incessant if not so before, and the matter thrown up is black; the patient then becomes comatose, with interrupted deliria. The thirst in some is very great, in others but little; the pulse still low and quick, attended with cold clammy sweats, and sometimes with deliquia. The eyes, which were inflamed and red before, and began to be of a more duskish colour, now turn yellow; and this yellowness also soon after appears round the mouth, eyes, temples, and neck, and in a short time diffuses itself all over the body. But this yellowness is so far from being always an encouraging prognostic, as some would have it, that it most commonly proves a mortal symptom. Sometimes indeed, though seldom, this suffusion of bile upon the surface has proved critical; but then it did not come on till the eighth or ninth day, nor appear till the coma and all the other bad symptoms began to abate; and then, in proportion as the yellowness increases, all the bad symptoms decrease. But the case is most commonly quite the reverse; especially when the yellowness comes soon on: and then it is not only symptomatical, but ushers in the most fatal symptoms of the disease, viz. a deep coma, a low, vermicular, and intermitting, pulse, great hæmorrhages from various parts of the body, a delirium with laborious and interrupted respiration, great anxiety, deep sighing, restlessness, a subsultus tendinum, coldness of the extreme parts first, and then all over the body, a faltering of the speech, tremors, and convulsions, which are soon after followed by death. So that from the first appearance of the yellowness we may say the patient is in the last stage of the disease, whether it terminates in death or recovery.

It has been observed, that, in some strong sanguine constitutions, when the patients have not been bled to a sufficient quantity in the beginning of the disease, the pulse has continued full, strong, and rapid, but never hard; the face flushed, eyes inflamed; the tongue dry, with great thirst and heat, till the second or last stage of the fever is come on, when the pulse has suddenly sunk, and death soon after ensued. Yet in others, who seemed to be of a plethoric habit, the tongue has been moist all along, though they have been delirious most of the time, and the heat of their skin and the strength and quickness of their pulse have continued, after the first stage of the disease

diſeaſe was over, pretty near to that of their natural ſtate in health, till within a few hours of their death; and when they have had a coma on them, one who is not well acquainted with the nature of this diſeaſe would, from their pulſe, heat, breathing, and other ſymptoms, have taken them to be in a natural ſleep. Others, when the pulſe has begun to ſink, and the fatal period ſeemed to be juſt approaching, to the great ſurpriſe of all preſent have recovered their ſenſes, ſat up, and talked pretty cheerfully for an hour or two, and in the midſt of this ſeeming ſecurity have been ſuddenly ſeized with convulſions, which carried them off immediately.

In the latter ſtage of this fever, the blood is ſo attenuated and diſſolved, that we frequently ſee it flowing not only out of the noſe and mouth, but from the eyes, and even through the pores of the ſkin; alſo great quantities of black, half-baked, or half-mortified, blood, are frequently voided both by vomiting and by ſtool, with great quantities of yellow and blackiſh putrid bile by the ſame paſſages; and the urine, which was before of a high icteritious colour, is now almoſt black, and is frequently mixed with a conſiderable quantity of half-diſſolved blood. The pulſe, which was much ſunk before, now becomes very low, unequal, and intermitting; the breathing difficult and laborious; and the anxiety inexpreſſible: an oppreſſion with a burning heat about the præcordia comes on, though the extremities are cold, and often covered with cold clammy ſweats: a conſtant delirium follows; and then a total loſs of the outward ſenſes as well as the judgment, with livid ſpots in many parts of the body, eſpecially about the præcordia; and ſometimes gangrenes in other parts of the body, which are very ſoon ſucceeded by death.

In a ſhort time after death, the body appears much more full of livid, large, mortified, ſpots, particularly about the præcordia and hypochondres, eſpecially the right; which parts ſeem, even from the firſt ſeizure, to be the principal ſeat of this terrible diſeaſe; and, upon opening the bodies of thoſe who die of it, we generally find the gall-bladder and biliary ducts turgid, and filled with a putrid blackiſh bile; and the liver, ſtomach, and adjoining parts, full of livid or blackiſh mortified, ſpots; and the whole corpſe ſoon putrifies after death, and can be kept but a few hours above ground.

Dr. Lind is of opinion, that the remarkable diſſolution of the blood, the violent hæmorrhages, black vomit, and the other ſymptoms which characterize the yellow fever, which has lately raged with ſo much violence among our troops at Guadaloupe, &c. are only accidental appearances in the common fever of the Weſt Indies; that they are to be eſteemed merely as adventitious, in the ſame manner as purple ſpots and bloody urine are in the ſmall-pox, or as an hiccough in the dyſentery: like theſe they only appear when the diſeaſe is attended with a high degree of malignity, and therefore always indicate great danger. This opinion, he thinks, is confirmed by an obſervation of Dr. Wind's, that in 1750 the crew of a Dutch ſhip of war were diſtreſſed by the yellow fever, accompanied with the black vomit; but when the ſhip left the harbour, and changed the noxious land-air for one more healthy, the fever continued, but was not accompanied with the black vomit.

Diſeaſes ſimilar to this fever, Dr. Lind informs us, may ariſe in any part of the world where the air is intenſely hot and unwholeſome; and therefore he treats as chimerical the notion of its being imported

imported from one part of the world to another. An example of this happened at Cadiz in Spain, in the months of September and October 1764, when excessive heat, and want of rain for some months, gave rise to violent epidemic bilious disorders, resembling those of the West Indies, of which one hundred persons often died in a day. At this time the winds blew principally from the south, and after sun-set there fell an unusual and very heavy dew.

This disease began commonly with alternate slight chills and heats, nausea, pains of the head, back, loins, and at the pit of the stomach. These symptoms were often followed, in less than twenty-four hours, with violent retchings, and vomiting of a green or yellow bile, the smell of which was very offensive. Some threw up a humour as black as ink, and died soon after in violent convulsions and in a cold sweat. The pulse was sometimes sunk, sometimes quick, but often varying. After the first day, the surface of the body was generally either cold, or dry and parched. The head-ach and stupor often ended in a furious delirium, which quickly proved fatal. The dead bodies having been examined by order of the court of Madrid, the stomach, mesentery, and intestines, were found covered with gangrenous spots. The orifice of the stomach appeared to have been greatly affected, the spots upon it being ulcerated. The liver and lungs seemed to be putrid, both from their texture and colour. The stomach contained a quantity of an atrabilious liquor, which, when poured on the ground, produced a sensible effervescence; and, when mixed with spirit of vitriol, a violent ebullition ensued. The dead bodies so quickly turned putrid, that at the end of six hours their fetor was intolerable; and, in some of them, worms were found already lodged in the stomach. His majesty's ship the Tweed being at that time in Cadiz-bay, several of her men were taken ill when on-shore, but by being carried on-board all of them recovered. Neither did the black vomit, or any other deadly symptom of that fever, make its appearance in any of the ships.

It has been a matter of much dispute, whether the yellow fever is of an infectious nature or not. Some time ago it became an object of consideration before the lords commissioners of trade and plantations, where it was urged, among other reasons, for not removing the seat of government and justice in the island of Jamaica from Spanish Town to Kingston, that there was danger from Greenwich hospital, situated near Kingston, of an infection from the yellow fever being frequently communicated to that town. On this affair a physician was consulted, who had long practised in that island, and who gave it as his opinion, that from the yellow fever in that island there was no infection. This was the opinion not only of that gentleman, but of many others who had an opportunity of being well acquainted with this fever in Jamaica. Dr. Lind, however, gives a remarkable instance of its being of an infectious nature.—A gentleman dying at Barbadoes of a yellow fever, his wearing apparel and linen, packed up in a chest, were sent to his friends at Philadelphia; where, upon opening the chest, the family was taken ill; and the clothes being unluckily hung abroad to be aired, they presently diffused the contagion of the yellow fever over the whole town, by which two hundred persons died. These contradictions, Dr. Lind thinks, can only be reconciled, by supposing the yellow

fever in the Weſt Indies to be ſometimes of an infectious nature and ſometimes not.

Although, from the deſcription which has now been given of the yellow fever, it may appear to be in many particulars very different from the remittent fever of warm climates; yet it is the opinion of many late writers of great accuracy, particularly of Dr. John Hunter in his Obſervations on the Diſeaſes of the Army in Jamaica, that it is to be conſidered only as a moredangerous form of the ſame diſeaſe. And there can be no doubt that the remittent fever not only appears in different ſeaſons and ſituations with very different degrees of ſeverity; but alſo that, while the remittent fever prevails in its uſual form in the Weſt-India iſlands, ſome individuals, particularly thoſe who are newly arrived, will be affected with very remarkable yellowneſs, as well as bilious and black vomitings.

The yellow fever attacks principally Europeans, eſpecially thoſe who have but lately arrived in the hot climates. Negroes are entirely exempt from it, though the mulattoes and tawnies are as liable to be ſeized with it as the whites themſelves. The cauſe of the diſeaſe appears to be a particular kind of contagion; but Dr. Lind ſeems to be of opinion, that the immediate cauſe of the ſymptoms is a diſpoſition in the glutinous part of the blood to ſeparate from the others, and to become purulent. In ſome perſons who have been bled in the yellow fever, the blood hath been obſerved prodigiouſly viſcid; the craſſamentum covered with a yellow gluten half an inch in thickneſs, and impenetrable to the finger unleſs cut by the nail; the ſerum being at the ſame time of the conſiſtence of a thin ſyrup, and of a deep yellow tinge. This ſerum taſted bitter, and was taken for a compoſition of ſoot. The appearances on diſſection, with his concluſions from them, we ſhall give in his own words: "In a man who died on the eleventh day of a yellow fever, whoſe body emitted no bad ſmell thirty-ſix hours after death, and was ſtill yellow, I found all the bowels of the abdomen ſound; the liver and ſpleen were remarkably ſo; as alſo the ſtomach and inteſtines. There was no ſuffuſion of the bile either in the inteſtines or ſtomach. The gall-bladder, of the natural ſize, contained the uſual quantity of bile, ſomewhat thicker than common, and grumous.

"Upon examining further, this diſeaſe was found to have lain wholly on the left ſide, where, within the breaſt, was found near a quart of yellowiſh water, in which were many large flakes of yellowiſh gluten, appearing, by compariſon, preciſely the ſame with the thick pellicle which had covered the blood taken from his arm. Theſe flakes bore in ſeveral places a reſemblance to a membranous ſubſtance beginning to be converted into a purulent jelly. The pleura, both on its inſide and outſide, as alſo its continuation, the inveſting membrane of the lungs (which in ſome parts was greatly thickened), were covered with cakes of this gluten, hanging in ſome places looſely, in others adhering more ſtrongly: and all in different ſtates of yellow or purulent corruption. The right cavity of the breaſt, and all the other parts of his body, were found entirely free from diſeaſe.

"His complaints had been chiefly in his breaſt; and a ſmall quantity of blood, taken from him two days before his death, was covered with an impenetrable, yellow, thick, gluten; the red portion below it being quite looſe.

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"In those fevers, I have also seen the disease entirely confined to the heart and pericardium. In one who died the tenth day of the fever, without having been yellow, a quantity of pus and purulent crusts were found mixed with the water of the pericardium. The heart in different places was excoriated; and, together with the inside of the pericardium, was lined with a thick membranous cake, similar to that already mentioned on the lungs and pleura. In some places this cake had a purulent, in others a gelatinous, appearance, exactly resembling the coagulum of the blood. His complaints had been, a great oppression on the breast, and an extreme difficulty of breathing. In a third person, who died on the thirteenth day of the fever, above two quarts of pus and purulent jelly were found in the cavity of the belly. The source of such an extraordinary quantity of matter was not from any preceding inflammation, nor any imposthume, that we could discover; but from innumerable ulcerations on the surface of the intestines, omentum, mesentery, and peritoneum. Neither did those ulcerations (or excoriations, as they rather appeared in several places) seem to be the primary fountains of the matter, but to have been occasioned by its acrimony.

"This purulent appearance seems to arise merely from an extravasation of one of the component parts of the blood, the gluten or coagulable lymph. Blood taken from persons in a fever, and frequently even from persons in perfect health, after standing in a clean vessel for a short time, commonly separates into three distinct portions; viz. the serum, or water of the blood, the red concreted mass, and a viscid pellicle termed the *size*, which spreads itself on the top of the red concretion. Some time ago, when making experiments with the blood taken from persons in the scurvy, I was surprised to find it often covered with that sizy crust. This induced me to extend my experiments to large quantities of blood from different subjects, which I had opportunities of inspecting at once in so large an hospital. For this purpose I one morning ordered ten patients in the scurvy to be bled, taking two ounces from each. A larger quantity was taken, for its inspection, from two men in health. That day I had occasion to prescribe bleeding to a woman in labour, two hours before her delivery; to a girl of sixteen years of age afflicted with a lunacy, proceeding from the chlorosis; to three patients in the rheumatism; and to a person labouring under an obstruction of the liver.

"From a nice comparison, and an examination of the different blood, I found in general, that the more size there was on the top, and the thicker and more viscid this white pellicle shewed itself, the concretion below it was of a more loose coherence. This was not so observable when only some slight white streaks appeared on the top. But, when much size had separated itself, the red mass became very soft at bottom of the vessel, and less compact in its different parts, in proportion to their distance from the surface, towards which this whitish portion had ascended.

"From this and from other experiments it appears, that this crust or pellicle is the natural gluten or cement of the blood (called by some the *coagulable lymph*), which becomes strongly disposed, in certain circumstances and diseases, to separate itself. And whereas the serum and red concretion are easily incorporated together, it will be

found, that this glue, after its separation, becomes immiscible with either. We have, by gentle drying, converted it into a perfectly tough elastic membrane; and, by the means of a small portion of the red mass being left adhering to it, into a substance resembling muscular flesh; and it is capable of undergoing various changes into corruption, in the same manner as either of these.

"Now, I can see no reason why this gluten, in its morbid state, may not separate itself from the circulating blood, and be deposited in the cavities of the body, as readily as the serum does in dropsies; the former having always a less disposition than the latter to incorporate with the mass.

"In dissecting persons who died of fevers in London and Minorca, and where no infection was suspected, appearances similar to these have also fallen under the inspection of those accurate anatomists Drs. Hunter and Cleghorn. Hence it may be presumed very difficult to distinguish fevers that are produced by infection from some others. I cannot, however, be induced to think, as those gentlemen seem to do, that these preternatural substances which were found in the cavities of the body are the consequence, but rather that they are the cause, of the inflammation and excoriations. I believe these substances to be at first diseased extravasated gluten, and conjecture their different states greatly to depend upon the different times at which they were deposited.

"I have remarked, in a variety of dead bodies, three different kinds of extravasation; these occurred in such as had died of the scurvy, of consumption, and of fevers. In the former of these diseases, red coagulated blood is found extravasated in almost all parts of the body, not only into the tela cellulosa, but into the bellies of the muscles, particularly of the legs and thighs, which often become quite stuffed and even distorted with large grumous masses. The intestines and mesentery are often spotted also with extravasated blood; and I have seen large ecchymoses on the stomach. Those appearances at first sight resembled so many distinct mortifications; and by this appearance some anatomists have been deceived; but, upon a nice examination, the texture of the parts is found to be sound and firm. There is likewise, in that disease, sometimes, an extravasation of water, chiefly collected in, and always when in the legs confined to, the tela cellulosa.

"But whereas, in the limbs of scorbutic persons, it is extremely difficult to make a good dissection by reason of such quantities of extravasated blood that every where obstruct the operator; so, on the contrary, the lower extremities of those who have died consumptive, with swelled legs, are, of all other subjects, in the best state to afford a satisfactory view of the muscles. The water inclosed in their legs having insinuated itself, by passing the tela cellulosa, into the spaces between the muscles, the muscles are easily separated from each other; and their several origins and insertions may be distinctly traced by means of their having been cleansed and washed by the water in the investing cellular membrane. Thus there are extravasations of three sorts; viz. first, the grumous mass in the scurvy; and this I have often remarked where no serum was observed. Secondly, the serum alone in anasarcous swellings. The third and last is what was taken notice of in those who died of fevers, being the gluten of the blood, accompanied for the most part with

some

some serum; both of them altogether confined in the large cavities of the body.

"I conjecture, that in those fevers there is always an ulcerous or purulent disposition in the blood; and that this gluten or coagulable lymph is greatly diseased. I have frequently seen it have a true purulent appearance soon after it was drawn off, when the patient seemed not very ill.

"And I further conjecture, that the mischief often lies within the breast; as also that the great benefit derived from the very early application of blisters in a great measure flows from so many ulcerations and vents being timely provided for the free discharge of those purulent and tainted particles from the body.

"If an infection depends, as many have imagined, on the admission of certain foreign particles into the blood, this gluten seems to be its more immediate seat, and to be primarily affected by it; and a discharge of this, as though by washing those particles out of the body, tends in a great measure to remove the disease.

"It is an observation of the best practical writers, that issues and setons are most excellent preservatives against receiving an infection, nay, even that of the plague itself. And indeed a suppuration and plentiful discharge from the proper ulcer, whether produced by nature or by art, seems to open a channel the best appropriated for an exit out of the body to some of the most malignant poisons. Thus the most favourable crisis in the plague, and in the most pestilential fevers, happens when nature excites tumors kindly suppurating in the groin or arm-pits, by whose beneficial and plentiful discharge the deadly poison is expelled from the constitution.

"I have observed it to be amongst the most certain characteristics of the worst fevers, that the blisters either do not rise and fill, or discharge such yellow, greenish, fetid, and highly-offensive, stuff, that even experienced nurses could give a pretty certain conjecture from the blisters, of the different degrees of malignity in the fever. We have more than once endeavoured to conceal the bad state of some patients in the hospital; but a discovery was always made of their condition in the wash-house, from the linen sent there stained with the discharges from the blistered parts. And indeed a careful inspection of the state and discharge from the blisters, together with their effects, furnishes us, in those diseases, with some of the most certain diagnostics of their nature and prognostics of their event."

The yellow fever, where it attacks with violence, is generally fatal; the prognosis therefore must be commonly unfavourable, and always uncertain; neither can any thing more be said on this subject, than that an abatement of the symptoms already enumerated affords a favourable prognostic, and an increase of them the contrary.

The cure of this terrible disease, according to Dr. Hillary, is to be pursued in the following manner. 1. To moderate the too great and rapid motions of the fluids, and abate the too great heat and violence of the fever in the two first days of the disease, as much and as safely as we can. 2. To evacuate and carry out of the body as much of the putrid bile and other humours, and as expeditiously and safely as possible. 3. To put a stop to the putrescent disposition of the fluids, and to prevent the gangrenes from coming on, by suitable antiseptics.

The

The first indication is answered by bleeding, which, in the first stage of this fever, is absolutely necessary in some degree: the quantity to be taken away must be determined by the age and strength of the patients, the degree of plethora, fulness of the pulse, &c. When called in at the beginning, he orders twelve, fourteen, sixteen, eighteen, or twenty, ounces of blood to be taken away on the first or second day: and if the patient's pulse rise after the first bleeding, or if the fever still continue high and the pulse full, he repeats the bleeding once on the days above-mentioned. But bleeding a third time is seldom or never required; neither is bleeding on the third day almost ever necessary; and, when it is performed on that day, it ought to be done with the greatest caution and judgment: neither should a vein be opened after the third day in this fever, unless some very extraordinary symptoms and circumstances require it; which seldom or never happen. On that day, indeed, the pulse generally sinks, and the blood is in such a dissolved state, that bleeding must be accounted highly pernicious. Nevertheless, it is indispensably necessary in the beginning of the distemper; and, if omitted at that time, the violent heat and motion of the blood increase the putrescence of the humours to such a degree as to bring on the fatal consequences much sooner than would otherwise have happened.

After bleeding, we come to the second indication of cure, namely, to evacuate as much of the bilious and putrid humours as soon and as safely as we can. The great irritation of the stomach, by the putrid bilious humours constantly attending this fever, with almost continual retchings and violent vomitings, seem to indicate the giving of an emetic: but the stomach is always observed to be so violently stimulated and irritated and most commonly inflamed by the acrimony of the putrescent bile, that any emetic, even the most mild and gentle, given in the smallest dose, brings on an incessant vomiting, which continues, in spite of all remedies, till a mortification and death ensue. Instead of this, it is proper to give large draughts of warm water, which, without any additional stimulus to the coats of the stomach, evacuates its acids and putrid contents, commonly with great relief to the patient: the warm water also acts as an emollient fotus to the inflamed coats of the stomach; and thus abates the inflammation, and prevents the gangrene and mortification from coming on.

After the patient has by this means vomited seven or eight times or oftener, and discharged a great quantity of yellow and blackish bilious matter, as they often do, a grain or a grain and a half of thebaic extract is given in order to procure some respite from the violent retching, vomiting, and anxiety. The person is desired to take nothing into his stomach for two hours after this, by which means it is seldom or never rejected; and thus all the symptoms are considerably abated, the retching and vomiting either totally cease or are very much lessened, so that medicines may now be exhibited which the stomach would not have retained before. These are cooling acid juleps, or other antiseptic remedies; but neither nitre nor any of its preparations will commonly be found to stay on the stomach; nor are the nitrous medicines, or even the common anti-emetic draughts, proper to be given in this disease, even though they should agree with the stomach, on account of their attenuating property.

If the patient has not a stool or two after drinking the warm water and vomiting, it is necessary to give a gentle purging clyster; and when six or eight hours rest have been obtained, a gentle antiphlogistic and antiseptic purge, in order to evacuate by stool as much of the bilious matter as we possibly can. Or if the patient has a purging before, which sometimes though very rarely happens, a dose of toasted rhubarb is given, and an antiseptic anodyne after it has operated, to abate and check the too great purging, but not to stop it, as this evacuation has been always observed to be of service, provided it be not too violent.

After this indication is completely answered, the next is to exhibit such proper antiseptic medicines as may stop the putrescent disposition of the fluids. Here the Peruvian bark would seem to be the most proper remedy; but unluckily the stomachs of the patients in this disease are so much irritated, and so apt to reject every thing, that the bark cannot be retained in any form whatever. In this case Dr. Percival recommends columbo-root, the infusion of which is found to be a powerful anti-emetic and anti-putrescent medicine, and might perhaps so far alter the state of the stomach as to make it bear the bark. Dr. Hillary, however, who was ignorant of the virtues of columbo, substituted the *radix serpentariæ Virginianæ* with success. A slight infusion of this root not only sat easily on the stomach of the patients, but moderately raised the pulse and fever, both of which are now too low. The following receipt was found the most agreeable and efficacious.

R. Rad. serpent. Virginian. ℥ii.

Croc. Ang. ʒss. M. et infunde vase clauso in aq. bul. q. per horam unam ut col. ℥vi. Adde aq. menth. simp. ℥ii. Vin. Maderiens. ℥iv. Syr. croc. vel syr. e mecon. ℥i. Elix. vitriol. acid. q. s. ad grat. acidior. sapor. Exhibe cochlearia duo vel tria singulis horis vel bihoris, vel sæpius pro re nata.

By the use of this medicine, and soft light nourishment taken in small quantities, the pulse is usually kept up and the distemper goes off. But if, after taking this a little while, we find that the pulse does not rise, but on the contrary that a coldness of the extreme parts comes on, the medicines must be made more warming, by increasing the quantity of the snake-root and saffron, or by adding *vinum croceum, confectio cardiaca*, or the like, but not by the use of volatile spirits and salts, which hurt by their stimulating and dissolving qualities.

At the same time that the strength of the patient is kept up by the medicines above-mentioned, or by others similar, he gave repeated gentle purgatives every second or third day, and sometimes, when the symptoms were very urgent, every day, for four or five days successively. But, if proper methods be taken in the beginning of the disease, it is seldom that such a repetition of purging is necessary; and the doctor gives the following remarkable instance of the efficacy of this method of treating the disease: "A young man about twenty-four years of age, surgeon to a Guinea ship, was brought into a house where I was visiting a patient; he was of a sanguine robust constitution, and a lover of spirituous liquors, and had been drunk three days and nights successively, and in that condition had run several races on the hot sea-shore, near noon, with the sailors, in the

the heat of the sun; and, to complete his folly, lay the last night, after that exercise, in the open air under a tamarind-tree all the night, where he was seized in the morning with all the symptoms of this fever, in the most violent manner that I have ever seen any one. In this condition he was brought to the house where I was: his retching and vomiting were so incessant, that he could not get time to say yes, or no, to the questions which I asked, without waiting some time for it, each time; his eyes were red and inflamed, attended with a burning heat, as usual in the beginning of this fever; and he had all the other symptoms which attend the first attack of this fever in the most violent manner, which I need not repeat. I ordered ℥xvi. of blood to be taken from him, which was very florid, thin, and much dissolved; and then directed him to drink warm water freely, and to vomit eight or ten times; and after that to take *extract. thebaic.* gr. jss. and take nothing for two hours after it. But I being gone, and he finding that he vomited with more ease, less sickness and retching, with the warm water, than he did before, and being much alarmed at his having this fever, he drank three gallons of the water, and brought up great quantities of yellow and blackish bilious matter with it, and washed his stomach effectually. He then took the *extr. thebaic.* and slept three or four hours after it; and the vomiting ceased: he took some panada, and four hours after that the purge of manna and tamarinds, &c. which gave him eight stools, and carried a good deal more of the putrid bilious matter off downwards; and got some rest after it: he then took of an antiseptic julep often, and light nourishment, a little acid, at the intervals; and repeated the purge on the third day, as directed. Being called out of the town, I did not see him till the fourth morning after; he said that he had followed my directions; and I found him free from the fever and all its symptoms, but weak and low, and his skin a little yellow, but much less so than usual, unless when the bilious matter is thus carried off. I ordered him to take *elix. vitrioli acid. gut.* lx. three or four times a-day for a few days, in an infusion of mint-leaves with a little snake-root, made as tea; which he did, and was recovered perfectly well in seven or eight days time.

"This patient being seized in so violent a manner, and recovering in so short a time, and so near to the rule which the elegant Celsus recommends, *Citò, tutò, et jucundè*, not only confirmed the above manner of reasoning on the cause and nature of this disease to be right, but made me determine to follow the same method as near as I possibly could ever since, and I must add, with the same good success also, when I am called so early in the disease that I can strictly pursue it: which is too seldom the case; for in general the physician is not called till the fourth or fifth day, or after, when the putrid acrid bilious matter is a great part of it carried into the blood, which it has so dissolved and brought its whole mass into a colliquated, putrid, gangrenescent, state, that the best of methods, and the most efficacious medicines, however judiciously timed and applied, are precarious and uncertain; or sometimes it is so far advanced, that the ablest physician can do no more than tell the relations of the sick that it is too late, and that they can live but a few hours: for I know no disease in which the recovery of the patient so much depends upon the right or wrong method of treating it, at the very first attack or beginning of the disease, as this fever does: for by

thus

thus discharging and carrying the putrid, acrimonious, bilious, matter, out of the body before much of it is carried into the blood, not only most of the bad symptoms which attend the second state of the fever are prevented from coming on, but the hemorrhages, and the yellowness of the skin, &c. also, and the fever, soon taken off too; for I have never seen any hemorrhage come on, and but little yellowness, or in some none, when they were thus treated.

And when the last stage of this fever is come on before we are called in, provided that it is not at the very latter end of it, I have always found that this method of gentle purging, whenever the before-mentioned symptoms indicate it, and the liberal use of the antiseptic medicines in the intervals, have been so successful, that I have seen but two patients that have died in this fever during the eight years past in which I treated it in this manner; and one of them was so weak that he could not take a spoonful of any thing, and so near his end that he died about two hours after without taking any medicine; and the other killed himself by drinking near a gallon of cold water in less than three hours time (after taking half an ounce of manna in the morning), which struck such a coldness into his whole body that he died; though I have visited several every year, and in some years a great many; therefore I take the liberty of recommending this method to others, and wish it to be as successful to all."

Of the malignant yellow fever which so lately raged in Philadelphia, it was remarked, that the mortality was not so great among women as among men; and it was observed that corpulent, high-fed, and drunken, men, common prostitutes, and such of the poor as had been debilitated through the want of sufficient nourishment, and lived in dirty and confined habitations, became an easy prey to it; whilst those who resided in the suburbs, enjoying the benefit of country air, were little affected by it. A singular fact is, that the French residing in Philadelphia were in a remarkable degree exempt from it; a circumstance which cannot be accounted for. The report which prevailed here of the Africans having wholly escaped the disease, proves to be not altogether true, several of them having been seized. The fever, however, was found to yield more readily to medicine in them than in white persons.

We find the following account of the nature and symptoms of this disease, in Philadelphia, described by Dr. Currie, in the third edition of his pamphlet. "The symptoms which characterised the first stage of the fever were, in the greatest number of cases, after a chilly fit of some duration, a quick tense pulse; hot skin; pain in the head, back, and limbs; flushed countenance; inflamed eye, moist tongue; oppression and sense of soreness at the stomach, especially upon pressure; frequent sick qualms, and retchings to vomit, without discharging any thing, except the contents last taken into the stomach; costiveness, &c. And, when stools were procured, the first generally shewed a defect of bile, or an obstruction to its entrance into the intestines. But brisk purges generally altered this appearance.

"These symptoms generally continued with more or less violence from one to three, four, or even five, days; and then, gradually abating left the patient free from every complaint, except general debility. On the febrile symptoms suddenly subsiding they were immediately succeeded by a yellow tinge in the opaque cornea, or whites of the

eyes; an increaſed oppreſſion at the præcordia, a conſtant puking of every thing taken into the ſtomach, with much ſtraining, accompanied with a hoarſe hollow noiſe.

If theſe ſymptoms were not ſoon relieved, a vomiting of matter reſembling coffee-grounds in colour and conſiſtence, commonly called the *black vomit*, ſometimes accompanied with or ſucceeded by hemorrhages from the noſe, fauces, gums, and other parts of the body; a yellowiſh purple colour, and putreſcent appearance of the whole body, hiccup, agitations, deep and diſtreſſed ſighing, comatoſe delirium, and finally death, are the conſequence. When the diſeaſe proved fatal, it was generally between the fifth and eighth days.

This was the moſt uſual progreſs of this formidable diſeaſe through its ſeveral ſtages. There were, however, very conſiderable variations in the ſymptoms as well as in the duration of its different ſtages, according to the conſtitution and temperament of the patient, the ſtate of the weather, the manner of treatment, &c.

In ſome caſes, ſigns of putreſcency appeared at the beginning or before the end of the third day. In theſe the black vomiting, which was generally a mortal ſymptom, and univerſal yellowneſs, appeared early. In theſe caſes, alſo, a low delirium and great proſtration of ſtrength were conſtant ſymptoms, and coma came on very ſpeedily.

In ſome, the ſymptoms inclined more to the nervous than the inflammatory type. In theſe, the jaundice colour of the eye and ſkin, and the black vomiting, were more rare. But in the majority of caſes, particularly after the nights became ſenſibly cooler, all the ſymptoms indicated violent irritation and inflammatory diatheſis. In theſe caſes, the ſkin was always dry, and the remiſſions very obſcure.

The febrile ſymptoms, however, as has been already obſerved, either gave way on the third, fourth, or fifth, day, and then the patient recovered; or they were ſoon after ſucceeded by a different but much more dangerous train of ſymptoms, by debility, low pulſe, cold ſkin (which aſſumed a tawny colour, mixed with purple), black vomiting, hemorrhages, hiccup, anxiety, reſtleſſneſs, coma, &c. Many who ſurvived the eighth day, though apparently out of danger, died ſuddenly in conſequence of an hemorrhage."

Purging the patient with calomel and jalap appears to have proved the moſt ſucceſsful treatment; and the repeated uſe of the lancet, in caſes where no ſymptoms of putridity exiſted. Dr. Griffiths, who had been ſeized with the diſeaſe, "was bled ſeven times in five days, and aſcribes his recovery principally to that operation." Dr. Maeſe alſo, "in five days loſt ſeventy-two ounces of blood, by which he was recovered when at the loweſt ſtage of the diſorder." It was generally remarked that an obſtinate coſtiveneſs took place at the commencement of the diſeaſe; and when this was removed, by purgatives, within the firſt twelve hours, the patient ſeldom failed to do well.

It is not difficult to conceive the general diſtreſs which ſuch an evil muſt have occaſioned to perſons of every rank and deſcription. Some of the moſt ſtriking inſtances have been related in very affecting terms; but no picture of human calamity perhaps ever exceeded the following: "A ſervant girl belonging to a family in this city, in which the fever had prevailed, was apprehenſive of danger, and reſolved to remove to a relation's houſe in the country. She was, however, taken ſick on the road, and returned to town, where ſhe could find no perſon to receive her. One of the guardians of the poor provided

provided a cart, and took her to the alms-house, into which she was refused admittance. She was brought back, and the guardians offered five dollars to procure her a single night's lodging, but in vain. And in fine, after every effort made to provide her shelter, she absolutely died in the cart."

The following is an account of burials, in Philadelphia, during the prevalence of this fatal complaint.

August	325
September	1442
October	1993
November	118
Jews, returned in gross	3
Baptists, do.	60
Methodists, do.	32
Free Quakers, do.	39
German part of St. Mary's congregation	30
Total	4042

OF PHILANTHROPY.

PHILANTHROPY is nearly of the same import with benevolence; and differs from friendship, as this latter affection subsists only between a few individuals, whilst philanthropy comprehends the human species throughout the universe.

Whether man has an instinctive propensity to love his species, which makes him incapable of happiness but in the midst of society, and impels him to do all the good he can to others, feeling their felicity an addition to his own, is a question that has been warmly debated among philosophers ever since metaphysics was studied as a science.

Hobbes, who believed that right results from power, and that in society there is no other standard of justice than the law of the land, or the will of the supreme magistrate, built his opinions upon a theory of human nature in which philanthropy has no place. According to him, mankind, in the original state of nature, were wholly *selfish*. Each endeavoured to seize, by fraud or force, whatever he thought would contribute to his comfort; and, as all had nearly the same wants, the inevitable consequence of this selfishness was universal war. We are taught indeed by the same philosoher, that, in a series of ages, mankind discovered the miseries of this state of nature; and therefore, upon the same basis of universal selfishness, formed societies, over which they placed supreme governors for the purpose of protecting the weak against the violence of the strong. He does not, however, explain how men, whose angry and selfish passions were thus excited to the utmost against each other, could enter upon this friendly treaty; or, supposing it formed, how the ignorant multitude were induced to pay obedience to the more enlightened few. Clogged with this and other insurmountable difficulties, his philosophy of human nature soon fell into merited contempt; but about the origin of philanthropy those who united in opposition to him still thought very differently from one another.

The elegant Shaftesbury, who had imbibed much of the spirit of Plato, endeavoured, like his master, to deduce all the duties of man,

and almost all his actions, from a number of internal feelings or instincts which he supposed to be interwoven with his constitution by the immediate hand of God. This system appeared so honourable to human nature, and at the same time was so easily comprehended, that the noble lord had soon many followers, and may indeed be considered as the founder of a school which has produced philosophers whose works do honour to the age and country in which they flourished. Among these we must reckon Bishop Butler, Hutchison, Lord Kames, Dr. Beattie, and Dr. Reid.

According to the system of these writers, the duty of man results from an intuitive principle, to which they have given the name of the moral sense; and with this sense they conceive philanthropy to be inseparably united, or rather perhaps to make an essential part of it. If this theory be carried to its utmost extent, as it has been by some of its patrons, it seems to follow, that peace and harmony should reign among savages; and that a man who had from his infancy grown up in solitude, would be delighted with the first sight of a fellow-creature, and run to him with eagerness as to a new source of enjoyment. This conclusion, however, is contrary to acknowledged facts. Savages are mostly divided into small tribes or hordes; and, though the attachment of individuals to their own tribe appears indeed to be abundantly strong, the tribes themselves are frequently at war, and entertain a constant jealousy of each other. Savages, too, are almost universally afraid of strangers; and the few solitary individuals, who have been caught in parts where they had run wild from their infancy, instead of being delighted with the appearance of fellow-men, have either fled from them with their utmost speed, or been fixed to the spot with terror and astonishment. These are no indications of that instinctive philanthropy for which some writers so strenuously plead. They have indeed induced others to deny, that in human nature there is any instinctive principles at all; and to endeavour to account for our several propensities by the influence of education producing early and deep-rooted habits.

At the head of this school stood Locke and Hartley. The former, employing himself almost wholly on the intellectual powers of man, and combating the absurd though then generally-received belief, that there are in the human mind innate principles of speculative truth, has touched but incidentally on our principles of action. It seems, however, to be evident, that he did not consider any one of these principles as innate; and his opinion was adopted by Hartley, who studied the sensitive part of human nature with greater industry and success than perhaps any writer who had preceded him in that department of science. This philosopher refuses all kinds of instinct to man, even the στοργη of a mother to her new-born infant, and that which has been generally supposed innate—the propensity of the infant to suck the breast. It is therefore needless to say that in his theory of human nature innate philanthropy can have no place.

The reader, however, must not suppose that the theory of Hartley is the theory of Hobbes. Though he admits no innate principles of action in the human mind, he is far from dreaming that the original state of man was a state of war and selfishness, or that the acquisition of philanthropic sentiments is not natural. He considers such acquisitions as even necessary and unavoidable, and founds them on the great law of association. Hartley was a Christian, and appears to have been a

man

man of great piety. Conceiving with Locke that men are born without any ideas, or any principles either of knowledge or of action, but that they are subject to the law of association as much as to the impressions of sense, he seems to have thought, that the important purpose for which they are sent into this world is, that they may acquire habits of piety and virtue, which, operating like instincts, will fit them for the purer society of a future state. That this theory is unfriendly to morals, no man who understands it will presume to affirm. It appears, indeed, to be more consistent with the necessity of a revelation from God than that of Shaftesbury, which has so many followers: but notwithstanding this, we cannot help thinking that the excellent author has carried his antipathy to instincts much too far, and that the truth lies in the middle between him and his opponents.

Without some instincts to influence before the dawn of reason, it is not easy to be conceived how children could be induced to that exercise which is absolutely necessary to life and health; nor does it appear with sufficient evidence that the human race are deserted by every instinct as soon as their rational powers are evolved. It seems to be a matter of fact which cannot be controverted, that women have an instinctive attachment to their new-born infants; but that these, when they become capable of distinguishing objects, are instinctively attached to their parents, their brothers, and sisters, is a position which, though it may be true, seems incapable of proof. That they soon appear to be so attached, is a fact which we believe no man will deny: but the attachment may be accounted for by the associating principle operating upon that desire of happiness which is necessarily formed as soon as happiness is experienced. An infant becomes earlier attached to its nurse than to any other person; because, feeling wants which she supplies, the idea of enjoyment becomes soon associated in its mind with the perception of the woman. If this woman be its mother, a hasty observer immediately attributes this attachment to instinct directing the infant to love its parent; but that instinct has here no place, is evident from the well-known facts, that a child is as fond of a tender nurse, though no relation, as of the most affectionate mother; and as regardless of a mother who seldom sees it, or sees it with indifference, as of any other person. Nay, we have seen children of the sweetest dispositions as fond of the maid with whom they slept, as of a very affectionate parent by whom they had been tenderly nursed: and sure no man will say that this could be instinct; it was evidently a new association of the idea of the maid with the greatest happiness which they enjoyed after the period of their suckling was at an end.

It is much in the same way that children acquire an attachment to their brothers and sisters. Brothers and sisters being constantly together contribute to each other's amusement: hence arises that pleasure which they have in each other's company, and the uneasiness which they feel when separated. This generates mutual love in their minds, which is strengthened by the perpetual injunctions of their parents; for, if these have any virtue themselves, they cannot fail to inculcate the duty of loving each other on their tender offspring. Benevolence, thus generated, soon extends to their daily companions; and takes a wider and a wider range as these companions are multiplied, and as children advance towards the state of manhood. New objects then present themselves to the mind. A man soon discovers, that,

that, as he is a member of a community, his happineſs as an individual depends in a great meaſure on the proſperity of the whole. Hence ariſes patriotiſm, and that pleaſure which we all take in the eminence of our countrymen. But the principle of benevolence ſtops not here. He whoſe mind is enlarged by a liberal education, conſiders all particular countries as provinces of one great country extended over the whole globe; and all mankind, of courſe, as not only ſharing the ſame nature with himſelf, but as being in reality his fellow-citizens and brethren. The principles of religion, if he be actuated by them, muſt aid theſe reflections, and make him wiſh the happineſs of all who ſtand in the ſame relation with himſelf to the Great Governor of the world. This is philanthropy; and we ſee how it may ſpring, by the great law of aſſociation, from deſires which, in their original ſtate, cannot be conſidered as other than ſelfiſh. It is a calm ſentiment, which we believe hardly ever riſes to the warmth of affection, and certainly not to the heat of paſſion.

Should any perſons be diſpoſed to controvert this opinion, or to fancy it degrading to human nature, we will not enter into controverſy with them; we only beg leave to aſk, whether they have ever rejoiced in the good fortune of a ſtranger or a foreigner, or regretted his loſs, with any portion of thoſe feelings which they have frequently experienced on hearing of the proſperity or the death of a friend or a neighbour? We anſwer candidly for ourſelves, that we feel no intereſt which can be called *paſſion* or *affection* in the fortunes of a native of China; and yet we ſhould be ſorry to think that our philanthropy is leſs than that of other men. A common clown, we are inclined to believe, ſeldom extends his affection beyond his friends and neighbours; and though, from having often heard his country praiſed, and knowing that he belongs to that country, he would probably be offended at the man who ſhould prefer another to it; yet if no misfortune befals himſelf, or his friends and neighbours, we imagine that his grief for public calamities may be borne with patience. In his mind no ſuch aſſociations have been formed as compriſe the good of a country, far leſs of all countries; and therefore his philanthropy muſt be confined to a very limited range. We doubt not, however, but that, as opportunity offers and as circumſtances permit, ſuch a man is ready to feed the hungry and clothe the naked of all countries; not indeed from ſentiments of affection either innate or acquired, but from the obvious reflection that he is not exempted from thoſe calamities which have befallen them, and from a ſtill higher principle—a ſenſe of duty to that God who has made of one blood all nations upon earth, and commanded them to be mutually aiding to each other.

DESCRIPTION OF THE PHILIPPINE ISLANDS.

THE Philippines are certain iſlands of Aſia, which lie between one hundred and fourteen and one hundred and twenty-ſix degrees of eaſt longitude, and between ſix and twenty degrees of north latitude; about three hundred miles ſouth-eaſt of China. They are ſaid to be about one thouſand two hundred in number, of which there are four hundred very conſiderable. They form a principal diviſion of that immenſe Indian Archipelago, which conſiſts of ſo many

many thousand islands, some of which are the largest, and many of them the richest, in the world. The Philippines form the northernmost cluster of these islands, and were discovered in the year 1521, by the famous navigator Ferdinand Magellan, a Portuguese gentleman, who had served his native country both in the wars of Africa and in the East Indies; particularly under Albuquerque, the famous Portuguese general, who reduced Goa and Malacca to the obedience of that crown. Magellan having had a considerable share in those actions, and finding himself neglected by the government of Portugal, and even denied, as it is said, the small advance of a ducat a month in his pay, left the court of Portugal in disgust, and offered his services to Charles V. then emperor of Germany and king of Spain, whom he convinced of the probability of discovering a way to the Spice Islands, in the East Indies, by the west; whereupon, the command of five small ships being given him, he set sail from Seville, on the 10th of August 1519, and, standing over to the coast of South America, proceeded southward to fifty-two degrees, where he fortunately hit upon a strait, since called the Strait of Magellan, which carried him into the Pacific Ocean or South Sea; and then, steering northward, repassed the equator: after which, he stretched away to the west, across that vast ocean, till he arrived at Guam, one of the Ladrones, on the 10th of March 1521; and soon after sailed to the westward, and discovered the Philippines, which he did on St. Lazarus's day; and in honour of that saint, he called them the Archipelago of St. Lazarus. He took possession of them in the name of the King of Spain, but happened to be killed in a skirmish he had with the natives of one of them. His people, however, arrived afterwards at the Moluccas or Clove Islands, where they left a colony, and returned to Spain by the way of the Cape of Good Hope; being the first persons that ever sailed round the globe.—But there was no attempt made by the Spaniards to subdue or plant the Philippine Islands until the year 1564, in the reign of Philip II. son of Charles V. when Don Louis de Velasco, viceroy of Mexico, sent Michael Lopez Delagaspes thither with a fleet sufficient to make a conquest of these islands, which he named the Philippines, in honour of Philip II. then upon the throne of Spain; and they have remained under the dominion of that crown till taken by Sir William Draper. The Philippines are scarcely inferior to any other islands of Asia in all the natural productions of that happy climate; and they are by far the best situated for an extensive and advantageous commerce. By their position, they form the centre of intercourse with China, Japan, and the Spice Islands; and, whilst they are under the dominion of Spain, they connect the Asiatic and American commerce, and become a general magazine for the rich manufactures of the one and for the treasures of the other. Besides, they are well situated for a supply of European goods, both from the side of Acapulco and by the way of the Cape of Good Hope. In fact, they formerly enjoyed a traffic in some degree proportioned to the peculiar felicity of their situation; but the Spanish dominion is too vast and unconnected to be improved to the best advantage.—The spirit of commerce is not powerful in that people. The trade of the Philippines is thought to have declined; its great branch is now reduced to two ships, which annually pass between these islands and

Acapulco in America, and to a single port of Manila in the Island of Luconia.

Indeed the Spaniards appear by no means to be actuated by the spirit of industry; for, so far from improving the fine situation of these islands to the utmost, it happens, on the contrary, that the trade is hurtful to the mother country; for (to confine ourselves to Manila, with which they have most to do), instead of taking Spanish manufactures, they trade with the Chinese for spices, silks, stockings, Indian stuffs, callicoes, chintz, and many other articles; and with the Japanese for cabinets, and all sorts of lacquered ware; for all which they pay in gold or silver. All these commodities, together with what the islands produce, and great quantities of wrought plate by the Chinese artisans, are collected at Manila, and transported annually in two ships to Acapulco in Mexico. Each of these ships is esteemed worth 600,000l. sterling; and in the war which began in 1739, and which was not distinguished by such a series of wonderful successes as that which ended in 1763, the taking of one of the galleons by Anson, which carry on the trade between Manila and America, was considered as one of the most brilliant advantages which we gained. This trade is not laid open to all the inhabitants of Manila, but is confined by very particular regulations, somewhat analogous to those by which the trade of the register-ships from Cadiz to the West Indies is restrained. The ships employed are all king's ships, commissioned and paid by him; and the tonnage is divided into a certain number of bales, all of the same size. These are divided among the convents at Manila, but principally the Jesuits, as a donation to support their missions, for the propagation of the Roman Catholic faith. [We do not know who has the Jesuits' share since they were expelled the Spanish dominions.] Most of the religious are concerned in this trade, and sell to the merchants at a great price what room in the ship they are not to occupy. This trade is by a royal edict limited to a certain value, but it always exceeds it, each ship being generally worth three millions of dollars. The returns made from America are in silver, cochineal, sweetmeats, together with some European millinery ware for the women, and some strong Spanish wine. It is obvious, that the greatest part of the treasure remitted does not remain at Manila, but is dispersed over India for goods. Many strong remonstrances against this Indian trade to Mexico have been made to the court of Spain, wherein they urge, that the silk manufactories of Valentia and other parts of Spain, the linens from Cadiz, and their other manufactories, are hurt in their sale in Mexico and Peru, by the Chinese being able to afford them goods of the same sort cheaper than themselves; that, were this trade laid open, the whole treasure of the New World would centre in Spain, or with European merchants; but now it enriches only the Jesuits and a few private persons. Wise as these arguments are, the Jesuits and priests, versant in intrigue, and the most selfish set of men on earth, had interest enough at court to stop the effect.

At Cavite in this bay, are a fort, a town, and a fine dock-yard, where these large galleons are built and repaired, and where they load and unload, together with all the other large ships that trade to this bay.

The principal of the Philippine Islands are Luconia or Manila, Tandago or Samul, Mashbate, Mindora, Luban, Paragoa, Panay, Leyte,

Leyte, Bohel, Sibu, Sogbu, Negros, St. John, Xolo, and Mindanao. In most of these, the Spanish power prevails, and all are under the governor of Luconia; but there are some in which that nation has little authority, or even influence, such as Mindanao.

The inhabitants of these islands consist of Chinese, Ethiopians, Malays, Spaniards, Portuguese, Pintados or Painted People, and Mestees, a mixture of all these. Their persons and habits resemble those of the several nations whence they derive their original; only, it is observable, that the features of the blacks of these islands are as agreeable as those of the white people. There is not a soil in the world that produces greater plenty of all things for life; as appears by the multitude of inhabitants to be found in the woods and mountains, who subsist almost entirely by the fruits of the earth, and the venison they take. Nor can any country appear more beautiful; for there is a perpetual verdure, and buds, blossoms, and fruit, are found upon the trees all the year round, as well on the mountains as in the cultivated gardens. Vast quantities of gold are washed down from the hills by the rains, and found mixed with the sand of their rivers. There are also mines of other metals, and excellent load-stones found here; and such numbers of wild buffaloes, that a good huntsman on horseback, armed with a spear, will kill ten or twenty in a day. The Spaniards take them for their hides, which they sell to the Chinese; and their carcases serve the mountaineers for food. Their woods also abound with deer, wild hogs, and goats. Of the last there is such plenty in one of these islands, that the Spaniards gave it the name of *Cabras*. Horses and cows have been likewise imported into these islands, from New Spain, China, and Japan, which have multiplied considerably; but the sheep that were brought over came to nothing. The trees produce a great variety of gums; one kind, which is the commonest, by the Spaniards called *brea*, is used instead of pitch; of the others some are medicinal, others odoriferous.

In these islands are monkeys and baboons of a monstrous bigness, that will defend themselves if attacked by men. When they can find no fruit in the mountains, they go down to the sea to catch crabs and oysters; and, that the oysters may not close and catch their paws, they first put in a stone to prevent their shutting close: they take crabs by putting their tails in the holes where they lie, and when the crab lays hold of it they draw him out. There are also great numbers of civet-cats in some of the islands. The bird called *tavan* is a black sea-fowl, something less than a hen, and has a long neck; it lays its eggs in the sand by the sea-side, forty or fifty in a trench, and then covers them, and they are hatched by the heat of the sun. They have likewise the bird *saligan*, which builds her nest on the sides of rocks, as the swallow does against a wall; and these are the delicious *bird's-nests* so much esteemed, being a kind of jelly that dissolves in warm water.

The Spaniards have introduced several of the American fruits, which thrive here as well as in America; the cocoa or chocolate nut particularly, which increases so that they have no occasion now to import it from Mexico. Here is also the fountain-tree, from which the natives draw water; and there is likewise a kind of cane, by the Spaniards called *vaxuco*, which, if cut, yields fair water enough

for a draught, of which there are a plenty in the mountains where water is most wanted.

These islands, being hot and moist, produce abundance of venomous creatures, as the soil does poisonous herbs and flowers, which do not kill those who touch or taste them, but so infect the air, that many people die in the time of their blossoming.

The orange, lemon, and several other, trees, bear twice a year. A sprig, when planted, becomes a tree and bears fruit in a year's time; so that without any hyperbole it may be affirmed, that a more luxuriant verdant soil can scarcely be conceived. The woods are filled with old, large, and lofty, trees, and such as yield more sustenance to man than is to be found in almost any other part of the world. These islands, however, besides their other inconveniences, of which they have many, are very subject to earthquakes, which often prove very fatal.

OF PICTURESQUE BEAUTY.

PICTURESQUE Beauty is chiefly applied to the works of nature, though it will often apply to works of art. Those objects are most properly denominated picturesque which are disposed by the hand of nature with a mixture of varied rudeness, simplicity, and grandeur. A plain neat garden, with little variation in its plan, and no striking grandeur in its position, displays too much of art, design, and uniformity, to be called picturesque. The ideas of *neat* and *smooth*, instead of being picturesque, in fact disqualify the object in which they reside from any pretensions to picturesque beauty. Nay, farther, we do not scruple to assert, that roughness forms the most essential point of difference between the beautiful and the picturesque; as it seems to be that particular quality which makes objects chiefly pleasing in painting. I use the general term roughness; but properly speaking roughness relates only to the surfaces of bodies: when we speak of their delineation, we use the word ruggedness. Both ideas, however, equally enter into the picturesque, and both are observable in the smaller as well as in the larger parts of nature; in the outline and bark of a tree, as in the rude summit and craggy sides of a mountain.

Let us then examine our theory by an appeal to experience, and try how far these qualities enter into the idea of picturesque beauty, and how far they mark that difference among objects which is the ground of our enquiry.

A piece of Palladian architecture may be elegant in the last degree; the proportion of its parts, the propriety of its ornaments, and the symmetry of the whole, may be highly pleasing; but, if we introduce it in a picture, it immediately becomes a formal object, and ceases to please. Should we wish to give it picturesque beauty, we must use the mallet instead of the chissel; we must beat down one half of it, deface the other, and throw down the mutilated members around in heaps; in short, from a smooth building, we must turn it into a rough ruin. No painter who had the choice of the two objects would hesitate a moment.

Again, why does an elegant piece of garden-ground make no figure on canvass? the shape is pleasing, the combination of the objects harmonious,

harmonious, and the winding of the walk in the very line of beauty. All this is true; but the smoothness of the whole, though right and as it should be in nature, offends in picture. Turn the lawn into a piece of broken ground, plant rugged oaks instead of flowering shrubs, break the edges of the walk, give it the rudeness of a road, mark it with wheel-tracks, and scatter around a few stones and brush-wood; in a word, instead of making the whole smooth, make it rough, and you make it also picturesque. All the other ingredients of beauty it already possessed. On the whole, picturesque composition consists in uniting in one whole a variety of parts, and these parts can only be obtained from rough objects.

It is possible therefore to find picturesque objects among works of art, and it is possible to make objects so; but the grand scene of picturesque beauty is nature in all its original variety, and in all its irregular grandeur. We seek it among all the ingredients of landscape, trees, rocks, broken grounds, woods, rivers, lakes, plains, valleys, mountains, and distances. These objects in themselves produce infinite variety; no two rocks or trees are exactly the same; they are varied a second time by combination; and almost as much a third time by different lights and shades and other aerial effects. Sometimes we find among them the exhibition of a whole, but oftener we find only beautiful parts.

Sublimity or grandeur alone cannot make an object picturesque: for, however grand the mountain or the rock may be, it has no claim to this epithet, unless its form, its colour, or its accompaniments, have some degree of beauty. Nothing can be more sublime than the ocean; but, wholly unaccompanied, it has little of the picturesque. When we talk therefore of a sublime object, we always understand that it is also beautiful; and we call it sublime or beautiful only as the ideas of sublimity or simple beauty prevail. But it is not only the form and the composition of the objects of landscape which the picturesque eye examines, it connects them with the atmosphere, and seeks for all those various effects which are produced from that vast and wonderful storehouse of nature. Nor is there in travelling a greater pleasure than when a scene of grandeur bursts unexpectedly upon the eye, accompanied with some accidental circumstance of the atmosphere which harmonizes with it, and gives it double value.

There are few places so barren as to afford no picturesque scene.

> ——————Believe the muse,
> She does not know that inauspicious spot
> Where beauty is thus niggard of her store.
> Believe the muse, through this terrestrial waste
> The seeds of grace are sown, profusely sown,
> Even where we least may hope.——————

Mr. Gilpin mentions the great military road between Newcastle and Carlisle as the most barren tract of country in England; and yet there, he says, there is "always something to amuse the eye. The interchangeable patches of heath and greensward make an agreeable variety. Often too on these vast tracts of intersecting grounds we see beautiful lights, softening off along the sides of the hills: and often we see them adorned with cattle, flocks of sheep, heath-cocks, grouse, plover, and flights of other wild-fowl. A group of cattle standing in the shade on the edge of a dark hill, and relieved by a lighter distance beyond them, will often make a complete picture

without any other accompaniment. In many other situations also we find them wonderfully pleasing, and capable of making pictures amidst all the deficiencies of landscape. Even a winding road itself is an object of beauty; while the richness of the heath on each side, with the little hillocks and crumbling earth, give many an excellent lesson for a fore-ground. When we have no opportunity of examining the grand scenery of nature, we have every where at least the means of observing with what a multiplicity of parts, yet with what general simplicity, she covers every surface.

But, if we let the imagination loose, even scenes like these administer great amusement. The imagination can plant hills; can form rivers and lakes in valleys; can build castles and abbeys; and, if it find no other amusement, can dilate itself in vast ideas of space, with which nature fails not to enrich the mind of the true-born painter, or the poet.

SURPRISING PROPERTY OF OIL IN QUELLING A TEMPESTUOUS SEA.

THE action of oil, in stopping the violent ebullition of various substances, is truly surprising. It is well known that if a mixture of sugar, honey, or the like, be boiling upon the fire, and in danger of rising over the sides of the vessel, the pouring in a little oil immediately makes it subside. In many cases the marking a circle round the inside of a vessel, in which a liquor of this kind is to be boiled, with a piece of hard soap, shall, like a magic ring, confine the ebullition to that height, and not suffer it to stir any farther. This is wholly owing to the oil, or fat, contained in the soap: but there is, besides these, another very important use of oil, on a like occasion, which is the pouring a little of it on any metallic solution, while making; this restrains the ascent of the noxious vapours; preserves the operator from danger; and, at the same time, by keeping down the evaporating matter, gives redoubled strength to the menstruum. Pliny has mentioned an extraordinary effect of oil, in stilling the surface of water when it is agitated with waves, and the use made of it, by the divers, for this purpose. *Omne*, says he, *oleo tranquillari*, &c. lib. ii. cap. 103. and Plutarch, in Quæst. Natur. asks, *Cur mare oleo consperſum perlucidum sit et tranquillum?* Pliny's account seems to have been either discredited or disregarded by our writers on experimental philosophy, till it was confirmed by several curious experiments of Dr. Franklin, which were published in the year 1774. The property of oil above-mentioned has, however, been well known to modern divers and dredgers for oysters, at Gibraltar, and elsewhere. The divers in the Mediterranean, in particular, descend, as in Pliny's time, with a little oil in their mouths, which they now and then let out; and which, on rising to the surface of the sea, immediately renders it smooth, so as to permit the light to pass through the water, undisturbed by various and irregular refractions. The Bermudans are enabled to see and strike fish, which would be concealed from their view, through the roughness of the sea, by pouring a little oil upon it. And the Lisbon fishermen effect a safe passage over the bar of the Tagus, by emptying a bottle or two of oil into the sea, when the surf is so great as

as to endanger its filling their boats. Our sailors have also observed, that the water is always much smoother in the wake of a ship that hath been newly tallowed than it is in one that is foul. Dr. Franklin was led, by an accidental observation made at sea, in 1757, to attend particularly to Pliny's account; and the various informations which he afterwards received relating to it induced him to try some experiments on the subject. Standing on the windward side of a large pond, the surface of which was rendered very rough with the wind, he poured a tea-spoonful of oil on the water. This small quantity produced an instant calm over a space of several yards square, which spread amazingly, and extended itself gradually, till it reached the lee side, making all that quarter of the pond, perhaps half an acre, as smooth as a looking-glass. On repeating this experiment, which constantly succeeded, one circumstance struck him with particular surprise; this was the sudden, wide, and forcible, spreading of a drop of oil on the face of the water, which, he adds, "I do not know that any body has considered." When a drop of oil is put on a looking-glass, or polished marble, it spreads very little; but on water it instantly expands into a circle extending several feet in diameter, becoming so thin as to produce the prismatic colours, for a considerable space, and beyond them so much thinner as to be invisible, except in its effects of smoothing the waves at a much greater distance. It seems, says Dr. Franklin, as if a mutual repulsion between its particles took place as soon as it touched the water, and a repulsion so strong as to act on other bodies swimming on the surface, as straws, leaves, &c. forcing them to recede every way from the drop, as from a center, leaving a large clear space. In endeavouring to account for the singular effects of oil, Dr. Franklin observes, that there seems to be no natural repulsion between water and air, such as to keep them from coming into contact with each other.—Therefore air, in motion, which is wind, in passing over the smooth surface of water, may rub, as it were, on that surface, and raise it into wrinkles, which, if the wind continues, are the elements of future waves. The smallest does not immediately subside, but in subsiding raises nearly as much of the water next to it. A small power, continually operating, will produce a great action: so that the first-raised waves, being continually acted upon by the wind, are, though the wind does not increase in strength, continually increased in magnitude, rising higher and extending their bases, so as to include a vast mass of water in each wave, which, in its motion, acts with great violence. But if there be a mutual repulsion between the particles of oil, and no attraction between oil and water, oil dropt on water will not be held together by adhesion to the spot on which it falls? it will not be imbibed by the water; but be at liberty to expand itself and spread on a surface, that prevents, perhaps, by repelling the oil, all immediate contact; the expansion will continue till the mutual repulsion between the particles of oil is weakened and reduced to nothing by their distance. Dr. Franklin imagines, that the wind, blowing over water, thus covered with a film of oil, cannot easily catch upon it, so as to raise the first wrinkles, but slides over it, and leaves it smooth as it finds it. It moves a little the oil, indeed, which, being between it and the water, serves it to slide with, and prevents friction: hence the oil, dropt on the windward side of the pond, proceeds gradually to leeward, as may be seen by the

smoothness

ſmoothneſs it carries with it quite to the oppoſite ſide: for the wind, being thus prevented from raiſing the firſt wrinkles, which he calls the elements of waves, cannot produce waves, which are to be made by continually acting upon and enlarging thoſe elements, and thus the whole pond is calmed. Upon the whole, there is great room to ſuppoſe (notwithſtanding the partial failure of an experiment made at Portſmouth, by Dr. Franklin, and others), that ſeafaring people may derive advantages from uſing oil on particular occaſions, in order to moderate the violence of the waves, or to leſſen the ſurf which ſometimes renders the landing on a lee-ſhore dangerous or impracticable. To this purpoſe we are informed, that the captain of a Dutch Eaſt-India ſhip, being, overtaken by a ſtorm, found himſelf obliged, for greater ſafety in wearing the ſhip, to pour oil into the ſea, to prevent the waves breaking over her, which had an excellent effect, and ſucceeded in preſerving her. Phil. Tranſ. vol. lxiv. part 2. p. 445, &c. It is alſo obſervable, on the coaſt of Sutherland, when the lump-fiſh abounds in ſpring, and are devoured by the ſeals, that it may be known by the ſmoothneſs of the water above the ſpot; the oil ſerving to ſtill the agitation of the waves.

DESCRIPTION OF THE MARBLE MOUNTAINS.

OF theſe there are great numbers in Egypt, from which, though immenſe quantities have been carried off for the multitude of great works erected by the ancient Egyptians; yet, in the opinion of Mr. Bruce who paſſed by them in his journey to Abyſſinia, there is ſtill ſuch an abundant ſupply, that it would be ſufficient to build Rome, Athens, Corinth, Syracuſe, Memphis, Alexandria, and half a dozen more of ſuch cities.

The firſt mountain of this kind mentioned by Mr. Bruce is one oppoſite to Terſowey, conſiſting partly of green marble, partly of granite, with a red bluſh upon a grey ground, and ſquare oblong ſpots. Here he ſaw a monſtrous obeliſk of marble, very nearly ſquare, broken at the end, and nearly thirty feet long and nineteen feet in the face. Throughout the plain there were ſcattered ſmall pieces of jaſper, with green, white, and red, ſpots, called in Italy *diſapro ſanguineo*; and all the mountains upon that ſide ſeemed to conſiſt of the ſame materials. Here alſo were quantities of ſmall pieces of granite of various kinds, as well as porphyry, which had been carried down by a torrent, probably from the ancient quarries. Theſe pieces were white mixed with black ſpots, and red with green veins and black ſpots. All the other mountains on the right hand were of red marble, but no great beauty; thoſe on the oppoſite ſide being green marble, probably of the ſerpentine kind. This, he ſays, was one of the moſt extraordinary ſights he ever ſaw. The former mountains were of a conſiderable height, without a tree, ſhrub, or blade of graſs, upon them; and this looked exactly as if it had been covered over with Havannah and Brazil ſnuff. Proceeding farther on, he entered another defile with mountains of green marble on every ſide. The higheſt he ſaw appeared to be compoſed of ſerpentine marble; having a large vein of green jaſper ſpotted with red running through about one-third of its thickneſs. It was extremely hard; ſo that it did not yield to the blows of a hammer, though

though it was evident that it had formerly been quarried; and there were channels for bringing water, which terminated in this quarry of jasper; "a proof (says Mr. Bruce) that water was one of the means used in cutting those hard stones."

On these mountains, our author observes, that "the porphyry shews itself by a fine purple sand without any gloss upon it, though the colour is very agreeable to the eye. It is mixed with the white sand and fixed marble of the plains. Green and unvariegated marble is also found in the same mountain with the porphyry. The marble is brittle for some inches where the two veins meet; but the porphyry is as hard as in other places. The granite appears like a dirty brown stone covered with sand; but this is only the change made upon it by the sun and weather; for, on breaking it, the colour appears to be grey with black spots, and a reddish cast on the surface. The reddish colour appears to be impaired by exposure to the atmosphere; but is recovered upon polishing it anew. It is in greater quantity than the porphyry, and nearer to the Red Sea. The granite is next to the porphyry, but never joined with it in the same mountain. Being covered with a reddish sand, it looks as if the whole mountain were covered with brick-dust." There is likewise a kind of red marble with white veins, which our author has seen at Rome and likewise in Britain. The common green, called *serpentine*, looks as if it were covered with Brazil snuff. Along with this green he saw two samples of the beautiful kind called *Isabella*; one of them with the yellowish cast of Quaker-colour, the other of that bluish cast called *dove-colour*; and these two seemed to divide the mountains with the serpentine. Here also he saw the vein of jasper; but had not time to determine whether it was the same with that called bloody-jasper or blood-stone or not.

The marble of greatest value, however, is that called *verde antico*, which is of a dark-green colour with white spots. It is found, like the jasper, in the mountains of the plain green serpentine, and is not discoverable by the dust or any particular colour upon it. "First (says Mr. Bruce) there is a blue flaky stone exceedingly even and smooth in the grain, solid, and without sparks and colour. When broken it is something lighter than a slate, and more beautiful than most kinds of marble; it is like the lava of volcanoes when polished. After lifting this we come to the beds of verde antico; and here the quarrying is very obvious; for it has been uncovered in patches not above twenty feet square. Then, in another part, the green stone has been removed, and another pit wrought." In other places of the plain he saw pieces of African marble, but no rocks or mountains of it. He supposes it to be found in the heart of some other coloured marble, and in strata like the jasper and verde antico; and, as he suspects, in the mountains of Isabella marble, especially of the yellowest sort. This vast store of marble is placed on a ridge, whence there is a descent to the east and west, so that it could be conveyed either to the Nile or the Red Sea. The level ground and hard fixed gravel are proper for the heaviest carriages; so that any weight whatever might easily be conveyed to the place of embarkation. In the more distant mountains also he observed the same care taken to facilitate the carriage: for the defiles between those mountains he supposes not to be natural but artificial openings; and he observed the roads from them to the Nile to be cut with a descent of about one foot

foot in fifty at most; so that, all the way down, the carriages must have moved with as little draught as possible, at the same time that the vast friction would prevent any undue acceleration; to which also some other means must have contributed: but thus, he thinks, it may be explained how such immense blocks might have been removed as were employed in the ancient Egyptian works.

Mountains of marble and porphyry are not peculiar to Egypt, for they are likewise to be met with in the north of Scotland; and in the Western Isles there are likewise such quantities of these materials to be met with, as, in the opinion of Mr. Williams, would be sufficient to serve all Europe.

INSTRUCTIONS FOR ERECTING A DOVE-HOUSE.

ANY lord of a manor may build a dove-house on his land, but a tenant cannot do it without the lord's licence. When persons shoot at or kill pigeons within a certain distance of the pigeon-house, they are liable to pay a forfeiture.

In order to erect a dove or pigeon house to advantage, it will be necessary, in the first place, to pitch upon a convenient situation; of which none is more proper than the middle of a spacious court-yard, because pigeons are naturally of a timorous disposition, and the least noise they hear frightens them. With regard to the size of the pigeon-house, it must depend entirely upon the number of birds intended to be kept; but it is better to have it too large than too little; and as to its form, the round should be preferred to the square ones; because rats cannot so easily come at them in the former as in the latter. It is also much more commodious; because you may, by means of a ladder turning upon an axis, easily visit all the nests in the house, without the least difficulty; which cannot so easily be done in a square house. In order to hinder rats from climbing up the outside of the pigeon-house, the wall should be covered with tin-plates to a certain height, about a foot and a half will be sufficient; but they should project out three or four inches at the top, to prevent their clambering any higher.

The pigeon-house should be placed at no great distance from water, that the pigeons may carry it to their young ones; and their carrying it in their bills will warm it, and render it more wholesome in cold weather. The boards that cover the pigeon-house should be well joined together, so that no rain may penetrate through it: and the whole building should be covered with hard plaster, and white-washed within and without, white being the most pleasing colour to pigeons. There must be no window, or other opening, in the pigeon-house to the eastward; these should always face the south, for pigeons are very fond of the sun, especially in winter.

The nests or covers in a pigeon-house should consist of square holes made in the walls of a size sufficient to admit the cock and hen to stand in them. The first range of these nests should not be less than four feet from the ground, that the wall underneath being smooth, the rats may not be able to reach them. These nests should be placed in quincunx order and not directly over one another. Nor must they be continued any higher than within three or four feet of the top of the wall: and the upper row should be covered with a

board projecting a considerable distance from the wall, for fear the rats should find means to climb the outside of the house.

M. Duhamel thinks that pigeons neither feed upon the green corn, nor have bills strong enough to search for its seeds in the earth; but only pick up the grains that are not covered, which would infallibly become the prey of other animals, or be dried up by the sun. "From the time of the sprouting of the corn (says he) pigeons live chiefly upon the seeds of wild uncultivated plants, and therefore lessen considerably the quantity of weeds that would otherwise spring up; as will appear from a just estimate of the quantity of grain necessary to feed all the pigeons of a well-stocked dove-house." But Mr. Worlidge and Mr. Lisle allege facts in support of the contrary opinion. The latter relates, that a farmer in his neighbourhood assured him he had known an acre sowed with peas, and, rain coming on so that they could not be harrowed in, every pea was fetched away in half a day's time by pigeons: and the former says, "It is to be observed, that, where the flight of pigeons falls, there they fill themselves and away, and return again where they first rose, and so proceed over a whole piece of ground, if they like it. Although you cannot perceive any grain above the ground, they know how to find it. I have seen them lie so much upon a piece of about two or three acres sown with peas, that they devoured at least three parts in four of the seed, which, I am sure, could not be all above the surface of the ground. That their smelling is their principal director, I have observed; having sown a small plat of peas in my garden, near a pigeon-house, and covered them so well that not a pea appeared above ground. In a few days, a parcel of pigeons were hard at work in discovering this hidden treasure; and in a few days more it had not above two or three peas left out of about two quarts that were planted; for what they could not find before, they found when the buds appeared, notwithstanding they were hoed in, and well covered. Their smelling alone directed them, as I supposed, because they followed the ranges exactly. The injury they do at harvest on the peas, vetches, &c. is such that we may rank them among the greatest enemies the poor husbandman meets with-al; and the greater, because he may not erect a pigeon-house, whereby to have a share of his own spoils; none but the rich being allowed this privilege, and so severe a law being also made to protect these winged thieves, that a man cannot encounter them, even in defence of his own property. You have therefore no remedy against them, but to affright them away by noises or such like. You may, indeed, shoot at them; but you must not kill them; or you may, if you can, take them in a net, cut off their tails, and let them go; by which means you will impound them: for, when they are in their houses, they cannot bolt or fly out of the tops of them but by the strength of their tails; after the thus weakening of which, they remain prisoners at home."

Mr. Worlidge's impounding the pigeons reminds us of a humorous story of a gentleman who, upon a neighbouring farmer's complaining to him, that his pigeons were a great nuisance to his land, and did sad mischief to his corn, replied jokingly, Pound them, if you catch them trespassing. The farmer, improving the hint, steeped a parcel of peas in an infusion of *coculus indicus*, or some other intoxicating drug, and strewed them upon his grounds.

The pigeons swallowed them, and soon remained motionless on the field: upon which the farmer threw a net over them, inclosed them in it, and carried them to an empty barn, from whence he sent the gentleman word that he had followed his directions with regard to the pounding of his pigeons, and desired him to come and release them.

ORIGIN OF CORPORATIONS.

A CORPORATION is a body politic or incorporate, so called, because the persons or members are joined into one body, and are qualified to take, grant, &c.

Of corporations there is a great variety subsisting, for the advancement of religion, of learning, and of commerce, in order to preserve entire and for ever those rights and immunities, which, if they were granted only to those individuals of which the body corporate is composed, would upon their death be utterly lost and extinct. To shew the advantages of these incorporations, let us consider the case of a college in either of our universities, founded *ad studendum et orandum*, for the encouragement and support of religion and learning. If this was a mere voluntary assembly, the individuals which compose it might indeed read, pray, study, and perform scholastic exercises, together, so long as they could agree to do so: but they could neither frame, nor receive, any laws or rules of their conduct; none at least which would have any binding force, for want of a coercive power to create a sufficient obligation. Neither could they be capable of retaining any privileges or immunities: for, if such privileges be attacked, which of all this unconnected assembly has the right or ability to defend them? And, when they are dispersed by death or otherwise, how shall they transfer these advantages to another set of students, equally unconnected as themselves? So also, with regard to holding estates or other property, if land be granted for the purposes of religion or learning to twenty individuals not incorporated, there is no legal way of continuing the property to any other persons for the same purposes, but by endless conveyances from one to the other, as often as the hands are changed. But when they are consolidated and united into a corporation, they and their successors are then considered as one person in law: as one person, they have one will, which is collected from the sense of the majority of the individuals: this one will may establish rules and orders for the regulation of the whole, which are a sort of municipal laws of this little republic; or rules and statutes may be prescribed to it at its creation, which are then in the place of natural laws: the privileges and immunities, the estates and possessions, of the corporation, when once vested in them, will be for ever vested, without any new conveyance to new successions; for all the individual members that have existed from the foundation to the present time, or that shall ever hereafter exist, are but one person in law, a person that never dies: in like manner as the river Thames is still the same river, though the parts which compose it are changing every instant.

The honour of originally inventing these political constitutions entirely belongs to the Romans. They were introduced, as Plutarch says,

ſays, by Numa; who finding, upon his acceſſion, the city torn to pieces by the two rival factions of Sabines and Romans, thought it a prudent and politic meaſure to ſubdivide theſe two into many ſmaller ones, by inſtituting ſeparate ſocieties of every manual trade and profeſſion. They were afterwards much conſidered by the civil law, in which they were called *univerſitates*, as forming one whole out of many individuals; or *collegia*, from being gathered together: they were adopted alſo by the canon law, for the maintenance of eccleſiaſtical diſcipline; and from them our ſpiritual corporations are derived. But our laws have conſiderably refined and improved upon the invention, according to the uſual genius of the Engliſh nation; particularly with regard to ſole corporations, conſiſting of one perſon only, of which the Roman lawyers had no notion; their maxim being that, *Tres faciunt collegium:* though they held, that if a corporation, originally conſiſting of three perſons, be reduced to one, *Si univerſitas ad unum redit*, it may ſtill ſubſiſt as a corporation, *Et ſtet nomen univerſitatis.*

As to the ſeveral ſorts of corporations, the firſt diviſion of them is into *aggregate* and *ſole*. Corporations aggregate conſiſt of many perſons united together into one ſociety, and are kept up by a perpetual ſucceſſion of members, ſo as to continue for ever: of which kind are the mayor and commonalty of a city, the head and fellows of a college, the dean and chapter of a cathedral church. Corporations ſole conſiſt of one perſon only and his ſucceſſors, in ſome particular ſtation, who are incorporated by law, in order to give them ſome legal capacities and advantages, particularly that of perpetuity, which in their natural perſons they could not have had. In this ſenſe the king is a ſole corporation; ſo is a biſhop; ſo are ſome deans and prebendaries, diſtinct from their ſeveral chapters; and ſo is every parſon and vicar. And the neceſſity, or at leaſt uſe, of this inſtitution will be very apparent, if we conſider the caſe of a parſon of a church. At the original endowment of pariſh-churches, the freehold of the church, the church-yard, the parſonage-houſe, the glebe, and the tithes of the pariſh, were veſted in the then parſon by the bounty of the donor, as a temporal recompenſe to him for his ſpiritual care of the inhabitants, and with intent that the ſame emoluments ſhould ever afterwards continue as a recompenſe for the ſame care. But how was this to be effected? The freehold was veſted in the parſon; and, if we ſuppoſe it veſted in his natural capacity, on his death it might deſcend to his heir, and would be liable to his debts and incumbrances: or at beſt heirs might be compellable, at ſome trouble and expence, to convey their rights to the ſucceeding incumbent. The law therefore has wiſely ordained, that the parſon, *quatenus* parſon, ſhall never die, any more than the king; by making him and his ſucceſſors a corporation. By which means all the original rights of the parſonage are preſerved entire to the ſucceſſor: for the preſent incumbent, and his predeceſſor who lived ſeven centuries ago, are in law one and the ſame perſon; and what was given to the one was given to the other alſo.

Another diviſion of corporation, either ſole or aggregate, is into *eccleſiaſtical* and *lay*. Eccleſiaſtical corporations are where the members that compoſe it are entirely ſpiritual perſons: ſuch as biſhops; certain deans and prebendaries; all archdeacons, parſons, and vicars; which are ſole corporations: deans and chapters at preſent, and

formerly prior and convent, abbot and monks, and the like, bodies aggregate. These are erected for the furtherance of religion, and perpetuating the rights of the church.—Lay corporations are of two sorts, *civil* and *eleemosynary*. The civil are such as are erected for a variety of temporal purposes. The king, for instance, is made a corporation, to prevent in general the possibility of an *interregnum* or vacancy of the throne, and to preserve the possessions of the crown entire; for, immediately upon the demise of one king, his successor is in full possession of the regal rights and dignity. Other lay corporations are erected for the good government of a town or particular district, as a mayor and commonalty, bailiff and burgesses, or the like: some for the advancement and regulation of manufactures and commerce; as the trading companies of London and other towns: and some for the better carrying on of divers special purposes; as church-wardens, for conservation of the goods of the parish; the college of physicians and company of surgeons in London, for the improvement of the medical science; the royal society, for the advancement of natural knowledge; and the society of antiquarians, for promoting the study of antiquities. The eleemosynary sort are such as are constituted for the perpetual distribution of the free alms, or bounty, of the founder of them to such persons as he has directed. Of this kind are all hospitals for the maintenance of the poor, sick, and impotent; and all colleges, both in our universities and out of them; which colleges are founded for two purposes: 1. For the promotion of piety and learning by proper regulations and ordinances. 2. For imparting assistance to the members of those bodies, in order to enable them to prosecute their devotion and studies with greater ease and assiduity. And all these eleemosynary corporations are, strictly speaking, lay, and not ecclesiastical, even though composed of ecclesiastical persons, and although they in some things partake of the nature, privileges, and restriction, of ecclesiastical bodies.

Having thus marshalled the several species of corporations, let us next proceed to consider, 1. How corporations in general may be created. 2. What are their powers, capacities, and incapacities. And, 3. How they may be dissolved.

I. Corporations, by the civil law, seem to have been created by the mere act and voluntary association of their members; provided such convention was not contrary to law, for then it was *illicitum collegium*. It does not appear that the prince's consent was necessary to be actually given to the foundation of them; but merely that the original founders of these voluntary and friendly societies (for they were little more than such) should not establish any meetings in opposition to the laws of the state.

But in England the king's consent is absolutely necessary to the erection of any corporation, either impliedly or expressly given. The king's implied consent is to be found in corporations which exist by force of the common law, to which our former kings are supposed to have given their concurrence; common law being nothing else but custom, arising from the universal agreement of the whole community. Of this sort are the king himself, all bishops, parsons, vicars, church-wardens, and some others; who by common law have ever been held (as far as our books can shew us) to have been corporations, *virtute officii*; and this incorporation is so inseparably

inseparably annexed to their offices, that we cannot frame a complete legal idea of any of these persons, but we must also have an idea of a corporation, capable to transmit his rights to his successors, at the same time. Another method of implication, whereby the king's consent is presumed, is as to all corporations by prescription, such as the city of London, and many others, which have existed as corporations, time whereof the memory of man runneth not to the contrary; and therefore are looked upon in law to be well created. For, though the members thereof can shew no legal charter of incorporation, yet in cases of such high antiquity the law presumes there once was one; and that, by the variety of accidents which a length of time may produce, the charter is lost or destroyed. The methods by which the king's consent is expressly given, are either by act of parliament or charter. By act of parliament, of which the royal assent is a necessary ingredient, corporations may undoubtedly be created; but it is observable, that most of those statutes, which are usually cited as having created corporations, do either confirm such as have been before created by the king; as in the case of the college of physicians, erected by charter 10 Hen. VIII. which charter was afterwards confirmed in parliament; or, they permit the king to erect a corporation *in futuro* with such and such powers; as is the case of the bank of England, and the society of the British fishery. So that the immediate creative act is usually performed by the king alone, in virtue of his royal prerogative.

All the other methods therefore whereby corporations exist, by common law, by prescription, and by act of parliament, are for the most part reducible to this of the king's letters patent, or charter of incorporation. The king's creation may be performed by the words *creamus, erigimus, fundamus, incorporamus*, or the like. Nay it is held, that if the king grants to a set of men to have *gildam mercatorium*, "a mercantile meeting or assembly," this is alone sufficient to incorporate and establish them for ever.

The king (it is said) may grant to a subject the power of erecting corporations, though the contrary was formerly held; that is, he may permit the subject to name the person and powers of the corporation at his pleasure; but it is really the king that erects, and the subject is but the instrument; for though none but the king can make a corporation, yet *qui facit per alium, facit per se*. In this manner the chancellor of the university of Oxford has power by charter to erect corporations; and has actually often exerted it in the erection of several matriculated companies, now subsisting, of tradesmen subservient to the students.

When a corporation is erected, a name must be given it; and by that name alone it must sue and be sued, and do all legal acts.

II. After a corporation is so formed and named, it acquires many powers and rights, which we are next to consider. Some of these are necessarily and inseparably incident to every corporation; which incidents, as soon as a corporation is duly erected, are tacitly annexed of course. As, 1. To have perpetual succession. This is the very end of its incorporation; for there cannot be a succession for ever without an incorporation; and therefore all aggregate corporations have a power necessarily implied of electing members in the room of such as go off. 2. To sue or be sued, implead or be impleaded, grant or receive, by its corporate name, and do all other acts as natural persons

persons may. 3. To purchase lands and hold them, for the benefit of themselves and their successors: which two are consequential to the former. 4. To have a common seal. For a corporation, being an invisible body, cannot manifest its intentions by any personal act or oral discourse: it otherwise acts and speaks only by its common seal. For, though the particular members may express their private consents to any act by words, or signing their names, yet this does not bind the corporation; it is the fixing of the seal, and that only, which unites the several assents of the individuals who compose the community, and makes one joint assent of the whole. 5. To make by-laws or private statutes for the better government of the corporation; which are binding upon themselves, unless contrary to the laws of the land, and then they are void. But no trading company is with us allowed to make by-laws which may affect the king's prerogative or the common profit of the people, under penalty of forty pounds, unless they be approved by the chancellor, treasurer, and chief justices, or the judges of assize in their circuits; and, even though they be so approved, still, if contrary to law, they are void. These five powers are inseparably incident to every corporation, at least to every corporation aggregate: for two of them, though they may be practised, yet are very unnecessary to a corporation sole; viz. to have a corporate seal to testify his sole assent, and to make statutes for the regulation of his own conduct.

Corporations have a capacity to purchase lands for themselves and successors; but they are excepted out of the statute of wills; so that no devise of lands to a corporation by will is good; except for charitable uses, by stat. 43 Eliz. c. 4. which exception is again greatly narrowed by the stat. 9 Geo. II. c. 36. And also, by a great variety of statutes, their privilege even of purchasing from any living granter is much abridged; so that now a corporation, either ecclesiastical or lay, must have a licence from the king to purchase, before they can exert that capacity which is vested in them by the common law: nor is even this in all cases sufficient. These statutes are generally called the statutes of *mortmain*.

The general duties of all bodies politic, considered in their corporate capacity, may, like those of natural persons, be reduced to this single one; that of acting up to the end or design, whatever it be, for which they were created by their founder.

III. How corporations may be dissolved. Any particular member may be disfranchised, or lose his place in the corporation, by acting contrary to the laws of the society, or the laws of the land: or he may resign it by his own voluntary act. But the body politic may also itself be dissolved in several ways; which dissolution is the civil death of the corporation: and in this case their lands and tenements shall revert to the person, or his heirs, who granted them to the corporation; for the law doth annex a condition to every such grant, that, if the corporation be dissolved, the granter shall have the lands again, because the cause of the grant faileth. The grant is indeed only during the life of the corporation; which may endure for ever: but, when that life is determined to be the dissolution of the body politic, the granter takes it back by reversion, as in the case of every other grant for life. The debts of a corporation, either to or from it, are totally extinguished by its dissolution; so that the members thereof cannot recover, or be charged with, them, in their natural

natural capacities: agreeable to that maxim of the civil law, *Si quid universitati debetur, singulis non debetur; nec quod debet universitas, singuli debent.*

A corporation may be dissolved, 1. By act of parliament, which is boundless in its operations. 2. By the death of all its members, in cases of an aggregate corporation. 3. By surrender of all its franchises into the hands of the king, which is a kind of suicide. 4. By forfeiture of its charter, through negligence or abuse of its franchises; in which case the law judges that the body politic has broken the conditions upon which it was incorporated, and therefore the incorporation is void. And the regular course is to bring an information in the nature of a writ of *quo warranto*, to enquire by what warrant the members now exercise their corporate power, having forfeited it by such and such proceedings. The exertions of this act of law, for the purposes of the state, in the reigns of King Charles and King James II. particularly by seizing the charter of the city of London, gave great and just offence; though perhaps, in strictness of law, the proceedings in most of them were sufficiently regular; but the judgment against that of London was reversed by act of parliament after the revolution; and by the same statute it is enacted, that the franchises of the city of London shall never more be forfeited for any cause whatsoever. And because by the common law corporations were dissolved, in case the mayor or head officer was not duly elected on the day appointed in the charter or established by prescription, it is now provided, that for the future no corporation shall be dissolved upon that account; and ample directions are given for appointing a new officer, in case there be no election, or a void one, made upon the charter or prescriptive day.

The corporation act prevents any person from being legally elected into any office relating to the government of any city or corporation, unless within a twelvemonth before has received the sacrament of the Lord's Supper according to the rites of the church of England; and also enjoins him to take the oaths of allegiance and supremacy when he takes the oath of office; otherwise his election is void.

DESCRIPTION OF HUDSON'S BAY.

HUDSON'S BAY is a large bay of North America, lying between fifty-one and sixty-nine degrees of latitude, discovered in 1610 by Henry Hudson. This intrepid mariner, in searching after a north-west passage to the South-seas, discovered three straits, through which he hoped to find a new way to Asia by America. He had made two voyages before on the same adventure; the first in 1607, and the second in 1608. In his third and last, 1610, he entered the straits that lead to this new Mediterranean, the bay known by his name; coasted a great part of it; and penetrated to eighty degrees and an half into the heart of the frozen zone. His ardour for the discovery not being abated by the difficulties he struggled with in this empire of winter, and world of frost and snow, he staid here until the ensuing spring, and prepared in the beginning of 1611 to pursue his discoveries; but his crew, who suffered equal hardships without the same spirit to support them, mutinied, seized upon

him and seven of those who were most faithful to him, and committed them to the fury of the icy seas in an open boat. Hudson and his companions were either swallowed up by the waves, or gaining the inhospitable coast were destroyed by the savages; but the ship and the rest of the men returned home. Other attempts towards a discovery were made in 1612 and 1667; and a patent for planting the country, with a charter for a company, was obtained in the year 1670. In 1746 Captain Ellis wintered as far north as fifty-seven degrees and an half, and Captain Christopher attempted farther discoveries in 1761. But besides these and the late voyages, which satisfy us that we must not look for a passage on this side of latitude sixty-seven degrees north, we are indebted to the Hudson's Bay Company for a journey by land; which throws much additional light on this matter, by affording what may be called demonstration, how much farther north, at least in some parts of their voyage, ships must go before they can pass from one side of America to the other. The northern Indians, who come down to the company's factories to trade, had brought to the knowledge of our people a river, which, on account of much copper being found near it, had obtained the name of Copper-mine river. The company, being desirous of examining into this matter with precision, directed Mr. Hearne, a young gentleman in their service, and who having been brought up for the navy and served in it the war before last, was extremely well qualified for the purpose, to proceed over land under the convoy of those Indians, for that river, which he had orders to survey, if possible, quite down to its exit into the sea; to make observations for fixing the latitudes and longitudes; and to bring home maps and drawings both of it and the countries through which he should pass. Accordingly Mr. Hearne set out from Prince of Wales's Fort, on Churchill river, latitude fifty-eight degrees forty-seven minutes and an half north, and longitude ninety-four degrees seven minutes and an half west from Greenwich, on the 7th of December 1770. On the 13th of June he reached the Copper-mine river, and found it all the way, even to its exit into the sea, encumbered with shoals and falls, and emptying itself into it over a dry flat of the shore, the tide being then out, which seemed by the edges of the ice to rise about twelve or fourteen feet. This rise, on account of the falls, will carry it but a very small way within the river's mouth, so that the water in it had not the least brackish taste. Mr. Hearne was nevertheless sure of the place it emptied itself into being the sea, or a branch of it, by the whale-bone and seal-skins which the Esquimaux had at their tents; and also by the number of seals which he saw upon the ice. The sea at the river's mouth was full of islands and shoals as far as he could see by the assistance of a pocket telescope; and the ice was not yet (July 17th) broken up, but thawed away only for about three quarters of a mile from the shore, and for a little way round the islands and shoals which lay off the river's mouth. But he had the most extensive view of the sea when he was about eight miles up the river; from which station the extreme parts of it bore N. W. by W. and N. E. By the time Mr. Hearne had finished his survey of the river, which was about one o'clock in the morning on the 18th, there came on a very thick fog and drizzling rain; and as he found the river and sea in every respect unlikely to be of any utility, he thought it unnecessary to wait for fair weather to determine the latitude more exactly

exactly by obſervation; but by the extraordinary care he took in obſerving the courſes and diſtances, walking from Congecathawhachaga, where he had two very good obſervations, he thinks the latitude may be depended on within twenty minutes at the utmoſt. It appears from the map which Mr. Hearne conſtructed of this ſingular journey, that the mouth of the Copper-mine river lies in latitude ſeventy-two degrees north, and longitude twenty-five degrees weſt, from Churchill river; that is about one hundred and nineteen degrees weſt of Greenwich. Mr. Hearne's journey back from the Copper-mine river to Churchill laſted till June the 30th 1772; ſo that he was abſent almoſt a year and ſeven months. The unparallelled hardſhips he ſuffered, and the eſſential ſervice he performed, met with a ſuitable reward from his maſters, and he was made governor of Prince of Wales Fort on Churchill river. But though the adventurers failed in the original purpoſe for which they navigated this bay, their project, even in its failure, has been of great advantage to this country.

The country lying round Hudſon's Bay is called New Britain, or the country of the Eſquimaux; comprehending Labrador, now New North and South Wales. The entrance of the bay from the ocean, after leaving to the north Cape Farewell and Davis's Straits, is between Reſolution iſles on the north, and Button's iſles on the Labrador coaſt to the ſouth, forming the eaſtern extremity of the ſtraits diſtinguiſhed by the name of its great diſcoverer. The coaſts are very high, rocky, and rugged at top; in ſome places precipitous, but ſometimes exhibit large beaches. The iſles of Saliſbury, Nottingham, and Digges, are alſo very lofty and naked. The depth of water in the middle of the bay is one hundred and forty fathoms. From Cape Churchill to the ſouth end of the bay are regular ſoundings; near the ſhore ſhallow, with a muddy or ſandy bottom. To the north of Churchill the ſoundings are irregular, the bottom rocky, and in ſome parts the rocks appear above the ſurface at low water. From Mooſe river at the bottom of the bay to Cape Churchill the land is flat, marſhy, and wooded with pines, birch, larch, and willows. From Cape Churchill to Wager the coaſts are all high and rocky to the very ſea, and woodleſs, except the mouths of Pockerekeſko and Seal rivers. The hills on their back are naked, nor are there any trees for a great diſtance inland.

The mouths of all the rivers are filled with ſhoals; except that of Churchill, in which the largeſt ſhips may lie: but ten miles higher, the channel is obſtructed with ſand-banks: and all their rivers, as far as has been navigated, are full of rapids and cataracts from ten to ſixty feet perpendicular. Down theſe rivers the Indian traders find a quick paſſage; but their return is a labour of many months. As far inland as the company have ſettlements, which is ſix hundred miles to the weſt, at a place called Hudſon Houſe, latitude fifty-three degrees, longitude one hundred and ſix degrees twenty-ſeven minutes from London, is flat country: nor is it known how far to the eaſtward the great chain ſeen by our navigators from the Pacific Ocean branches off.

The climate even about Haye's river, in only latitude fifty-ſeven degrees, is during winter exceſſively cold. The ſnows begin to fall in October, and continue falling by intervals the whole winter; and, when the froſt is moſt rigorous, is in form of the fineſt ſand. The

ice on the rivers is eight feet thick. Port-wine freezes into a solid mass; brandy coagulates. The very breath fell on the blankets of the beds in the form of a hoar frost, and the bed-clothes often were found frozen to the wall. The sun rises in the shortest day at five minutes past nine, and sets five minutes before three. In the longest day the sun rises at three, and sets about nine. The ice begins to disappear in May, and hot weather commences about the middle of June, which at times is so violent as to scorch the face of the hunters. Thunder is not frequent, but very violent. But there must be great difference of heat and cold in this vast extent, which reaches from latitude fifty degrees forty minutes to latitude sixty-three degrees north.—During winter the firmament is not without its beauties. Mock suns and halos are not unfrequent; they are very bright, and richly tinged with all the colours of the rainbow. The sun rises and sets with a large cone of yellowish light. The night is enlivened with the aurora borealis, which spreads a thousand different lights and colours over the whole concave of the sky, not to be defaced even by the splendour of a full moon; and the stars are of a fiery redness.

The eastern boundary of the bay is Terra di Labrador; the northern part has a straight coast facing the bay, guarded with a line of isles innumerable. A vast bay, called the Archiwinnipy Sea, lies within it, and opens into Hudson's Bay by means of Gulph Hazard, through which the Beluga whales dart in great numbers. Here the company had a settlement for the sake of the fishery, and for trading with the Esquimaux; but deserted it as unprofitable about the year 1758 or 1759. The eastern coast is barren past the efforts of cultivation. The surface is every where uneven, and covered with masses of stone of an amazing size. It is a country of fruitless valleys and frightful mountains, some of an astonishing height: the first watered by a chain of lakes, formed not from springs but rain and snow, so chilly as to be productive of only a few small trout. The mountains have here and there a blighted shrub, or a little moss. The valleys are full of crooked stunted trees, pines, fir, birch, and cedars, or rather a species of juniper. In latitude sixty degrees, on this coast, vegetation ceases. The whole shore, like that on the west, is faced with islands at some distance from land. The inhabitants among the mountains are Indians; along the coasts Esquimaux. The dogs of the former are very small; of the latter large, and headed like a fox. Notwithstanding they have rein-deer, they never train them for the sledge; but apply the dogs to that use. Walruses visit a place called Nuchvûnk, in latitude sixty degrees, during winter; from thence the natives purchase the teeth with which they head their darts. Davis suspected that he had found a passage on this coast, in 1586, to the Western ocean; but it proves no more than a deep bay.

The laudable zeal of the Moravian clergy induced them to send, in the year 1752, missionaries from Greenland to this country. They fixed on Nisbet's harbour for their settlement; but the first party was partly killed, partly driven away. In 1764, under the protection of our government, another attempt was made. The missionaries were well received by the Esquimaux, and, we hear, from some very recent accounts, that the mission now goes on with success.

The

The animals of these countries are, the moose-deer, stags, rein-deer, bears, tigers, buffaloes, wolves, foxes, beavers, otters, lynxes, martins, squirrels, ermins, wild cats, and hares. The rein-deer pass in vast herds towards the north in October, seeking the extreme cold. The male polar bears rove out at sea, on the floating ice, most of the winter, and till June: the females lie concealed in the woods, or beneath the banks of rivers till March, when they come abroad with their twin cubs, and bend their course to the sea in search of their consorts. Several are killed in their passage; and those which are wounded shew vast fury, roar hideously, and bite and throw up into the air even their own progeny. The females and the young, when not interrupted, continue their way to sea. In June the males return to shore, and by August are joined by their consorts, with the cubs, by that time of a considerable size. The feathered kinds are geese, bustards, ducks, patridges, and all manner of wild-fowls. Indeed multitudes of birds retire to this remote country, to Labrador and Newfoundland, from places most remotely south, perhaps from the Antilles; and some even of the most delicate little species. Most of them, with numbers of aquatic fowls, are seen returning southward with their young broods to more favourable climates. The savages in some respects regulate their months by the appearance of birds; and have their goose-month from the vernal appearance of geese from the south. All the grous kind, ravens, cenereous crows, titmouse, and Lapland finch, brave the severest winter; and several of the falcons and owls seek shelter in the woods. Of fish, there are whales, morses, seals, cod-fish, and a white fish preferable to herrings; and in their rivers and fresh waters, pike, perch, carp, and trout.

All the quadrupeds of these countries are clothed with a close, soft, warm, fur. In summer there is here, as in other places, a variety in the colour of the several animals; when the season is over, which holds only for three months, they all assume the livery of winter, and every sort of beasts, and most of their fowls, are of the colour of the snow; every thing animate and inanimate is white. This is a striking phenomenon. But what is yet more surprising, and what indeed is one of the most striking things, that draw the most inattentive to an admiration of the wisdom and goodness of Providence, is, that the dogs and cats from Britain, that have been carried to Hudson's Bay, on the approach of winter have entirely changed their appearancce, and acquire a much longer, softer, and thicker, coat of hair than they had originally.

CONSTRUCTION OF AIR-PIPES FOR SHIPS.

THESE are an invention for drawing foul air out of ships, or any other close places, by means of fire. These pipes were first found out by one Mr. Sutton, a brewer in London; and from him have got the name of *Sutton's Air-pipes*. The principle on which their operation depends is known to every body, being indeed no other than that air is necessary for the support of fire; and, if it has not access from the places most adjacent, will not fail to come from those that are more remote. Thus, in a common furnace, the air enters through the ash-hole; but if this is closed up, and a hole

made in the ſide of the furnace, the air will ruſh in with great violence through that hole. If a tube of any length whatever is inſerted in this hole, the air will ruſh through the tube into the fire, and of conſequence there will be a continual circulation of air in that place where the extremity of the tube is laid. Mr. Sutton's contrivance then, as communicated to the Royal Society by Dr. Mead, amounts to no more than this—"As, in every ſhip of any bulk, there is already provided a copper or boiling place proportionable to the ſize of the veſſel; it is propoſed to clear the bad air by means of the fire already uſed under the ſaid coppers or boiling-places for the neceſſary uſes of the ſhip.

"It is well known, that, under every ſuch copper or boiler, there are placed two holes, ſeparated by a grate; the firſt of which is for the fire, and the other for the aſhes falling from the ſame; and that there is alſo a flue from the fire-place upward, by which the ſmoke of the fire is diſcharged at ſome convenient place of the ſhip.

"It is alſo well known, that the fire, once lighted in theſe fire-places, is only preſerved by the conſtant draught of air through the forementioned two holes and flue; and that, if the ſaid two holes are cloſely ſtopped up, the fire, though burning ever ſo briſkly before, is immediately put out.

"But if, after ſhutting the above-mentioned holes, another hole be opened, communicating with any other room or airy place, and with the fire; it is clear, the ſaid fire muſt again be raiſed and burn as before, there being a like draught of air through the ſame as there was before the ſtopping up of the firſt holes; this caſe differing only from the former in this, that the air feeding the fire will now be ſupplied from another place.

"It is therefore propoſed, that, in order to clear the holds of ſhips of the bad air therein contained, the two holes above-mentioned, the fire-place and aſh-place, be both cloſed up with ſubſtantial and tight iron-doors; and that a copper or leaden pipe, of ſufficient ſize, be laid from the hold to the aſh-place, for the draught of air to come in that way to feed the fire. And thus it ſeems plain, from what has been already ſaid, that there will be, from the hold, a conſtant diſcharge of the air therein contained; and conſequently, that that air, ſo diſcharged, muſt be as conſtantly ſupplied by freſh air down the hatches or ſuch other communications as are opened into the hold; whereby the ſame muſt be continually freſhened, and its air rendered more wholeſome and fit for reſpiration.

"And if into this principal pipe ſo laid into the hold, other pipes are let in, communicating reſpectively either with the well or lower decks; it muſt follow, that part of the air, conſumed in feeding the fire, muſt be reſpectively drawn out of ſuch places to which the communication ſhall be ſo made."

This account is ſo plain, that no doubt can remain concerning the efficacy of the contrivance: it is evident, that, by means of pipes of this kind, a conſtant circulation of freſh air would be occaſioned through thoſe places where it would otherwiſe be moſt apt to ſtagnate and putrefy. Several other contrivances have been uſed for the ſame purpoſe; and Dr. Hales's ventilators, by ſome unaccountable prejudice, have been reckoned ſuperior in efficacy and even ſimplicity to Mr. Sutton's machine, which at its firſt invention met with great

great oppofition; and even when introduced by Dr. Mead, who uſed all his intereſt for that purpoſe, was ſhamefully neglected.

A machine capable of anſwering the ſame purpoſe was invented by Mr. Deſaguliers, which he called the *ſhip's lungs*. It conſiſted of a cylindrical box ſet up on its edge, and fixed to a wooden pedeſtal. From the upper edge of the box iſſued a ſquare trunk open at the end, and communicating with the cavity of the box. Within this box was placed a cylindrical wheel turning on an axis. It was divided into twelve parts, by means of partitions placed like the radii of a circle. Theſe partitions did not extend quite to the centre, but left an open ſpace of about eighteen inches diameter in the middle; towards the circumference, they extended as far as poſſible without interfering with the caſe, ſo that the wheel might always be allowed to turn freely.—Things being thus circumſtanced, it is plain, that if the wheel was turned towards that ſide of the box on which the trunk was, every diviſion would puſh the air before it, and drive it out through the trunk, at the ſame time that freſh air would come in through the open ſpace at the centre, to ſupply that which was thrown out through the trunk. By turning the wheel ſwiftly, a ſtrong blaſt of air would be continually forced out through the ſquare trunk, on the ſame principles on which a common fanner winnows corn. If the wheel is turned the oppoſite way, a draught of air may be produced from the trunk to the centre. If this machine, then, is placed in a room where a circulation of air is wanted, and the trunk made to paſs through one of the walls; by turning the wheel ſwiftly round, the air will be forced with great velocity out of that room, at the ſame time that freſh air will enter through any chinks by which it can have acceſs to ſupply that which has been forced out.

It is evident, that the circulation which is promoted by this machine, is entirely of the ſame kind with that produced by Mr. Sutton's; the turning of the wheel in Mr. Deſagulier's machine being equivalent to the rarefaction of the air by fire in Mr. Sutton's; but that the latter is vaſtly ſuperior, as acting of itſelf, and without intermiſſion, requires no arguments to prove. Mr. Sutton's machine has yet another conveniency, of which no other contrivance for the ſame purpoſe can boaſt; namely, that it not only draws out putrid air, but deſtroys it by cauſing it to paſs through fire; and experience has abundantly ſhewn, that, though putrid air is thrown into a great quantity of freſh air, it is ſo far from loſing its pernicious properties, that it often produces noxious diſeaſes. We do not ſay, indeed, that putrid air becomes ſalutary by this means; but it is undoubtedly rendered leſs noxious than before; though whether it is equally innocent with the ſmoke of a fire fed in the common way, we cannot pretend to determine.

Beſides this machine by Mr. Deſaguliers, the ventilators of Dr. Hales, already mentioned, and thoſe called *wind-ſails*, are likewiſe uſed for the ſame purpoſe. The former of which is an improvement of the Heſſian-bellows: the other is a contrivance for throwing freſh air into thoſe places where putrid air is apt to lodge; but this has the laſt-mentioned inconvenience in a much greater degree than any of the others, as the blaſt of freſh air throws out that which was rendered putrid by ſtagnation, in ſuch a manner as to contaminate all around it.

Air-

Air-trunk, is also a contrivance by Dr. Hales to prevent the *stagnation* of putrid effluvia in jails and other places where a great number of people are crowded together in a small space. It consists only of a long square trunk open at both ends; one of which is inserted into the ceiling of the room, the air of which is required to be kept pure; and the other extends a good way beyond the roof. Through this trunk a continued circulation is carried on: and the reason is, that the putrid effluvia which do so much mischief when collected, being much lighter than the pure atmosphere, arise to the top of the room; and, if they there find a vent, will continually go out through it. These effluvia arise in very considerable quantity, being calculated by the late Dr. Keil at no less than thirty-nine ounces from one man in twenty-four hours.

These trunks were first made trial of by Mr. Yeoman, over the house of commons, where they were nine inches wide within; and over the court of king's bench in Westminster-hall, where they were six inches wide. They are sometimes made wider, and sometimes narrower: but the wider they are the longer they ought to be, more effectually to promote the ascent of the vapour. The reason why vapours of this kind ascend more swiftly through a long trunk than a short one, is, that the pressure of fluids is always according to their different depth, without regard to the diameter of their basis, or of the vessel which contains them; and, upon this principle, a gallon of water may be made to split a strong cask. When the column of putrid effluvia is long and narrow, the difference between the column of atmosphere pressing on the upper end of the trunk, and that which presses on the lower end, is much greater than if the column of putrid effluvia was short and wide; and consequently the ascent is much swifter.—One pan of a single pair of scales, which was two inches in diameter, being held within one of these trunks over the house of commons, the force of the ascending air made it rise so as to require four grains to restore the equilibrium, and this when there was no person in the house; but, when it was full, no less than twelve grains were requisite to restore the equilibrium; which clearly shews that these trunks must be of real and very great efficacy.

ACCOUNT OF THE CELEBRATED SALT-MINES OF WEILITSKA IN POLAND. [From Cox's TRAVELS.]

BEFORE we quitted this part of Poland, we visited the celebrated salt-mines of Weilitska, which are situated within eight miles of Cracow. These mines are excavated on a ridge of hills on the northern extremity of the chain which joins to the Carpathian mountains: they take their appellation from the small village of Weilitska; but are sometimes called in foreign countries the mines of Cracow, from their vicinity to that city.

Upon our arrival at Weilitska, we repaired to the mouth of the mine. Having fastened three separate hammocks in a circle round the great rope that is employed in drawing up the salt, we seated ourselves in a commodious manner, and were let down gently, without the least apprehension of danger, about one hundred and sixty yards below the first layer of salt. Quitting our hammocks, we passed a long and gradual descent, sometimes through broad passages or gal-

leries capable of admitting several carriages abreast; sometimes down steps cut in the solid salt, which had the grandeur and commodiousness of the stair-case in a palace. We each of us carried a light, and several guides preceded us with lamps in their hands: the reflection of these lights upon the glittering sides of the mine was extremely beautiful, but did not cast that luminous splendour which some writers have compared to the lustre of precious stones.

The salt dug from this mine is called *Ziebna* or green salt, for what reason I cannot determine; for its colour is an iron-grey; when pounded it has a dirty ash-colour like what we call brown salt. The quality improves in proportion to the depth of the mine: towards the sides and surface it is mixed with earthy or stony particles; lower down it is said to be perfectly pure, and requires no other process before it is used than to be pounded. The finest of this grey salt, however, is of a weak quality when compared with our common sea-salt: it is therefore undoubtedly by no means perfectly pure, but is blended with extraneous mixtures, though it serves very well for common purposes. Being almost as hard as stone, the miners hew it with pick-axes and hatchets, by a tedious operation, into large blocks, many of which weigh six or seven hundred pounds. These large masses are raised by a windlass, but the smaller pieces are carried up by horses along a winding gallery, which reaches to the surface of the earth.

Besides grey salt, the miners sometimes discover small cubes of white salt, as transparent as crystal, but not in any considerable quantity; they find likewise occasionally pieces of coal and petrified wood buried in the salt.

The mine appears to be inexhaustible, as will easily be conceived from the following account of its dimensions. Its known breadth is 1115 feet; its length 6691 feet; and depth 743; and the best judges on the spot suppose, with the greatest appearance of probability, this solid body of salt to branch into various directions, the extent of which cannot be known: of that part which has been perforated, the depth is only calculated as far as they have hitherto dug; and who can ascertain how much farther it may descend?

Our guide did not omit pointing out to us, what he considered as one of the most remarkable curiosities of the place, several small chapels excavated in the salt, in which mass is said on certain days of the year; one of these chapels is above thirty feet long and twenty-five broad; the altar, the crucifix, the ornaments of the church, the statues of several saints, are all carved out of the salt.

Many of the excavations or chambers, from whence the salt has been dug, are of an immense size; some are supported with timber, others by vast pillars of salt, which are left standing for that purpose: several of vast dimensions are without any support in the middle. I remarked one of this latter sort in particular, which was certainly eighty feet in height, and so extremely long and broad, as almost to appear amid the subterraneous gloom without limits. The roofs of these vaults are not arched, but flat. The immense size of these chambers, with spacious passages or galleries, together with the chapels above-mentioned, and a few sheds built for the horses which are foddered below, probably gave rise to the exaggerated accounts of some travellers, that these mines contain several villages inhabited by colonies of miners, who never see the light. It is certain that there

there is room sufficient for such purposes; but the fact is, that the miners have no dwellings under ground, none of them remaining below more than eight hours at a time, when they are relieved by others from above. Those mines are of a most stupendous extent and depth, and are sufficiently wonderful without the least exaggeration. We found them as dry as a room, without the least damp or moisture; observing only in our whole progress one small spring of water, which is impregnated with salt as it runs through the mine.

Such an enormous mass of salt exhibits a wonderful phenomenon in the natural history of this globe. Monsieur Guetard, who visited these mines with great attention, and who has published a treatise upon the subject, informs us, that the uppermost bed of earth at the surface immediately over the mines is sand, the second clay, occasionally mixed with sand and gravel, and containing petrefactions of marine bodies, the third calcarious stone. From all these circumstances he conjectures that this spot was formerly covered by the sea, and that the salt is a gradual deposit formed by the evaporation of its waters.

OF THE BURIAL-PLACES OF THE ANCIENT TARTARS.

OF these Russian and Siberian sepulchres some are perfect tumuli, raised to a most enormous height; while others are almost level with the ground. Some of them are encompassed with a square wall of large quarry stones placed in an erect position; others are covered only with a small heap of stones, or they are tumuli adorned with stones at top. Some are mured with brick within, and vaulted over; others are no more than pits, or common graves. In some the earth is excavated several fathoms deep; others, and especially those which are topped by a lofty tumulus, are only dug of a sufficient depth for covering the carcase.

What chiefly excites our astonishment is, that some of these should be surmounted by the large quarry stones before mentioned: for in all the neighbouring country there is not a rock to be seen. They must therefore have been transported thither from immense distances, by the most surprising efforts of labour; especially as the inhabitants of these parts have no idea of a machine adequate to the purpose in the most distant degree.

These sepulchres are discovered only in plain and extensive deserts, formerly the abode of a nation which seems to have subsisted by pasturage and the produce of the chace. On some sepulchral stones figures of various forms are engraved, such as rude and misshapen outlines of the human face, crosses of different angles, and other representations, which in all probability had never any meaning. But inscriptions, in any known or unknown languages or letters, have never hitherto been found upon them. And yet inscriptions are to be met with on single stones and statues in the desert, on this side the river Yenisei, such as no one has ever been able to explain.

The foregoing are the several characteristics of the exterior form of these sepulchral monuments. For pointing out their difference within, the following remarks will amply suffice.

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In many of these sepulchres the bones of men, and frequently of horses, are found, and in a condition that renders it probable the bodies were not burnt before they were inhumed. Other bones shew clearly that they have been previously burnt; because a part of them is unconsumed, and because they lie in a disordered manner, and some of them are wanting. Urns, in which other nations of antiquity have deposited the ashes of their dead, are never met with here. But sometimes what remained of the bodies after the combustion, and even whole carcases, are found wrapped up in thin plates of gold. Many dead bodies are frequently seen deposited together in one tomb; a certain indication that either a battle had been fought in the neighbourhood of the place, or that some families buried their relations in an hereditary tomb.

Skeletons of horses are often found in these abodes of the dead. From whence we may infer, that the same superstitious opinions which still prevail among some nations of the east were likewise held by this ancient people. It is received as an article of faith by many tribes, that departed souls continue the same kind of life they followed while inhabitants of this material world; and Mohammed's doctrine of his paradise seems to be established on the same belief. Men of quality therefore want their horses, and their favourite wives, and the servants that attended them in their terrestrial life. In conformity to this opinion, the women of India throw themselves into the flames upon the body of their deceased spouse; and a similar custom was prevalent among the Yakutes, when they were first subjected to the Russian empire. The servants that had been faithful to their master were slain at his grave during the interment, and then buried with him. Nor was there any means of abrogating this cruel custom, but by punishing the guilty as wilful murderers. In consequence of the same notion, the dead bodies are ornamented for denoting their quality in future life. In the tomb of the defunct were deposited the sword, and other implements of war; and to persons of both sexes were given the utensils and necessaries that might be requisite for the continuation of their existence.

No race of creatures in the human form can be so totally stupid as to believe that these utensils could be of any use to the dead bodies, since they are assured that these remain in the grave. When therefore they adhere to these superstitious practices, it is the souls of the wives, the horses, the servants, the utensils (for, according to these philosophers, every production of nature and art is animated with a living soul), which they consecrate to the spirits of their departed friends. This tenet, which was held by the most remote antiquity, must have been common likewise to the people by whom these sepulchres were formed. For no other hypothesis can account for the relics of gold and silver they generally contain; and of which many articles are carefully preserved in the museum of the Imperial Academy of St. Petersburg, for the inspection of the curious.

Some of these sepulchres are rich; but in others, here as well as in other districts, nothing of value is to be found. In the monuments abounding in the precious metals were without doubt deposited personages of rank; and we may presume that, wherever these are frequently found, there anciently dwelt a wealthy nation. Nothing was added to the body in the graves of the poor; and we may thence

 infer

infer that, when we find all the ſepulchres in one diſtrict deſtitute of any valuables, it was a poor people who there interred their dead.

The richeſt ſepulchres are diſcovered on the banks of the Volga, the Tobol, the Irtiſh, and the Ob. The tombs in the deſerts on the river Yeniſei are likewiſe not without relics of value; but thoſe beyond the Baikal ſea are the pooreſt of all. To account for this difference, we are by no means obliged to admit that theſe countries were inhabited by different nations. The moſt certain conſequence to be drawn from it is, that ſome nation inhabited theſe parts, which, at ſucceſſive periods, was in different conditions; poor in its commencement, but advancing afterwards from poverty to affluence. This inference is warranted by the hiſtory of all ages.

There is a very remarkable circumſtance obſervable in ſome of the tombs on the upper part of the Yeniſei, which forms an exception to the general rule of other ſepulchres. Inſtead of ornaments and utenſils of gold and ſilver found in other tombs, you meet here only with copper utenſils. Even ſuch inſtruments as would have been better wrought of iron are here found all of copper, as knives, darts, and daggers. The nation therefore, whoſe dead are here inhumed, ſeems to have been unacquainted with the uſe of iron; and theſe tombs muſt accordingly be more ancient than the others. Hence the travellers who found theſe relics conjectured that thoſe regions muſt contain ſome rich copper-mines. And in this they were not miſtaken; for the Sayane mountains abound in copper, and the mines have been worked by the ancient inhabitants of the country. In a large open deſert on the river Abakan are likewiſe found mines of that metal; and, if they yield not ſo much at preſent as they formerly did, nothing is neceſſary but induſtry and attention for finding other places more abundant in mines. From the name of the Altaian mountains, a ſimilar conjecture has been formed. Alta, in the language of the Mongoles and Kalmucs, ſignifies gold; and this conjecture is now brought to perfect certainty by the diſcovery of the mines of Kolyvan.

Hiſtory has tranſmitted down to us no certain accounts of the nation whoſe dead are here depoſited, and who made uſe of copper utenſils and weapons inſtead of iron. But, whoever they were, it is probable that the inſcriptions in the unknown language, diſcovered in theſe regions, were compoſed and written by that people. Perhaps it was the Uigures or Igureans, from whom the great founder of the Mongole monarchy firſt received letters and the art of writing; for the nation was not inſtructed in that art till the time of this conqueror. The Igureans muſt certainly have been an ancient and a poliſhed nation, if they invented a particular mode of writing, which had nothing in common with that of any other people. Such are theſe inſcriptions. But, if we preſume that Tſchingis uſed this manner of writing, his ſucceſſors muſt have changed it for another; ſince the preſent Mongole writing evidently diſcovers its Syrian origin. Yet even this language may be called the Igurean; becauſe certain miſſionaries of the Neſtorian ſect lived among the Igureans; and communicated their manner of writing to the Mongoles. The word Uigur or Uegar, in the Mongole language, generally denotes a foreigner.

With greater certainty we may affirm, that the ancient ſepulchres in Siberia and Ruſſia are the work of the Tartars who lived in the

reign of Tschingis and his first successors. This hero founded his monarchy in the beginning of the thirteenth century. The Mongoles and Tartars united under this sceptre were at that time a poor people, wandering in the deserts of the rivers Selenga, Orchon, and Onon, and sometimes straying as far as the Baikal sea. This last circumstance obviously affords us a reason, why these tombs contain so few valuable relics; and the fact is corroborated by history, which likewise in its turn receives light from it. By the same means as we are enabled to account for the poverty of the tombs about Selenginsk and Nertschinsk, we are capacitated also to ascertain whence the Tartars got these riches that are found in the other sepulchres.

In the year 1281 Tschingis began the conquest of China, which was finished so successfully by his nephew Koblai; in whose person began a new dynasty, known in the history of that empire by the name of Juen, which continued uninterruptedly to the year 1369. The Tartars soon made themselves rich in China; but, not contented with their wealth, they traversed almost all Asia, and a considerable part of Europe; increasing their riches in proportion as they proceeded in their conquests. In the year 1224 they first invaded Russia, and fought that signal battle on the river Kalka. From 1237 to 1240 they subdued the whole country. Notwithstanding they were divided under different chieftains and into different parties, and those who over-ran Asia had nothing in common with the conquerors of Europe but the name, they had however a general head of the family, who had been acknowledged by their forefathers. To the main camp of that chieftain was therefore brought much of the riches carried off from the conquered countries. I think it highly probable that this main camp was, in the thirteenth century, in some parts of the desert on the Irtish; and that the Tartars, divided into different hordes, inhabited all the regions between the Yaik and the Ob. In that century the missionaries from Rome, Carpin, Rubruquis, and others, visited these countries. The last river they mention in their voyages is the Yaik; had they crossed the Irtish, they would not certainly have omitted to take notice of it. But, as they say nothing of that river, we may thence infer that the camp of the Khans, to whom they were delegated, was on this side of the river Irtish.

We know that European goldsmiths resided among the Tartars, and worked for them. Rubruquis mentions a Frenchman, Guilleaume, who he says made very curious pieces of workmanship for the Khan Mangus Batu. The conqueror of Poland, Russia, Silesia, and Hungary, must have had still more of these artists in his service. It is remarked likewise, that the best relics, which are found in the sepulchres near the Volga, are as rich as those in other tombs. The *Zolotaia orda* (the golden horde), that was given to the camp of the Khans who subdued Russia, must have been given on account of the riches of that Tartarian horde.

But concerning the tombs of the Zolotaia horde we can only form conjectures; as these were opened and searched in times very remote, of which no narrative is preserved. Some curiosities in the cabinet of the Imperial Academy here are presumed to be from those regions; but this opinion is founded merely on conjecture.

We are better informed upon the articles of the sepulchres found on the rivers Irtish, Tobol, Ob, and Yenisei. These could only be

explored at the beginning of the present century, after the Kalmucs and Kirguises, who infested these parts, had retired to other plains. About twenty years ago, there were many persons in Siberia who still subsisted entirely on the spoils they had formerly obtained by ransacking these sepulchres. But, since that time, it is not certainly known that any have followed this occupation. The custom was to associate in large companies for searching after sepulchres, in the same manner as they do in our times for hunting sables. But the countries between the Ob and the Irtish were often plundered by the Kirguise Kosacs, after the retreat of the Kalmucs. To the western side of the Irtish very few have ventured of late years, on account of the incursions of those Kosacs; but, since the government has now taken care to prevent them, it may be presumed that in some future period great riches may be procured from thence.

We cannot find that the rich sepulchres bear any peculiar external marks upon them; but it is supposed, from various reasons, that the tombs on the eastern side of the Irtish, where great numbers are yet unexplored, will yield no great advantage. Some have been examined at Ustkamenogorskaia, but they contained nothing of any value. Their whole contents consisted in instruments of iron, grown so rusty that it was scarcely possible to discover for what use they had been made. In others, that were opened near Nertschinsk, nothing of any consequence was found; not even the bones of men, but only those of horses. Hence it is probable, that the ashes of burnt bodies alone, or the remains of human bones that were here deposited, might have been long ago mouldered away; but the bones of horses killed at the interment, and which were not burnt, may have subsisted a longer time unaltered.

Some of these curiosities were brought to the academy. Among others, there is a man on horseback tolerably well executed in gold; as likewise some silver coins, with the impress of a rose just opening from the bud; but there are no inscriptions on any of them. The nation therefore by whom this coin was struck could not have been at that time acquainted with the art of writing: or at least this money must have been coined previous to the introduction of the Mohammedan religion among the Tartars; for it was by that means that these nations became acquainted with the Arabic letters, which they have ever since made use of in inscriptions on their coins.

The gold in these tombs is seldom pure, but commonly adulterated with silver; and the silver has generally an alloy of half its weight in copper. It was very easy for the European workmen to cheat the simple Tartars.

It is extremely unfortunate that many of these curiosities fell into the hands of ignorant people, who immediately melted them down. But from those preserved in the Imperial Academy we may form an idea of several circumstances relating to that ancient nation.

ART OF MAKING PINS.

THOUGH pins are apparently simple, their manufacture is, however, not a little curious and complex. We shall therefore give our readers an account of it from Ellis's Campagna of London.

"When the brass-wire, of which the pins are formed, is first received at the manufactory, it is generally too thick for the purpose of

of being cut into pins. The first operation therefore is that of winding it off from one wheel to another with great velocity, and causing it to pass between the two, through a circle in a piece of iron of smaller diameter; the wire being thus reduced to its proper dimensions, is straitened by drawing it between iron pins, fixed in a board in a zig-zag manner, but so as to leave a straight line between them: afterwards it is cut into lengths of three or four yards, and then into smaller ones, every length being sufficient to make six pins; each end of these is ground to a point, which was performed when I viewed the manufactory by boys who sat each with two small grinding stones before him, turned by a wheel. Taking up a handful, he applies the ends to the coarsest of the two stones, being careful at the same time to keep each piece moving round between his fingers, so that the points may not become flat: he then gives them a smoother and sharper point, by applying them to the other stone, and by that means a lad of twelve or fourteen years of age is enabled to point about sixteen thousand pins in an hour. When the wire is thus pointed, a pin is taken off from each end, and this is repeated till it is cut into six pieces. The next operation is that of forming the heads, or, as they term it, head-spinning; which is done by means of a spinning-wheel, one piece of wire being thus with astonishing rapidity wound round another, and the interior one being drawn out, leaves a hollow tube between the circumvolutions: it is then cut with sheers; every two circumvolutions or turns of the wire forming one head; these are softened by throwing them into iron pans, and placing them in a furnace till they are red-hot. As soon as they are cold, they are distributed to children, who sit with anvils and hammers before them, which they work with their feet, by means of a lathe, and, taking up one of the lengths, they thrust the blunt end into a quantity of the heads which lie before them, and catching one at the extremity, they apply them immediately to the anvil and hammer, and by a motion or two of the foot, the top and the head are fixed together in much less time that it can be described, and with a dexterity only to be acquired by practice; the spectator being in continual apprehension for the safety of their fingers ends. The pin is now finished as to its form, but still it is merely brass; it is therefore thrown into a copper, containing a solution of tin and the leys of wine. Here it remains for some time; and when taken out assumes a white though dull appearance: in order therefore to give it a polish, it is put into a tub containing a quantity of bran, which is set in motion by turning a shaft that runs through its centre, and thus by means of friction it becomes perfectly bright. The pin being complete, nothing remains but to separate it from the bran, which is perfectly similar to the winnowing of corn; the bran flying off and leaving the pin behind fit for immediate sale. I was the more pleased with this manufactory, as it appeared to afford employment to a number of children of both sexes, who are thus not only prevented from acquiring the habits of idleness and vice, but are on the contrary initiated in their early years in those of a beneficial and virtuous industry."

ACCOUNT

ACCOUNT OF ST. KILDA.

ST. Kilda is one of the Hebrides or weſtern iſlands of Scotland. It lies in the Atlantic ocean, about 58. 30. N. lat. and is about three Engliſh miles in length from eaſt to weſt, and its breadth from ſouth to north not leſs than two. The ground of St. Kilda, like much the greateſt part of that over all the Highlands, is much better calculated for paſture than tillage.—Reſtrained by idleneſs, a fault or vice much more pardonable here than in any other part of Great Britain, or diſcouraged by the form of government under which they live, the people of the iſland ſtudy to rear up ſheep, and to kill wild-fowl, much more than to engage deeply in the more toilſome buſineſs of huſbandry.—All the ground hitherto cultivated in this iſland lies round the village. The ſoil is thin, full of gravel, and of conſequence very ſharp. This, though naturally poor, is, however, rendered extremely fertile, by the ſingular induſtry of very judicious huſbandmen: theſe prepare and manure every inch of their ground, ſo as to convert it into a kind of garden. All the inſtruments of agriculture they uſe, or indeed require, according to their ſyſtem, are a ſpade, a mall, and a rake or harrow. After turning up the ground with a ſpade, they rake or harrow it very carefully, removing every ſmall ſtone, every noxious root or growing weed that falls in their way, and pound down every ſtiff clod into duſt. It is certain that a ſmall number of acres well prepared in St. Kilda, in this manner, will yield more profit to the huſbandman than a much greater number when roughly handled in a hurry, as is the caſe in the other weſtern iſles. The people of St. Kilda ſow and reap much earlier than any of their neighbours on the weſtern coaſt of Scotland. The heat of the ſun, reflected from the hills and rocks into a low valley facing the ſouth-eaſt, muſt in the ſummer-time be quite intenſe; and, however rainy the climate is, the corn muſt for theſe reaſons grow very faſt and ripen early.

The harveſt is commonly over at this place before the beginning of September; and, ſhould it fall out otherwiſe, the whole crop would be almoſt deſtroyed by the equinoctial ſtorms. All the iſlanders on the weſtern coaſt have great reaſon to dread the fury of autumnal tempeſts: theſe, together with the exceſſive quantities of rain they have generally throughout ſeven or eight months of the year, are undoubtedly the moſt diſadvantageous and unhappy circumſtances of their lives.

Barley and oats are the only ſorts of grain known at St. Kilda; nor does it ſeem calculated for any other. Fifty bolls of the former, old Highland meaſure, are every year brought from thence to Harris; and all the weſtern iſlands hardly produce any thing ſo good of the kind. Potatoes have been introduced among that people only of late, and hitherto they have raiſed but ſmall quantities of them. The only appearance of a garden in this whole land, ſo the natives call their principal iſland in their own language, is no more than a very inconſiderable piece of ground, which is incloſed and planted with ſome cabbages. On the eaſt ſide of the iſland, at the diſtance of a quarter of a mile from the bay, lies the village, where the whole body of this little people (the number amounting in 1764 to

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no more than eighty-eight) live together like the inhabitants of a town or city. It is certain that the inhabitants were much more numerous formerly than at present; and the island, if under proper regulations, might easily support three hundred souls. Martin, who visited it about the end of the last century, found one hundred and eighty persons there; but about the year 1730, one of the people coming to the island of Harris was seized with the small-pox and died. Unluckily his clothes were carried away by one of his relations next year; and thus was the infection communicated, which made such havock, that only four grown persons were left alive. Their houses are built in two rows, regular, and facing one another; with a tolerable causeway in the middle, which they call the street. These habitations are made and contrived in a very uncommon manner. Every one of them is flat in the roof, or nearly so, much like the houses of some oriental nations. That from any one of these the St. Kildans have borrowed their manner of building, no man of sense will entertain a suspicion. They have been taught this lesson by their own reason, improved by experience. The place in which their lot has fallen is peculiarly subject to violent squalls and furious hurricanes: were their houses raised higher than at present, they believe the first winter-storm would bring them down about their ears. For this reason the precaution they take in giving them roofs much flatter than ordinary seems to be not altogether unnecessary. The walls of these habitations are made of a rough gritty kind of stones, huddled up together in haste, without either lime or mortar, from eight to nine feet high. In the heart of the walls are the beds, which are overlaid with flags, and large enough to contain three persons. In the side of every bed is an opening, by way of door, which is much too narrow and low to answer that purpose. All their dwelling-houses are divided into two apartments by partition-walls. In the division next the door, which is much the largest, they have their cattle stalled during the whole winter-season; the other serves for kitchen, hall, and bed-room.

It will be readily expected, that a race of men and women bred in St. Kilda must be a very slovenly generation, and every way inelegant. It is indeed impossible to defend them from this imputation. Their method of preparing a sort of manure, to them indeed of vast use, proves that they are very indelicate. After having burnt a considerable quantity of dried turf, they spread the ashes with the nicest care over the floor of that apartment in which they eat and sleep. These ashes, so exactly laid out, they cover with a rich friable sort of earth; over this bed of earth they scatter a proportionable heap of that dust into which peats are apt to crumble away: this done, they water, tread, and beat the whole compost into a hard floor, on which they immediately make new fires very large, which are never extinguished till they have a sufficient stock of new ashes on hand. The same operations are repeated with a never-failing punctuality, till they are just ready to sow their barley; by that time the walls of their houses are sunk down, or, to speak more properly, the floors risen, about four or five feet.

To have room enough for accumulating heaps of this compost one above another, the ancient St. Kildans had ingenuity enough to contrive their beds within the linings of their walls; and it was for the same reason they took care to raise these walls to an height far from

from being common in the other weſtern iſlands. The manure produced in this way muſt undoubtedly be good; though probably rather ſharp than of long duration, as it is ſcattered in ſmall quantities upon the ſurface of the ground. Be that as it will, thoſe who practiſe this art are abundantly laviſh in its praiſes. They call it a commodity ineſtimably precious; and one may venture to affirm, that a genuine St. Kildan would ſcruple to barter it away for all the diamonds in Braſil and Golconda.

It is certain that cleanlineſs muſt contribute greatly to health, and of courſe longevity; but in ſpite of that inſtance of indelicacy now given, and many more which might have been added, the people of this iſland are not more ſhort-lived than other men. Their total want of thoſe articles of luxury which have ſo natural a tendency to deſtroy the conſtitution of the human body, and their moderate exerciſes, will, together with ſome other circumſtances, keep the balance of life equal enough between them and thoſe who are abſolute ſtrangers to ſlovenlineſs.

Beſides the dwelling-houſes already deſcribed, there are a prodigious number of little cells diſperſed over all the iſland; which conſiſt entirely of ſtones, without any the ſmalleſt help of timber. Theſe cells are from twelve to eighteen feet in length, and a little more than ſeven in height. Their breadth at the foundation is nearly equal to the height. Every ſtone hangs above that immediately below, not perpendicularly, but inclines forward, ſo as to be nearer the oppoſite ſide of the grotto, and thus by imperceptible degrees till the two higheſt courſes are near enough to be covered by a ſingle flag at the top. To hinder the rain from falling down between the interſtices above, the upper part of the building is overlaid with turf, which looks like a fine green-ſward while new. The inhabitants ſecure their peats, eggs, and wild-fowl, within theſe ſmall repoſitories: every St. Kildan has his ſhare of them, in proportion to the extent of land he poſſeſſes, or the rent he pays to the ſteward. From the conſtruction of theſe cells, and the toil they muſt have coſt before they could have been finiſhed, it ſeems plain, that thoſe who put them together, were, if not more ingenious than their neighbours in the adjacent iſlands, at leaſt more induſtrious than their own ſucceſſors.

The St. Kilda method of catching wild-fowl is very entertaining. The men are divided into fowling-parties, each of which conſiſts generally of four perſons diſtinguiſhed by their agility and ſkill. Each party muſt have at leaſt one rope about thirty fathoms long; this rope is made out of a ſtrong raw cow-hide, ſalted for that very purpoſe, and cut circularly into three thongs all of equal length; theſe thongs, being cloſely twiſted together, form a three-fold cord, able to ſuſtain a great weight, and durable enough to laſt for about two generations: to prevent the injuries it would otherwiſe receive from the ſharp edges of the rocks, againſt which they muſt frequently ſtrike, the cord is lined with ſheep-ſkins, dreſſed in much the ſame manner.

This rope is a piece of furniture indiſpenſably neceſſary, and the moſt valuable implement a man of ſubſtance can be poſſeſſed of in St. Kilda. In the teſtament of a father, it makes the very firſt article in favour of his eldeſt ſon: ſhould it happen to fall to a daughter's ſhare, in default of male heirs, it is reckoned equal in value to the two beſt cows in the iſland.

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By the help of ſuch ropes, the people of the greateſt proweſs and experience here traverſe and examine rocks prodigiouſly high. Linked together in couples, each having either end of the cord faſtened about his waiſt, they go frequently through the moſt dreadful precipices: when one of the two deſcends, his colleague plants himſelf on a ſtrong ſheif, and takes care to have ſuch ſure footing there, that if his fellow-adventurer makes a falſe ſtep, and tumbles over, he may be able to ſave him.

The following anecdote of a ſteward of St. Kilda's deputy will give the reader a ſpecimen of the dangers they undergo, and at the ſame time of the uncommon ſtrength of the St. Kildans. This man, obſerving his colleague loſe his hold, and tumbling down from above, placed himſelf ſo firmly upon the ſhelf where he ſtood, that he ſuſtained the weight of his friend, after falling the whole length of the rope. Undoubtedly theſe are ſtupendous adventures, and equal to any thing in the feats of chivalry. Mr. Macaulay gives an inſtance of the dexterity of the inhabitants of St. Kilda in catching wild-fowl, to which he was an eye-witneſs. Two noted heroes were drawn out from among all the ableſt men of the community: one of them fixed himſelf on a craggy ſhelf; his companion went down ſixty fathoms below him; and, after having darted himſelf away from the face of a moſt alarming precipice hanging over the ocean, he began to play his gambols; he ſang merrily, and laughed very heartily: after having performed ſeveral antic tricks, and given all the entertainment his art could afford, he returned in triumph, and full of his own merit, with a large ſtring of fowls about his neck, and a number of eggs in his boſom. This method of fowling reſembles that of the Norwegians, as deſcribed by Biſhop Pontoppidan.

ACCOUNT OF THE CAVES ON THE ELEPHANTA ISLAND, NEAR BOMBAY. *By Lieutenant-colonel Barry.*

IN ſeveral parts of the coaſt about Bombay are found caves of ſuch remote antiquity, that neither tradition nor records can reach their origin; in many of them are inſcriptions, written in a language and characters now totally unknown; but of theſe diſuſed or dead languages, beſides the Shanſcrit, or ſacred one, there are in India ſeveral remains. I am told the Jews at Cochin have yet the grant of their ſynagogue, at preſent unintelligible; this, I once conjectured, might be in the primitive Hebrew, as theſe people are ſuppoſed to be of the miſſing tribes; but I am aſſured, the country powers never admitted their public deeds to be drawn in the language of foreigners.

That theſe caves were formed for religious purpoſes cannot even be doubted, as well from their conſtruction, as the ſculptured repreſentations of Gentoo mythology, which all of them contain: perhaps a deſcription of one might be introduced, with good effect, as an epiſode to ſome eaſtern heroic poem.

It is not unpleaſant to trace, as men grow refined, the temples of their worſhip, from the darkneſs of caves and foreſts, through the gloom of Gothic ſtructures, to the airy elegance of Grecian architecture.

As I visited the Elephanta, the principal, I would call it, cathedral, of these caves, I shall attempt some account of it.

This extraordinary offspring of human industry is on Elephanta Island, so called from the statue of an elephant, of natural size, tolerably cut out of a solid rock, on its west coast, which is nearly six miles from the castle of Bombay: the caves are about the middle of this islet; the approach to them being through a deep ravine, so that one is struck with surprise at coming suddenly on their openings, and seeing an abrupt precipice, of more than sixty feet perpendicular, rising from the roofs of these excavations, and covered at the summit with shrubs and trees, that hang over the rock, which is of hard stone, more so than that usually employed in our home-edifices; but, as many quarries are known to indurate when exposed to the air, it may not be unreasonable to infer, that its present density is partly original and partly acquired; but of this, however, I neither made experiment nor sought information.

Of these caves there are three; the principal being in the centre, and the smaller ones on either hand, though not placed in similar directions; one having a common front, the other being at right angles with it: in each of the inferior ones is a small chapel, with baths at the end.

To the grand cave, or temple, there are three entrances by porticoes of four pillars each, of the same order with those within. Its elevation is very disproportionate to its area, which last is nearly a square of forty yards, whilst its height is not more than half as many feet; but the eye is not only offended at first by the lowness, but also by the flatness, of the roof; which certainly would have acquired more of grandeur by being arched, the effect of which we observe in our own churches. This roof is supported by thirty-six columns, placed at equal distances, though some of them have been broken down by the intemperate zeal of the Portuguese to exterminate idolatry; which, as well as the tasteless curiosity of latter visitants, has likewise impaired many of the figures.

Each column is divided in three equal parts, the pedestal being one, the shaft another; and the capital, including the entablature, the third; the pedestals are square; the shafts rudely grooved, and not, as usual, cylindrical, but gradually bulbing outwards to the centre, their greatest diameter being more than half their height. The capitals are, as their shafts, grooved, and appear, to use the miner's phrase, like globes flattened by the pressure of country on them. The entablatures are simple, and without distinct divisions of members. These proportions and forms, so different from Grecian rules, are not pleasing to a corrected taste; but, as they have in themselves the strictest uniformity of common principle, undoubtedly prove the arts to have been far advanced at the early period of their construction.

To the right, and within the large cave, extending the square of four pillars, which form its angles, is a small temple or chapel, having on the ground a large altar, oblong, somewhat raised, and coarsely cut; on the top of which is a cone, resembling the pivots of the rocking stones in Cornwall, or at Stone-Henge the tops of the uprights for receiving their transems, and, perhaps, in its design, for some such purpose. In each of the smaller caves, there are several chapels.

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On the ſides of the porticoes, and in compartments at the further end, are, in baſſo relievo, pieces of ſculpture, moſt of their figures being Coloſſian, and all repreſenting parts of the Gentoo mythology; the centre is an image of the quadruple-faced Brimha, the god of the Bedas. Theſe ſtatues, ſuch as we ſee them, groteſque and fanciful, are to us the objects of eaſtern adoration, and, in their preſent mutilated ſtate, prove the artiſt neither unſkilful nor unacquainted with animal proportions, which are well preſerved, even in thoſe which extend the height of the excavation, and which the hieroglyphic doctrines of the Bramins repreſent moſt whimſically; for, indeed, the acquaintance with nature and ſymmetry may as well be diſplayed in the ſtatues of a Silenus or Medea as in thoſe of an Apollo or Venus."

SLEDGE-TRAVELLING AND BEAR-HUNTING IN KAMTSCHATKA.

[From Captain KING's Continuation of Captain COOK's laſt Voyage.]

ABOUT nine o'clock in the evening we were awakened by the melancholy howlings of the dogs, which continued all the time our baggage was laſhing upon the ſledges; but as ſoon as they were yoked, and we were all prepared to ſet out, this changed into a light cheerful yelping, which intirely ceaſed the inſtant they marched off. But, before we ſet out, the reader may expect to be made more particularly acquainted with this curious mode of travelling.

The body of the ſledge is about four feet and a half long, and a foot wide, made in the form of a creſcent of light tough wood, ſtrongly bound together with wicker-work; which in thoſe belonging to the better ſort of people is elegantly ſtained of a red and blue colour, and the ſeat covered with bear-ſkins or other furs. It is ſupported by four legs, about two feet high, which reſt on two long flat pieces of wood, five or ſix inches broad, extending a foot at each end beyond the body of the ſledge. Theſe are turned up before, in the manner of a ſkate, and ſhod with the bone of ſome ſea-animal. The fore part of the carriage is ornamented with thongs of leather and taſſels of coloured cloth; and from the croſs bar, to which the harneſs is joined, are hung links of iron, or ſmall bells, the jingling of which they conceive to be encouraging to the dogs. They are ſeldom uſed to carry more than one perſon at a time, who ſits aſide, reſting his feet on the lower part of the ſledge, and carrying his proviſions and other neceſſaries, wrapped up in a bundle, behind him. The dogs are uſually five in number, yoked two and two, with a leader. The reins not being faſtened to the head of the dogs, but to the collar, have but little power over them, and are therefore generally hung upon the ſledge, whilſt the driver depends entirely on their obedience to his voice for the direction of them. With this view, the leader is always trained up with a particular degree of care and attention; ſome of them riſing to a moſt extraordinary value on account of their docility and ſteadineſs; inſomuch, that for one of theſe, I am well aſſured, forty roubles (or ten pounds) was no unuſual price. The driver is alſo provided with a crooked ſtick, which anſwers the purpoſe both of whip and reins; as, by ſtriking it into the ſnow, he is enabled to moderate the ſpeed of the dogs, or even to ſtop them entirely; and when they are lazy, or otherwiſe inattentive to his voice, he chaſtiſes them, by throwing it at them. Upon theſe

occasions, their dexterity in picking it up again is very remarkable, and forms the principal difficulty of their art. But it is indeed not surprising, that they should labour to be skilful in a practice upon which their safety so materially depends. For they say, that, if the driver should happen to lose his stick, the dogs will instantly perceive it; and, unless their leader be of the most sober and resolute kind, they will immediately run a-head full speed, and never stop till they are quite spent. But, as that will not be the case soon, it generally happens, that either the carriage is overturned, and dashed to pieces against the trees, or they hurry down some precipice, and are all buried in the snow. The accounts that were given us of the speed of these dogs, and of their extraordinary patience of hunger and fatigue, were scarcely credible, if they had not been supported by the best authority. We were indeed ourselves witnesses of the great expedition with which the messenger, who had been dispatched to Bolcheretsk with the news of our arrival, returned to the harbour of St. Peter and St. Paul, though the snow was, at this time, exceedingly soft. But I was informed, by the commander of Kamtschatka, that this journey was generally performed in two days and a half; and that he had once received an express from the latter place in twenty-three hours.

The dogs are fed, during the winter, on the offals of dried and stinking fish; but are always deprived of this miserable food a day before they set out on a journey, and never suffered to eat before they reach the end of it. We were also told, that it was not unusual for them to continue thus fasting two entire days, in which time they would perform a journey of one hundred and twenty miles. These dogs are, in shape, somewhat like the Pomeranian breed, but considerably larger.

As we did not choose to trust to our own skill, we had each of us a man to drive and guide the sledge, which from the state the roads were now in, proved a very laborious business. For, as the thaw had advanced very considerably in the valleys, through which our road lay, we were under the necessity of keeping along the sides of the hills; and this obliged our guides, who were provided with snow-shoes for that purpose, to support the sledges, on the lower side, with their shoulders for several miles together. I had a very good-humoured cossack to attend me, who was, however, so very unskilful in his business, that we were overturned almost every minute, to the great entertainment of the rest of the company. Our party consisted, in all, of ten sledges. That in which Captain Gore was carried, was made of two lashed together, and abundantly provided with furs and bear-skins; it had ten dogs, yoked four abreast; as had also some of those that were heavy laden with baggage.

When we had proceeded about four miles, it began to rain; which, added to the darkness of the night, threw us all into confusion. It was at last agreed, that we should remain where we were till daylight; and accordingly we came to anchor in the snow (for I cannot better express the manner in which the sledges were secured), and, wrapping ourselves up in our furs, waited patiently for the morning. About three o'clock we were called on to set out, our guides being apprehensive, that if we waited longer we might be stopped by the thaw, and neither be able to proceed nor to return. After encountering many difficulties, which were principally occasioned by the bad con-

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dition of the road, at two in the afternoon we got safe to an *ostrog*, called Natcheekin, situated on the side of a small stream, which falls into the Bolchoireka, a little way below the town. The distance between Karatchin and Natcheekin is thirty-eight werfts (or twenty-five miles); and, had the hard frost continued, we should not, by their account, have been more than four hours in performing it; but the snow was so soft, that the dogs, almost at every step, sunk up to their bellies; and I was indeed much surprised at their being at all able to overcome the difficulties of so fatiguing a journey.

I shall now proceed to give a short account of the manner of hunting the bear in this country.—When the natives come to the ground frequented by the bears, which they contrive to reach about sun-set, the first step is to look for their tracks, to examine which are the fresheſt, and the best situated with a view to concealment, and taking aim at the breast, either as he is passing by, or advancing in front, or going from them. These tracks are found in the greatest numbers leading from the woods down to the lakes, and among the long sedgy grass and brakes by the edge of the water. The place of ambuscade being determined upon, the hunters next fix in the ground the crutches upon which the firelocks are made to rest, pointing them in the direction they mean to make their shot. This done, they kneel or lie down, as the circumstances of the cover require; and, with their bear-spears by their side, wait for their game. These precautions, which are chiefly taken in order to make sure of their mark, are, on several accounts, highly expedient. For, in the first place, ammunition is so dear at Kamtschatka, that the price of a bear will not purchase more of it than is sufficient to load a musket four or five times; and, what is more material, if the bear be not rendered incapable of pursuit by the first shot, the consequences are often fatal. He immediately makes towards the place from whence the noise and smoke issue, and attacks his adversaries with great fury. It is impossible for them to reload, as the animal is seldom at more than twelve or fifteen yards distance when he is fired at: so that, if he does not fall, they immediately put themselves in a posture to receive him upon their spears; and their safety greatly depends on their giving him a mortal stab as he first comes upon them. If he parries the thrust (which, by the extraordinary strength and agility of their paws, they are often enabled to do), and thereby breaks in upon his adversaries, the conflict becomes very unequal, and it is well if the life of one of the party alone suffice to pay the forfeit.

There are two seasons of the year when this diversion, or occupation as it may be rather called, is more particularly dangerous: in the spring, when the bears first come forth, after having subsisted, as is universally asserted here, on sucking their paws through the winter; and especially if the frost happens to be severe, and the ice not to be broken up in the lake at that time, by which means they are deprived of their ordinary and expected food. Under these circumstances, they soon become exceedingly famished, and fierce and savage in proportion. They will pursue the natives by the scent; and, as they now prowl about out of their usual tracks, frequently come upon them unawares; and when this happens, as the Kamtschadales have not the smallest notion of shooting flying, nor even at an animal running, or in any way except with their piece on a rest, the bear-

hunters

hunters often fall a sacrifice to their hunger. The other season in which it is dangerous to come in their way is at the time of their copulation, which is generally about this time of the year.

Extraordinary instances of natural affection in these animals have been frequently related. The chace affords a variety of a similar nature, and not less affecting; many of which were related to me. The Kamtschadales derive great advantage in hunting from this circumstance. They never venture to fire upon a young bear when the mother is near: for, if the cub drop, she becomes enraged to a degree little short of madness, and, if she get sight of the enemy, will only quit her revenge with her life. On the contrary, if the dam be shot, the cubs will not leave her side, even after she has been dead a long time; but continue about her, shewing, by a variety of affecting actions and gestures, marks of the deepest affliction, and thus become an easy prey to the hunters.

Nor is the sagacity of the bears, if the Kamtschadales are to be credited, less extraordinary, or less worthy to be remarked, than their natural affection. Of this they have a thousand stories to relate. I shall content myself with mentioning one instance, which the natives speak of as a well-known fact; and that is, the stratagem they have recourse to, in order to catch the bareins, which are considerably too swift of foot for them. These animals keep together in large herds; they frequent mostly the low grounds, and love to browse at the feet of rocks and precipices. The bear hunts them by scent, till he comes in sight; when he advances warily, keeping above them, and concealing himself amongst the rocks, as he makes his approaches, till he gets immediately over them, and nigh enough for his purpose. He then begins to push down, with his paws, pieces of the rock amongst the herd below. This manœuvre is not followed by any attempt to pursue until he finds he has maimed one of the flock, upon which a chace immediately ensues, that proves successful, or otherwise, according to the hurt the barein has received.

I cannot conclude this article without observing, that the Kamtschadales very thankfully acknowledge their obligations to the bears for what little advancement they have hitherto made, either in the sciences or polite arts. They confess that they owe to them all their skill both in physic and surgery; that by remarking with what herbs these animals rub the wounds they have received, and what they have recourse to when sick and languid, they have become acquainted with most of the simples in use among them, either in the way of internal medicine or external application. But what will appear somewhat more singular, is, they acknowledge the bears likewise for their dancing-masters. Indeed the evidence of one's senses puts this out of dispute; for the bear-dance of the Kamtschadales is an exact counterpart of every attitude and gesture peculiar to this animal, through its various functions; and this is the foundation and ground-work of all their other dances, and what they value themselves most upon.

ART OF MALT-DISTILLERY.

THIS is an extensive article of trade, and by which very large fortunes are made. The art is to convert fermented malt liquors into a clear inflammable spirit, which may be either sold for use in the common state of a proof strength, that is, the same strength

strength with French brandy; or is rectified into that purer spirit usually sold under the name of spirit of wine; or made into compound cordial waters, by being distilled again from herbs and other ingredients.

To brew with malt in the most advantageous manner, it is necessary, 1. That the subject be well prepared; 2. That the water be suitable and duly applied; and, 3. That some certain additions be used, or alterations made, according to the season of the year, and the intention of the operator: and, by a proper regulation in these respects, all the fermentable parts of the subject will thus be brought into the tincture, and become fit for fermentation.

The due preparation of the subject consists in its being justly malted and well ground. When the grain is not sufficiently malted, it is apt to prove hard, so that the water can have but very little power to dissolve its substance; and, if it be too much malted, a part of the fermentable matter is lost in that operation. The harder and more flinty the malt is, the finer it ought to be ground; and in all cases, when intended for distillation, it is advisable to reduce it to a kind of finer or coarser meal. When the malt is thus ground, it is found by experience that great part of the time, trouble, and expence, of the brewing is saved by it, and yet as large a quantity of spirit will be produced; for thus the whole substance of the malt may remain mixed among the tincture, and be fermented and distilled among it. This is a particular that very well deserves the attention of the malt-distiller as that trade is at present carried on; for the dispatch of the business, and the quantity of spirit procured, is more attended to than the purity or perfection of it.

The secret of this matter depends upon the thoroughly mixing or briskly agitating and throwing the meal about, first in cold and then in hot water; and repeating this agitation after the fermentation is over, when, the thick turbid wash being immediately committed to the still already hot and dewy with working, there is no danger of burning, unless by accident, even without the farther trouble of stirring, which in this case is found needless, though the quantity be ever so large, provided that requisite care and cleanliness be used; and thus the business of brewing and fermenting may very commodiously be performed together, and reduced to one single operation. Whatever water is made choice of, it must stand in a hot state upon the prepared malt, especially if a clear tincture be desired; but a known and very great inconvenience attends its being applied too hot, or too near a state of boiling, or even scalding, with regard to the hand. To save time in this case, and to prevent the malt running into lumps and clods, the best way is to put a certain measured quantity of cold water to the malt first; the malt is then to be stirred very well with this, so as to form a sort of thin uniform paste or pudding; after which the remaining quantity of water required may be added in a state of boiling, without the least danger of making what, in the distillers language, is called a pudden.

In this manner the due and necessary degree of heat in the water, for the extracting all the virtues of the malt, may be hit upon very expeditiously, and with a great deal of exactness, as the heat of boiling water is a fixed standard which may be let down to any degree by a proportionate mixture of cold water, due allowances being made for the season of the year and for the temperature of the air.

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This little obvious improvement, added to the method just before hinted for the reducing brewing and fermentation to one operation, will render it practicable to very considerable advantage, and the spirit improved in quality as well as quantity.

A much more profitable method than that usually practised for the fermenting malt for distillation, in order to get its spirit, is the following: take ten pounds of malt reduced to a fine meal, and three pounds of common wheat-meal: add to these two gallons of cold water, and stir them well together; then add five gallons of water, boiling hot, and stir all together again. Let the whole stand two hours, and then stir it again; and when grown cold, add to it two ounces of solid yeast, and set it by loosely covered in a warmish place to ferment.

This is the Dutch method of preparing what they call the wash for malt spirit, whereby they save much trouble and procure a large quantity of spirit; thus commodiously reducing the two businesses of brewing and fermenting to one single operation. In England the method is to draw and mash for spirit as they ordinarily do for beer, only, instead of boiling the wort, they pump it into large coolers, and afterwards run it into their fermenting backs, to be there fermented with yeast. Thus they bestow twice as much labour as is necessary, and lose a large quantity of their spirit by leaving the gross bottoms out of the still for fear of burning.

All simple spirits may be considered in the three different states of low-wines, proof-spirit, and alcohol, the intermediate degrees of strength being of less general use; and they are to be judged of only according as they approach to or recede from these. Low-wines at a medium contain a sixth part of pure inflammable spirit, five times as much water as spirit necessarily arising in the operation with a boiling heat. Proof-goods contain about one half of the same totally inflammable spirit; and alcohol entirely consists of it.

Malt low-wines, prepared in the common way, are exceeding nauseous; they have, however, a natural vinosity or pungent agreeable acidity, which would render the spirit agreeable to the palate were it not for the large quantity of the gross oil of the malt that abounds in it. When this oil is detained in some measure from mixing itself among the low-wines, by the stretching a coarse flannel over the neck of the still or at the orifice of the worm, the spirit becomes much purer in all respects; it is less fulsome to the taste, less offensive to the smell, and less milky to the eye. When these low-wines, in the rectification into proof-spirits, are distilled gently, they leave a considerable quantity of this gross fetid oil behind them in the still along with the phlegm; but, if the fire be made fierce, this oil is again raised and brought over with the spirit; and, being now broken somewhat more fine, it impregnates it in a more nauseous manner than at first. This is the common fault both of the malt-distiller and of the rectifier; the latter, instead of separating the spirit from this nasty oil, which is the principal intent of his process, attends only to the leaving the phlegm in such quantity behind that the spirit may be of a due strength as proof or marketable goods, and brings over the oil in a worse state than before. To this inattention to the proper business of the process it is owing, that the spirit, after its several rectifications, as they are miscalled, is often found more stinking than when delivered out of the hands of the malt-distiller.

All this may be prevented by the taking more time in the subsequent distillations, and keeping the fire low and regular; the sudden stirring of the fire, and the hasty way of throwing on the freshest fuel, being the general occasion of throwing up the oil by spurts, where the fire in general, during the process, has not been so large as to do that mischief.

The use of a balneum mariæ, instead of the common still, would effectually prevent all this mischief, and give a purer spirit in one rectification than can otherwise be procured in ten, or indeed according to the common methods at all.

Malt low-wine, when brought to the standard of proof-spirit, loses its milky colour, and is perfectly clear and bright, no more oil being contained in it than is perfectly dissolved by the alcohol, and rendered miscible with that proportion of phlegm, which is about one half the liquor: its taste also is cleaner, though not more pleasant; there being less of the thick oil to hang on the tongue than its own form; which is not the case in the low-wines, where the oil being undissolved, adheres, to the mouth in its own form, and does not pass lightly over it.

When proof-spirit of malt is distilled over again, in order to be rectified into alcohol, or, as we usually call it, spirits of wine, if the fire be raised at the time when the faints begin to fall off, a very considerable quantity of oil will be raised by it, and will run in the visible form of oil from the nose of the worm. This is not peculiar to malt spirit; but the French brandy shews the same phenomenon, and that in so great a degree, that half an ounce of this oil may be obtained from a single piece of brandy.

Malt spirit, more than any other kind, requires to be brought into the form of an alcohol, before it can be used internally, especially as it is now commonly made up in the proof state, with as much of this nauseous and viscous oil as will give it a good crown of bubbles. For this reason it ought to be reduced to an alcohol, or totally inflammable spirit, before it is admitted into any of the medicinal compositions. If it be used without this previous caution, the odious taste of the malt-oil will be distinguished among all other flavours of the ingredients.

Malt spirit, when it has once been reduced to the true form of an alcohol, is afterwards more fit for all the curious internal uses than even French brandy; it being after this purification a more uniform, hungry, tasteless, and impregnable, spirit, than any other spirits which we esteem so much finer.

A pure spirit being thus procured, should be kept carefully in vessels of glass or stone, well stopped, to prevent the evaporation of any of its volatile part. If preserved in casks, it is apt to impregnate itself very strongly with the wood. The quantity of pure alcohol obtainable from a certain quantity of malt, differs according to the goodness of the subject, the manner of the operation, the season of the year, and the skilfulness of the workmen; according to which variations, a quarter of malt will afford from eight or nine to thirteen or fourteen gallons of alcohol. This should encourage the malt-distiller to be careful and diligent to his business, as so very large a part of his profit depends wholly on the well conducting his processes.

After every operation in this business, there remains a quantity of faints, which in their own coarse state ought never to be admitted into the pure spirit; these are to be saved together, and large quantities of them at once wrought into alcohol. It is easy to reduce these to such a state that they will serve for lamp-spirits. Their disagreeable flavour being corrected by the adding of aromatics during the distillations, the reducing them into a perfect and pure alcohol is practicable, but not without such difficulties as render it scarcely worth the trader's while. One way of doing it is, by distilling them from water into water, and that with a very slow fire. By this means a pure alcohol may be made out of the foulest faints.

The malt-distiller always gives his spirit a single rectification *per se*, in order to purify a little, and make it up proof; but in this state it is not to be reckoned fit for internal uses, but serves to be distilled into geneva and other ordinary compound strong waters for the vulgar.

The Dutch, who carry on great trade with malt spirit, never give it any farther rectification than this; and it is on this account, that the malt spirit of England is in general so much more in esteem. The Dutch method is only to distil the wash into low-wines, and then to full-proof spirit; they then directly make it into geneva, or else send it as it is to Germany, Guinea, and the East Indies, for the Dutch have little notion of our rectification. Their spirit is by this means rendered very foul and coarse, and is rendered yet more nauseous by the immoderate use they make of rye-meat. Malt spirit, in its unrectified state, is usually found to have common bubble-proof, as the malt-distiller knows that it will not be marketable without it.

The whole matter requisite to this is, that it have a considerable portion of the gross oil of the malt well broke and mixed along with it; this gives the rectifier a great deal of trouble if he will have the spirit fine; but, in the general run of the business, the rectifier does not take out this oil, but breaks it finer, and mixes it faster in by alkaline salts, and disguises its taste by the addition of certain flavouring ingredients. The spirit loses in these processes the vinosity it had when it came out of the hands of the malt-distiller, and is in all respects worse, except in the disguise of a mixed flavour.

The alkaline salts used by the rectifier destroying the natural vinosity of the spirit, it is necessary to add an extraneous acid in order to give it a new one. The acid they generally use is the spiritus nitri dulcis; and the common way of using it is, the mixing it to the taste with the rectified spirit: this gives our malt spirit, when well rectified, a flavour somewhat like that of French brandy, but this soon flies off; and the better method is to add a proper quantity of Glauber's strong spirit of nitre to the spirit in the still. The liquor in this case comes over impregnated with it, and the acid being more intimately mixed, the flavour is retained.

OBSERVATIONS ON PLEASURE AND PAIN.

THE Author of Nature has furnished us with many pleasures, as well as made us liable to many pains; and we are susceptible of both in some degree as soon as we have life and are endowed with the faculty of sensation. A French writer, in a work which once raised

raised high expectations, contends, that a child in the womb of its mother feels neither pleasure nor pain. "These sensations (says he) are not innate; they have their origin from without: and it is at the moment of our birth that the soul receives the first impressions; impressions slight and superficial at the beginning, but which, by time and repeated acts, leave deeper traces in the sensorium, and become more extensive and more lasting. It is when the child sends forth its first cries that sensibility or the faculty of sensation is produced, which in a short time gathers strength and stability by the impression of exterior objects. Pleasure and pain not being innate, and being only acquired in the same manner as the qualities which we derive from instruction, education, and society, it follows that we learn to suffer and enjoy as we learn any other science."

This is strange reasoning and strange language. That sensations are innate is universally acknowledged; but it does not therefore follow that the soul receives its first impressions and first sensations at the moment of birth. The child has life, the power of locomotion, and the sense of touch, long before it is born; and every mother will tell this philosopher, that an infant unborn exhibits symptoms both of pain and of pleasure. That many of our organs of sense are improved by use is incontrovertible; but it is so far from being true that our sensible pleasures become more exquisite by being often repeated, that the direct contrary is experienced of far the greater part of them; and though external objects, by making repeated impressions on the senses, certainly leave deeper traces on the memory than an object once perceived can do, it by no means follows that these impressions become the more delightful the more familiar that they are to us. That we learn to suffer and enjoy as we learn any other science, is a most extravagant paradox; for it is self-evident that we cannot live without being capable in some degree both of suffering and enjoyment, though a man may certainly live to an old age in profound ignorance of all the sciences.

The same writer assures us, indeed, that sensation is not necessary to human life. "Philosophers (says he) make mention of a man who had lost every kind of feeling in every member of his body: he was pinched or pricked to no purpose. Meanwhile this man made use of all his members; he walked without pain, he drank, ate, and slept, without perceiving that he did so. Sensible neither to pleasure nor pain, he was a true natural machine."

To the tale of these anonymous philosophers our author gives implicit credit, whilst he favours us at the same instant with the following argumentation, which completely proves its falsehood. "It is true that sensation is a relative quality, susceptible of increase and diminution; that it is not necessary to existence; and that one might live without it: but in this case he would live as an automaton, without feeling pleasure or pain; and he would possess neither idea, nor reflection, nor desire, nor passion, nor will, nor sentiment; his existence would be merely passive, he would live without knowing it, and die without apprehension."

But if this man of the philosophers, whom our author calls an automaton, and a true natural machine, had neither idea, nor desire, nor passion, nor will, nor sentiment, (and without sensation he certainly could have none of them,) what induced him to walk, eat, or drink, or to cease from any of these operations after they were accidentally

cidentally begun? The instances of the automata which played on the flute and at chess are not to the purpose for which they are adduced; for there is no parallel between them and this natural machine, unless the philosophers wound up their man to eat, drink, walk, or sit, as Vacanson and Kempeler wound up their automata to play or, cease from playing, on the German flute and at chess.

Our author having for a while sported with these harmless paradoxes, proceeds to put the credulity of his reader to the test with others of a very contrary tendency. He institutes an inquiry concerning the superiority, in number and degree, of the pleasures enjoyed by the different orders of men in society; and labours, not indeed by argument, but by loose declamation, to propagate the belief that happiness is very unequally distributed. The pleasures of the rich, he says, must be more numerous and exquisite than those of the poor; the nobleman must have more enjoyments than the plebeian of equal wealth; and the king, according to him, must be the happiest of all men. He owns, indeed, that although "birth, rank, honours, and dignity, add to happiness, a man is not to be considered as miserable because he is born in the lower conditions of life. A man may be happy as a mechanic, a merchant, or a labourer, provided he enters into the spirit of his profession, and has not imbibed, by a misplaced education, those sentiments which make his condition insupportable. Happiness is of easy acquisition in the middling stations of life; and though perhaps we are unable to know or to rate exactly the pleasure which arises from contentment and mediocrity, yet happiness being a kind of aggregate of delights, of riches, and of advantages, more or less great, every person must have a share of it; the division is not exactly made, but all other things equal, there will be more in the elevated than in the inferior conditions of society; the enjoyment will be more felt, the means of enjoying more multiplied, and the pleasures more varied. Birth, rank, fortune, talents, wit, genius, and virtue, are then the great sources of happiness: those advantages are so considerable, that we see men contented with any one of them, but their union forms supreme felicity.

"There is so vast a difference, says Voltaire, between a man who has made his fortune and one who has to make it, that they are scarcely to be considered as creatures of the same kind. The same thing may be said of birth, the greatest of all advantages in a large society; of rank, of honours, and of great abilities. How great a difference is made between a person of high birth and a tradesman; between a Newton or Descartes and a simple mathematician? Ten thousand soldiers are killed on the field of battle, and it is scarcely mentioned; but if the general falls, and especially if he be a man of courage and abilities, the court and city are filled with the news of his death, and the mourning is universal.

"Frederic the Great, the late king of Prussia, felt in a more lively manner than perhaps any other man the value of great talents. I would willingly renounce, said he to Voltaire, every thing which is an object of desire and ambition to man; but I am certain if I were not a prince I should be nothing. Your merit alone would gain you the esteem, and envy, and admiration, of the world; but to secure respect for me, titles, and armies, and revenues, are absolutely necessary."

For

For what purpose this account of human happiness was published, it becomes not us to say. Its obvious tendency is to make the lower orders of society discontented with their state, and envious of their superiors; and it is not unreasonable to suppose, that it contributed in some degree to excite the ignorant part of the author's countrymen to the commission of those atrocities of which they have since been guilty. That such was his intention, the following extract will not permit us to believe; for though in it the author attempts to support the same false theory of human happiness, he mentions virtuous kings with the respect becoming a loyal subject of the unfortunate Louis, whose character he seems to have intentionally drawn, and whose death by the authority of a savage faction he has in effect foretold.

"Happiness, in a state of society, takes the most variable forms: it is a Proteus susceptible of every kind of metamorphosis: it is different in different men, in different ages, and in different conditions, &c. The pleasures of youth are very different from those of old age: what affords enjoyment to a mechanic would be supreme misery to a nobleman; and the amusements of the country would appear insipid in the capital. Is there then nothing fixed with regard to happiness? Is it of all things the most variable and the most arbitrary? Or, in judging of it, is it impossible to find a standard by which we can determine the limits of the greatest good to which man can arrive in the present state? It is evident that men form the same ideas of the beautiful and sublime in nature, and of right and wrong in morality, provided they have arrived at that degree of improvement and civilization of which human nature is susceptible; and that different opinions on these subjects depend on different degrees of culture, of education, and of improvement. The same thing may be advanced with regard to happiness: all men, if equal with respect to their organs, would form the very same ideas on this subject if they reached the degree of improvement of which we are presently speaking; and in fact, do we not see in the great circles at Rome, at Vienna, at London, and Paris, that those who are called people of fashion, who have received the same education, have nearly the same taste, the same desires, and the same spirit, for enjoyment? there is doubtless a certain degree of happiness to be enjoyed in every condition of life; but as there are some conditions preferable to others, so are there degrees of happiness greater and less; and if we were to form an idea of the greatest possible in the present state, it perhaps would be that of a sovereign master of a great empire, enjoying good health and a moderate spirit; endowed with piety and virtue, whose whole life was employed in acts of justice and mercy, and who governed by fixed and immoveable laws. Such a king is the image of the divinity on earth, and he must be the idol of a wise people. His whole life should present a picture of the most august felicity. Although such sovereigns are rare, yet we are not without examples of them. Ancient history affords us Titus and Marcus Aurelius, and the present age can boast of piety and munificence in the character of some of its kings. This state of the greatest happiness to which man can reach not being ideal, it will serve as a standard of comparison by which happiness and misery can be estimated in all civilized countries. He is as happy as a king, is a proverbial expression, because we believe with justice that royalty is the extreme limit

limit of the greatest enjoyments; and in fact, happiness being the work of man, that condition which comprehends all the degrees of power and of glory, which is the source of honour and of dignity, and which supposes in the person invested with it all means of enjoyment either for himself or others, leaves nothing on this earth to which any reasonable man would give the preference.

"We can find also in this high rank the extreme of the greatest evils to which the condition of nature is exposed. A king condemned to death, and perishing on a scaffold, by the authority of a faction, while at the same time he had endeavoured by every means in his power to promote the general happiness of his subjects, is the most terrible and striking example of human misery; for if it be true that a crown is the greatest of all blessings, then the loss of it, and at the same time the loss of life by an ignominious and unjust sentence, are of all calamities the most dreadful!

"It is also in the courts of kings that we find the most amiable and perfect characters; and it is there where true grandeur, true politeness, the best tone of manners, the most amiable graces, and the most eminent virtues, are completely established. It is in courts that men seem to have acquired their greatest improvement:—Whosoever has seen a court, says La Bruyere, has seen the world in the most beautiful, the most enchanting, and attractive, colours. The prejudices of mankind in behalf of the great are so excessive, that if they inclined to be good they would be almost the objects of adoration."

In this passage there are doubtless many just observations; but there is at least an equal number of others both false and dangerous. That a crown is the greatest of earthly blessings, and that it is in the courts of kings that we meet with the most amiable and perfect characters, are positions which a true philosopher will not admit but with great limitations. The falsehood of the author's general theory respecting the unequal distribution of happiness in society, we need not waste time in exposing. He enters upon other speculations respecting the pleasures and pains of savages, which are ingenious and worthy of attention; but, before we proceed to notice them, it will be proper to consider the connection which subsists between pleasure and pain.

"That the cessation of pain is accompanied by pleasure, is a fact (says a philosopher of the first rank) which has been repeatedly observed, but perhaps not sufficiently accounted for. Let us suppose a person in a state of indifference as to heat. Upon coming near a fire, he will experience at first an agreeable warmth, *i. e.* pleasure. If the heat be increased, this state of pleasure will, after a time, be converted into one of pain, from the increased action upon the nerves and brain, the undoubted organs of all bodily sensations. Let the heat now be gradually withdrawn, the nervous system must acquire again, during this removal, the state of agreeable warmth or pleasure; and after passing through that state it will arrive at indifference. From this fact then we may conclude, that a state of pleasure may be pushed on till it is converted into one of pain; and, on the other hand, that an action which produces pain will, if it go off gradually, induce at a certain period of its decrease a state of pleasure. The same reasoning which has thus been applied to the body may be extended also to the mind. Total languor of mind is

not so pleasant as a certain degree of action or emotion; and emotions pleasant at one period may be increased till they become painful at another; whilst painful emotions, as they gradually expire, will, at a certain period of their decrease, induce a state of pleasure. Hence then we are able to explain why pleasure should arise in all cases from the gradual cessation of any action or emotion which produces pain."

The same author maintains, that from the mere removal of pain, whether by degrees or instantaneously, we always experience pleasure; and if the pain removed was exquisite, what he maintains is certainly true. To account for this phenomenon he lays down the following law of nature, which experience abundantly confirms, viz. "that the temporary withdrawing of any action from the body or mind invariably renders them more susceptible of that action when again produced." Thus, after long fasting, the body is more susceptible of the effects of food than if the stomach had been lately satisfied; the action of strong liquors is found to be greater on those who use them seldom than on such as are in the habit of drinking them. Thus, too, with respect to the mind; if a person be deprived for a time of his friend's society, or of a favourite amusement, the next visit of his friend, or the next renewal of his amusement, is attended with much more pleasure than if they had never been withheld from him.

"To apply this law to the case of a person suddenly relieved from acute pain. While he labours with such pain, his mind is so totally occupied by it, that he is unable to attend to his customary pursuits or amusements. He becomes therefore so much more susceptible of their action that when they are again presented to him, he is raised above his usual indifference to positive pleasure. But all pains do not proceed from an excess of action. Many of them arise from reducing the body or the mind to a state below indifference. Thus, if a person have just sufficient warmth in his body to keep him barely at ease or in a state of indifference, by withdrawing this heat a state of uneasiness or pain is produced; and if in a calm state of mind one be made acquainted with a melancholy event, his quiet is interrupted, and he sinks below indifference into a painful state of mind. If now, without communicating any new source of positive pleasure, we remove in the former case the cold, and in the latter the grief, the persons from whom they are removed will experience real pleasure. Thus, then, whether pain arises from excess or deficiency of action, the gradual or the sudden removal of it must be in all cases attended with pleasure." It is equally true that the gradual or sudden removal of pleasure is attended with pain.

We are now prepared to examine our French author's account of the pleasures and pains of savages. "Every age (says he) has its different pleasures; but if we were to imagine that those of childhood are equal to those of confirmed age, we should be much mistaken in our estimation of happiness. The pleasures of philosophy, either natural or moral, are not unfolded to the infant; the most perfect music is a vain noise; the most exquisite perfumes and dishes highly seasoned offend his young organs instead of affording delight; his touch is imperfect; forty days elapse before the child gives any sign of laughter or of weeping; his cries and groans before that period are not accompanied with tears; his countenance expresses

expresses no passion; the parts of his face bear no relation to the sentiments of the soul, and are moreover without consistency. Children are but little affected with cold; whether it be that they feel less, or that the interior heat is greater than in adults. In them all the impressions of pleasure and pain are transitory; their memory has scarcely begun to unfold its powers; they enjoy nothing but the present moment; they weep, laugh, and give tones of satisfaction, without consciousness, or at least without reflection; their joy is confined to the indulgence of their little whims, and constraint is the greatest of their misfortunes; few things amuse, and nothing satisfies them. In this happy condition of early infancy nature is at the whole expence of happiness; and the only point is not to contradict her. What desires have children? Give them liberty in all their movements, and they have a plenitude of existence, an abundance of that kind of happiness which is confined in some sort to all the objects which surround them; but if all beings were happy on the same conditions, society would be at no expence in procuring the happiness of the different individuals who compose it. Sensation is the foundation of reflection; it is the principal attribute of the soul; it is by this that man is elevated to sublime speculations, and secures his dominion over nature and himself. This quality is not stationary, but susceptible, like all other relative qualities, of increase and decay, of different degrees of strength and intenseness: it is different in different men; and in the same man it increases from infancy to youth, from youth to confirmed manhood: at this period it stops, and gradually declines as we proceed to old age and to second childishness. Considered physically, it varies according to age, constitution, climate, and food; considered in a moral point of view, it takes its different appearances from individual education, and from the habits of society; for man in a state of nature and society, with regard to sensation, and the unfolding of his powers, may be considered as two distinct beings: and if one were to make a calculation of pleasure in the course of human life, a man of fortune and capacity enjoys more than ten thousand savages.

"Pleasure and pain being relative qualities, they may be almost annihilated in the moment of vehement passion. In the heat of battle, for example, ardent and animated spirits have not felt the pain of their wounds; and minds strongly penetrated with sentiments of religion, enthusiasm, and humanity, have supported the most cruel torments with courage and fortitude. The sensibility of some persons is so exquisitely alive, that one can scarcely approach them without throwing them into convulsions. Many diseases shew the effect of sensibility pushed, to an extreme; such as hysteric affections, certain kinds of madness, and some of those which proceed from poison, and from the bite or sting of certain animals, as the viper and the tarantula. Excessive joy or grief, fear and terror, have been known to destroy all sensation, and occasion death." There are instances of persons who have died at the noise of thunder without being touched. A man frighted with the fall of a gallery in which he happened to be, was immediately seized with the black jaundice. Ma. le Cat mentions a young person on whom the insolence of another made such an impression, that his countenance became at first yellow, and then changed into black, in such a manner that in less than eight days he appeared to wear a mask of black velvet:

velvet: he continued in this ſtate for four months without any other ſymptom of bad health or any pain. A ſailor was ſo terrified in a ſtorm, that his face ſweated blood, which like ordinary ſweat returned as it was wiped off. Stahl, whoſe teſtimony cannot be called in queſtion, cites a ſimilar caſe of a girl who had been frightened by ſoldiers. The exceſs of fear, according to many phyſicians, produces madneſs and epilepſy.

Having made theſe preliminary obſervations on pleaſure and pain in infancy, and as they are increaſed or diminiſhed by education, and the different conditions of body and mind, our author proceeds to conſider the capability of ſavages to feel pleaſure and pain. "By ſavages he underſtands all the tribes of men who live by hunting and fiſhing, and on thoſe things which the earth yields without cultivation. Thoſe tribes who poſſeſs herds of cattle, and who derive their ſubſiſtence from ſuch poſſeſſions, are not to be conſidered as ſavages, as they have ſome idea of property. Some ſavages are naturally compaſſionate and humane, others are cruel and ſanguinary. Although the phyſical conſtitution of man be every where the ſame, yet the varieties of climate, the abundance or ſcarcity of natural productions, have a powerful influence to determine the inclinations. Even the fierceneſs of the tyger is ſoftened under a mild ſky; now nature forms the manners of ſavages juſt as ſociety and civil inſtitutions form the manners of civilized life. In the one caſe climate and food produce almoſt the whole effect; in the other they have ſcarcely any influence. The habits of ſociety every moment contend with nature, and they are almoſt always victorious. The ſavage devotes himſelf to the dominion of his paſſions; the civilized man is employed in reſtraining, in directing, and in modifying, them: ſo much influence have government, laws, ſociety, and the fear of cenſure and puniſhment, over his ſoul.

"It is not to be doubted that ſavages are ſuſceptible both of pleaſure and pain; but are the impreſſions made on their organs as ſenſible, or do they feel pain in the ſame degree with the inhabitants of a civilized country?

"Their enjoyments are ſo limited, that, if we confine ourſelves to truth, a few lines will be ſufficient to deſcribe them: our attention muſt therefore be confined to pain, becauſe the manner in which they ſupport misfortune, and even torture, preſents us with a view of character unequalled in the hiſtory of civilized nations. It is not uncommon in civilized countries to ſee men braving death, meeting it with cheerfulneſs, and even not uttering complaints under the torture; but they do not inſult the executioners of public vengeance, and defy pain in order to augment their torments; and thoſe who are condemned by the laws ſuffer the puniſhment with different degrees of fortitude. On thoſe mournful occaſions, the common ranks of mankind in general die with leſs firmneſs: thoſe, on the other hand, who have received education, and who, by a train of unfortunate events, are brought to the ſcaffold, whether it be the fear of being reproached with cowardice, or the conſideration that the ſtroke is inevitable, ſuch men diſcover the expiring ſigns of ſelf-love even in their laſt moments; and thoſe eſpecially of high rank, from their manners and ſentiments, are expected to meet death with magnanimity: but an American ſavage in the moment of puniſhment appears to be more than human; he is a hero of the firſt

order, who braves his tormentors, who provokes them to employ all their art, and who considers it as his chief glory to bear the greatest degree of pain without shrinking. The recital of their tortures would appear exaggerated, if it were not attested by the best authority, and if the savage nations among whom those customs are established were not sufficiently known; but the excess of the cruelty is not so astonishing as the courage of the victim. The European exposed to sufferings of the same dreadful nature would rend heaven and earth with his piercing cries and horrible groans; the reward of martyrdom, the prospect of eternal life, could alone give him fortitude to endure such torments; but the savage is not animated with this exalted hope. What supports him then in scenes of such exquisite suffering? The feeling of shame, the fear of bringing reproach on his tribe, and giving a stain to his fellows never to be wiped away, are the only sentiments which influence the mind of a savage, and which, always present to his imagination, animate him, support him, and lend him spirit and resolution. At the same time, however powerful those motives may be, they would not be alone sufficient, if the savage felt pain in the same degree with the European. Sensibility, as we have already observed, is increased by education; it is influenced by society, manners, laws, and government; climate and food work it into a hundred different shapes; and all the physical and moral causes contribute to increase and diminish it. The habitual existence of a savage would be a state of suffering to an inhabitant of Europe. You must cut the flesh of the one and tear it away with your nails, before you can make him feel in an equal degree to a scratch or prick of a needle in the other. The savage, doubtless, suffers under torture, but he suffers much less than an European in the same circumstances: the reason is obvious; the air which the savages breathe is loaded with fog and moist vapours; their rivers, not being confined by high banks, are by the winds as in floods spread over the level fields, and deposite on them a putrid and pernicious slime; the trees, squeezed one upon another, in that rude uncultivated country serve rather as a covering to the earth than an ornament. Instead of those fresh and delicious shades, those openings in the woods, and walks crossing each other in all directions, which delight the traveller in the fine forests of France and Germany, those in America serve only to intercept the rays of the sun, and to prevent the benign influence of his beams. The savage participates of this cold humidity; his blood has little heat, his humours are gross, and his constitution phlegmatic. To the powerful influence of climate, it is necessary to join the habits of his life. Obliged to traverse vast deserts for subsistence, his body is accustomed to fatigue; food not nourishing, and at the same time in no great plenty, blunts his feelings; and all the hardships of the savage state give a rigidity to his members which makes him almost incapable of suffering. The savage in this state of nature may be compared to our milk-women and street-porters, who, though they possess neither great vigour nor strength, are capable of performing daily, and without complaint, that kind of labour which to man in a different condition of life would be a painful and grievous burden. Feeling, in less perfection with the savage, by the effects of climate and food, and the habits of his life, is still farther restrained by moral considerations. The European is less a man of nature than of society: moral restraints are powerful with him; while over the American

American they have ſcarcely any influence. This latter then is in a double condition of imperfection with regard to us; his ſenſes are blunted, and his moral powers are not diſcloſed. Now, pleaſure and pain depending on the perfection of the ſenſes and the unfolding of the intellectual faculties, it cannot be doubted, that in enjoyments of any kind ſavages experience leſs pleaſure, and in their ſuffering leſs pain, than Europeans in the ſame circumſtances. And in fact, the ſavages of America poſſeſs a very feeble conſtitution. They are agile without being ſtrong; and this agility depends more on their habits than on the perfection of their members: they owe it to the neceſſity of hunting; and they are moreover ſo weak, that they were unable to bear the toil which their firſt oppreſſors impoſed on them. Hence a race of men in all reſpects ſo imperfect could not endure torment under which the moſt robuſt European would ſink, if the pain which they feel were really as great as it appears to be. Feeling is then, and muſt neceſſarily be, leſs in the ſavage condition; for this faculty diſcloſing itſelf by the exerciſe of all the phyſical and moral qualities, muſt be leſs as they are leſs exerciſed. Every thing ſhews the imperfection of this precious quality, this ſource of all our affections, in the American ſavages.

"All the improvements in Europe have had a tendency to unfold ſenſibility: the air is purified that we may breathe more freely; the moraſſes are drained, the rivers are regulated in their courſes, the food is nouriſhing, and the houſes commodious. With the ſavages, on the contrary, every thing tends to curb it; they take pleaſure even in hardening the organs of the body, in accuſtoming themſelves to bear by degrees the moſt acute pain without complaining. Boys and girls among the ſavages amuſe themſelves with tying their naked arms together, and laying a kindled coal between them, to try which of them can longeſt ſuffer the heat; and the warriors, who aſpire to the honour of being chief, undergo a courſe of ſuffering which exceeds the idea of torture inflicted on the greateſt criminals in Europe."

Theſe obſervations on the pleaſures and pains of ſavages appear to be well-founded, and, as the attentive reader will perceive, are perfectly agreeable to the theory of Dr. Sayers. If indeed that theory be juſt, as we believe it to be, it will follow, that the few pleaſures of ſenſe which the American enjoys, he ought to enjoy more completely than any European, becauſe to him they recur but ſeldom. This may very poſſibly be the caſe; and certainly would be ſo, were not his fibres, by climate and the habits of his life, rendered more rigid than thoſe of the civilized part of the inhabitants of Europe. But if we agree with our author in what he ſays of the pains and pleaſures of ſavages, we cannot admit, without many exceptions, his theory of the enjoyments of children. It is ſo far from being true, that few things amuſe, and that nothing ſatisfies, them, that the direct contrary muſt have been obſerved by every man attentive to the operations of the infant mind, which is amuſed with every thing new, and often completely ſatisfied with the mereſt trifle. The pleaſures of philoſophy are not indeed unfolded to the infant; but it by no means follows that he does not enjoy his rattle and his drum as much as the philoſopher enjoys his teleſcope and air-pump; and, if there be any truth in the ſcience of phyſiognomy, the happineſs of the former is much more pure and exquiſite than that of

the latter. That the most perfect music is vain noise to an infant, is far from being self-evident, unless the author confines the state of infancy to a very few months; and we are not disposed to believe, without better proof than we have yet received, that the relish of exquisite perfumes and highly-seasoned dishes adds much to the sum of human felicity.

But, however much we disapprove of many of these reflections, the following we cordially adopt as our own. "If we compare (says our author) the pleasures of sense with those which are purely intellectual, we shall find that the latter are infinitely superior to the former, as they may be enjoyed at all times and in every situation of life. What are the pleasures of the table, says Cicero, of gaming, and of women, compared with the delights of study? This taste increases with age, and no happiness is equal to it. Without knowledge and study, says Cato, life is almost the image of death. The pleasures of the soul are such, that it is frequent enough to see men preserve their gaiety during their whole life, notwithstanding a weak, diseased, and debilitated, body. Scarron, who lived in the last century, was an example of this. Balzac, speaking of him, says, that Prometheus, Hercules, and Philoctetes, in profane, and Job in sacred, history, said many great things while they were afflicted with violent pain, but Scarron alone said pleasant things. I have seen, continues he, in many places of ancient history, constancy, and modesty, and wisdom, and eloquence, accompanying affliction, but he is the only instance wherein I have seen pleasantry.

"There are men whose understandings are constantly on the stretch, and by this very means they are improved; but if the body were as constantly employed in the pursuit of sensual gratification, the constitution would soon be destroyed. The more we employ the mind, we are capable of the greater exertion; but the more we employ the body we require the greater repose. There are besides but some parts of the body capable of enjoying pleasure; every part of it can experience pain. A toothach occasions more suffering than the most considerable of our pleasures can procure of enjoyment. Great pain may continue for any length of time; excessive pleasures are almost momentary. Pleasure carried to an extreme becomes painful; but pain, either by augmenting or diminishing it, never becomes agreeable. For the moment, the pleasures of the senses are perhaps more satisfactory; but in point of duration those of the heart and mind are infinitely preferable. All the sentiments of tenderness, of friendship, of gratitude, and of generosity, are sources of enjoyment for man in a state of civilization. The damned are exceedingly unhappy, said St. Catherine de Sienna, if they are incapable of loving or being beloved.

"Pleasure, continued for a great length of time, produces languor and fatigue, and excites sleep; the continuation of pain is productive of none of these effects. Many suffer pain for eight days and even a month without interruption; an equal duration of excessive pleasure would occasion death.

"Time is a mere relative idea with regard to pleasure and pain; it appears long when we suffer, and short when we enjoy. If there existed no regular and uniform movement in nature, we should not be able from our sensations alone to measure time with any degree of exactness, for pain lengthens and pleasure abridges it. From the

languor of unoccupied time has arisen the proverb expressive of our desire to kill it. It is a melancholy reflection, and at the same time true, that there is no enjoyment which can effectually secure us from pain for the remainder of our lives; while there are examples of evils which hold men in constant sorrow and pain during their whole existence. Such then is the imperfection of the one and the power of the other.

"Pleasure and pain are the sources of morality; an action is just or unjust, good or otherwise, only as its natural tendency is to produce suffering or enjoyment to mankind. No crime could be committed against a being altogether insensible, nor could any good be bestowed on it. Unless he were endowed with the desire of pleasure and the apprehension of pain, man, like an automaton, would act from necessity, without choice and without determination.

"All our passions are the developement of sensibility. If we were not possessed of feeling, we should be destitute of passions; and, as sensibility is augmented by civilization, the passions are multiplied; more active and vigorous in an extensive and civilized empire than in a small state; more in the latter than among barbarous nations; and more in these last than among savages. There are more passions in France and England than all the nations of Europe; because every thing which serves to excite and foster them is always in those countries in the greatest state of fermentation. The mind is active; the ideas great, extensive, and multiplied. And is it not the soul, the mind, and heart, which are the focus of all the passions?"

But, wherever the passions are multiplied, the sources of pleasure and pain are multiplied with them. This being the case, it is impossible to prescribe a fixed and general rule of happiness suited to every individual. There are objects of pleasure with regard to which all men of a certain education are agreed; but there are perhaps many more, owing to the variety of tempers and education, about which they differ. Every man forms ideas of enjoyment relative to his character; and what pleases one may be utterly detested by another. In proportion as a nation is civilized and extensive, those differences are remarkable. Savages who are not acquainted with all the variety of European pleasures, amuse themselves with very few objects. Owing to the want of civilization, they have scarcely any choice in the objects of taste. They have few passions; we have many. But even in the nations of Europe pleasure is infinitely varied in its modification and forms. Those differences arise from manners, from governments, from political and religious customs, and chiefly from education. Meanwhile, however different and variable the ideas of pleasure may be among nations and individuals, it still remains a fact, that a certain number of persons in all civilized states, whether distinguished by birth, or rank, or fortune, or talents, as they have nearly the same education so they form nearly the same ideas of happiness: but to possess it, a man must give his chief application to the state of his mind; and notwithstanding all his efforts it is of uncertain duration. Happiness is the sunshine of life: we enjoy it frequently at great intervals; and it is therefore necessary to know how to use it. All the productions of art perish; the largest fortunes are dissipated; rank, honour, and dignity, pass away like a fleeting shadow; the memory is impaired; all the faculties of the soul are extinguished; the body sinks under

the infirmities of old age; and ſcarcely has once reached the boundaries of happineſs marked out by his imagination, when he muſt give place to another, and renounce all his pleaſures, all his hopes, all his illuſions; the fugitive images of which had given happineſs to the mind.

There are pleaſures, however, on which the mind may ſecurely reſt, which elevate man above himſelf, dignify his nature, fix his attention on ſpiritual things, and render him worthy of the care of Providence. Theſe are to be found in true religion; which procures for thoſe who practiſe its duties inexpreſſible happineſs in a better country, and is in this world the ſupport of the weak, and the ſweet conſolation of the unfortunate.

AN ACCOUNT OF AN ARTIFICIAL SPRING OF WATER, MADE BY ERASMUS DARWIN, M. D. F. R. S.

To the Preſident and Fellows of the Royal Society.

GENTLEMEN, DERBY, *July* 16, 1784.

CONFIDENT that every atom which may contribute to increaſe the treaſure of uſeful knowledge, which you are ſo ſucceſsfully endeavouring to accumulate, will be agreeable and intereſting to the ſociety, I ſend you an account of an artificial ſpring of water, which I produced laſt ſummer near the ſide of the river Derwent in Derby.

Near my houſe was an old well, about one hundred yards from the river, and about four yards deep, which had been many years diſuſed on account of the badneſs of the water, which I found to contain much vitriolic acid, with, at the ſame time, a ſlight ſulphureous ſmell and taſte; but did not carefully analyſe it. The mouth of of this well was about four feet above the ſurface of the river; and the ground, through which it was ſunk, conſiſted of a black, looſe, moiſt, earth, which appeared to have been very lately a moraſs, and is now covered with houſes built upon piles. At the bottom was found a bed of red marl, and the ſpring, which was ſo ſtrong as to give up many hogſheads in a day, oozed from between the moraſs and the marl; it lay about eight feet beneath the ſurface of the river, and the water roſe within two feet of the top of the well.

Having obſerved that a very copious ſpring, called Saint Alkmund's well, roſe out of the ground about half a mile higher on the ſame ſide of the Derwent, the level of which I knew by the height of the intervening wier to be about four or five feet above the ground about my well; and having obſerved, that the higher lands, at the diſtance of a mile or two behind theſe wells, conſiſted of red marl like that in the well; I concluded, that, if I ſhould bore through this ſtratum of marl, I might probably gain a water ſimilar to that of St. Alkmund's well, and hoped that at the ſame time it might riſe above the ſurface of my old well to the level of St. Alkmund's.

With this intent a pump was firſt put down for the purpoſe of more eaſily keeping dry the bottom of the old well, and a hole about two and an half inches diameter was then bored about thirteen yards below the bottom of the well, till ſome ſand was brought by the auger. A wooden pipe, which was previouſly cut in a conical form

at

at one end, and armed with an iron ring at the other, was driven into the top of this hole, and ſtood up about two yards from the bottom of the well, and, being ſurrounded with well-rammed clay, the new water aſcended in a ſmall ſtream through the wooden pipe.

Our next operation was to build a wall of clay againſt the moraſſy ſides of the well, with a wall of well-bricks internally, up to the top of it. This completely ſtopped out every drop of the old water; and, on taking out the plug which had been put in the wooden pipe, the new water in two or three days roſe up to the top, and flowed over the edges of the well.

Afterwards, to gratify my curioſity in ſeeing how high the new ſpring would riſe, and for the agreeable purpoſe of procuring the water at all times quite cold and freſh, I directed a pipe of lead, about eight yards long, and three-quarters of an inch diameter, to be introduced through the wooden pipe deſcribed above, into the ſtratum of marl at the bottom of the well, ſo as to ſtand about three feet above the ſurface of the ground. Near the bottom of this leaden pipe was ſewed, between two leaden rings or flances, an inverted cone of ſtiff leather, into which ſome wool was ſtuffed to ſtretch it out, ſo that, after having paſſed through the wooden pipe, it might completely fill up the perforation of the clay. Another leaden ring or flanch was ſoldered round the leaden pipe, about two yards below the ſurface of the ground, which, with ſome doubles of flannel placed under it, was nailed on the top of the wooden pipe, by which means the water was perfectly precluded from riſing between the wooden and the leaden pipes.

This being accompliſhed, the bottom of the well remained quite dry, and the new water quickly roſe about a foot above the top of the well in the leaden pipe; and, on bending the mouth of this pipe to the level of the ſurface of the ground, about two hogſheads of water flowed from it in twenty-four hours, which had ſimilar properties with the water of St. Alkmund's well, as on compariſon both theſe waters curdled a ſolution of ſoap in ſpirit of wine, and abounded with calcareous earth, which was copiouſly precipitated by a ſolution of fixed alkali; but the new water was found to poſſeſs a greater abundance of it, together with numerous ſmall bubbles of aërial acid or calcareous gas.

The new water has now flowed about twelve months, and, as far as I can judge, is already increaſed to almoſt double the quantity in a given time; and, from the rude experiments I made, I think it is now leſs replete with calcareous earth, approaching gradually to an exact correſpondence with St. Alkmund's well, as it probably has its origin between the ſame ſtrata of earth.

As many mountains bear inconteſtable marks of their having been forcibly raiſed up by ſome power beneath them; and other mountains, and even iſlands, have been lifted up by ſubterraneous fires in our own times, we may ſafely reaſon on the ſame ſuppoſition in reſpect to all other great elevations of ground. Proofs of theſe circumſtances are to be ſeen on both ſides of this part of the country; whoever will inſpect, with the eye of a philoſopher, the lime-mountain at Breedon, on the edge of Leiceſterſhire, will not heſitate a moment in pronouncing, that it has been forcibly elevated by ſome power beneath it; for it is of a conical form, with the apex cut off, and the ſtrata, which compoſe the central parts of it, and which are found

found nearly horizontal in the plain, are raised almost perpendicularly, and placed upon their edges, while those on each side decline like the surface of the hill; so that this mountain may well be represented by a bur made by forcing a bodkin through several parallel sheets of paper. At Route, or Eagle-stone, in the Peak, several large masses of gritstone are seen on the sides and bottom of the mountain, which by their form evince from what parts of the summit they were broken off at the time it was elevated; and the numerous loose stones scattered about the plains in its vicinity, and half buried in the earth, must have been thrown out by explosions, and prove the volcanic origin of the mountain. Add to this the vast beds of toad-stone or lava in many parts of this county, so accurately described, and so well explained, by Mr. Whitehurst, in his Theory of the Formation of the Earth.

Now as all great elevations of ground have been thus raised by subterraneous fires, and in a long course of time their summits have been worn away, it happens, that some of the more interior strata of the earth are exposed naked on the tops of mountains; and that, in general, those strata, which lie uppermost, or nearest to the summit of the mountain, are the lowest in the contiguous plains. This will be readily conceived if the bur, made by thrusting a bodkin through several parallel sheets of paper, had a part of its apex cut off by a pen-knife, and is so well explained by Mr. Michell, in an ingenious paper on the Phænomena of Earthquakes, published a few years ago in the Philosophical Transactions.

And as the more elevated parts of a country are so much colder than the valleys, owing, perhaps, to a concurrence of two or three causes, but particularly to the less condensed state of the air upon hills, which thence becomes a better conductor of heat, as well as of electricity, and permits it to escape the faster; it is from the water condensed on these cold surfaces of mountains, that our common cold springs have their origin; and which, sliding between two of the strata above described, descend till they find or make themselves an outlet, and will in consequence rise to a level with the part of the mountain where they originated. And hence, if by piercing the earth you gain a spring between the second and third, or third and fourth, stratum, it must generally happen, that the water from the lowest stratum will rise the highest, if confined in pipes, because it comes originally from a higher part of the country in its vicinity.

The increasing quantity of this new spring, and its increasing purity, I suppose to be owing to its continually dissolving a part of the earth it passes through, and hence making itself a wider channel, and that through materials of less solubility. Hence it is probable, that the older and stronger springs are generally the purer; and that all springs were originally loaded with the soluble impurities of the strata through which they transuded.

Since the above-related experiment was made, I have read with pleasure the ingenious account of the king's wells at Sheerness, in the last volume of the Transactions, by Sir Thomas Hyde Page, in which the water rose three hundred feet above its source in the well; and have also been informed, that in the town of Richmond in Surrey, and at Inship near Preston in Lancashire, it is usual to bore for water through a lower stratum of earth to a certain depth; and that when it is found, at both those places, it rises so high as overflow the surface

face of the well. All these facts contribute to establish the theory above-mentioned: and there is reason to conclude, that, if similar experiments were made, artificial springs, rising above ground, might in many places be thus produced at small expence, both for the common purposes of life, and for the great improvement of lands, by occasionally watering them.

DESCRIPTION OF PHILADELPHIA, WITH REMARKS ON THE DUMPLERS.

PHILADELPHIA is the capital of the state of Pennsylvania in North America, situated in W. long. 75. 8. N. lat. 39. 57. It is one of the most beautiful and regular cities in the world, being of an oblong form, situated on the west bank of the river Delaware, on an extensive plain, about one hundred and eighteen miles (some say more) from the sea. The length of the city east and west, that is, from the Delaware to the Schuylkill, upon the original plan of Mr. Penn, is one thousand three hundred feet, and the breadth, north and south, is four thousand eight hundred and thirty-seven feet. Not two fifths of the plot covered by the city charter is yet built. The inhabitants, however, have not confined themselves within the original limits of the city, but have built north and south along the Delaware two miles in length. The longest street is Second-street, about seven hundred feet from Delaware river, and parallel to it. The circumference of that part of the city which is built, if we include Kensington on the north and Southwark on the south, may be about five miles. Market-street is one hundred feet wide, and runs the whole length of the city from river to river. Near the middle, it is intersected at right angles by Broad-street, one hundred and thirteen feet wide, running nearly north and south quite across the city.

Between Delaware river and Broad-street are fourteen streets, nearly equidistant, running parallel with Broad-street across the city; and between Broad-street and the Schuylkill, there are nine streets equidistant from each other. Parallel to Market-street are eight other streets, running east and west from river to river, and intersect the cross streets at right angles; all these streets are fifty feet wide, except Arch-street, which is sixty-five feet wide. All the streets which run north and south, except Broad-street mentioned above, are fifty feet wide. There were four squares of eight acres each, one at each corner of the city, originally reserved for public and common uses. And in the centre of the city, where Broad-street and Market-street intersect each other, is a square of ten acres, reserved in like manner, to be planted with rows of trees for public walks. This city was founded in 1682 by the celebrated William Penn, who in October 1701 granted a charter incorporating the town with city privileges. In 1749 the dwelling-houses were computed, and found to be two thousand and seventy-six; in 1790 they amounted to five thousand. They are in general handsomely built of brick; and contain forty thousand inhabitants, composed of almost all nations and religions. Their places for religious worship are as follow:—The Friends or Quakers have five, the Presbyterians six, the Episcopalians three, the German Lutherans two, the

German Calviniſts one, the Catholics three, the Swediſh Lutherans one, the Moravians one, the Baptiſts one, the Univerſal Baptiſts one, the Methodiſts one, the Jews one.

The other public buildings in the city, beſides the univerſity, academies, &c. are the following, viz. a ſtate-houſe and offices, a city-court houſe, a country-court houſe, a carpenter's hall, a philoſophical ſociety's hall, a diſpenſary, an hoſpital and offices, an almshouſe, a houſe of correction, a public factory of linen, cotton, and woollen, a public obſervatory, three brick market-houſes a fiſh-market, a public gaol.

The univerſity of Philadelphia was founded during the war. Its funds were partly given by the ſtate, and partly taken from the old college of Philadelphia. A medical ſchool, which was founded in 1765, is attached to the univerſity; and has profeſſors in all the branches of medicine, who prepare the ſtudents (whoſe number yearly is fifty or ſixty) for degrees in that ſcience. Beſides the univerſity and medical ſchool, there is the Proteſtant Epiſcopal academy, a very flouriſhing inſtitution; the academy for young ladies; another for the Friends or Quakers, and one for the Germans; beſides five free ſchools.

In Market-ſtreet, between Front and Fourth ſtreets, is the principal market, built of brick, and is fifteen hundred feet in length. This market, in reſpect to the quantity, the variety, and neatneſs of the proviſions, is not equalled in America, and perhaps not exceeded in the world.

The Philadelphians are not ſo ſocial, nor perhaps ſo hoſpitable, as the people in Boſton, Charleſtown, and New York. Various cauſes have contributed to this difference; among which the moſt operative has been the prevalence of party-ſpirit, which has been and is carried to greater lengths in this city than in any other in America; yet no city can boaſt of ſo many uſeful improvements in manufactures, in the mechanical arts, in the art of healing, and particularly in the ſcience of humanity. In ſhort, whether we conſider the convenient local ſituation, the ſize, the beauty, the variety and utility of the improvements, in mechanics, in agriculture, and manufactures; or the induſtry, the enterpriſe, the humanity, and the abilities, of the inhabitants of the city of Philadelphia, it merits to be viewed as the capital not only of the province, but of the flouriſhing empire of united America.

Several canals are let into the town, which add much to the beauty and convenience of the place. Its quay is two hundred feet ſquare, to which ſhips of four hundred or five hundred tons may come up, and lay their broadſides cloſe to it; with wet and dry docks for building and repairing ſhips, beſides magazines, warehouſes, and all other conveniences for exporting and importing merchandize. Scarcely any thing can appear more beautiful than the city and the adjacent country, which for ſome miles may be compared to a fine and flouriſhing garden.

There are a very extraordinary people who live within fifty miles of Philadelphia; where there is a little town or colony, particularly remarkable on account of its origin and the manners of the people by whom it is inhabited. It was founded by a German, who, weary of the world, returned into the country that he might be more at liberty to give himſelf up to contemplation. Curioſity brought ſeveral

veral of his countrymen to visit his retreat; and by degrees his pious, simple, and peaceable, manners, induced them to settle near him; when they all formed a little colony, which they called Euphrates, in allusion to the Hebrews, who used to sing psalms on the borders of that river.

This little town forms a triangle, the outsides of which are bordered with mulberry and apple trees planted with great regularity; and its inhabitants, we know not for what reason, are called Dumplers. In the middle of the town is a very large orchard, and between the orchard and those ranges of trees are houses built of wood, three stories high, where every Dumpler is left to enjoy the the pleasures of his meditation without disturbance. These contemplative men do not amount to above five hundred; and the extent of their territory is about two hundred and fifty acres, bounded by a river, a piece of stagnated water, and a mountain covered with trees.

The men and women live in separate quarters of the town, and never see each other but at places of worship; for among the Dumplers there are no assembles of any kind but for public business. Their lives are spent in labour, prayer, and sleep. Twice every day and night they are called forth from their cells to attend divine service. Like the Methodists and Quakers, every individual among them has the right of preaching when he thinks himself inspired. The favourite subjects on which they discourse in their assemblies, are humility, temperance, chastity, and the other Christian virtues. They never violate that day of repose which all orders of men, whether idle or luxurious, much delight in. They admit a hell and a paradise; but reject the eternity of future punishments. They abhor the doctrine of original sin as an impious blasphemy; and, in general, every tenet that is severe to men appears to them injurious to the Divinity. As they do not allow merit to any but voluntary works, they administer baptism only to the adult; at the same time, they think baptism so essentially necessary to salvation, that they imagine the souls of Christians in another world are employed in converting those who have not died under the law of the gospel. In this ridiculous opinion we have known Christians of other denominations, and who boasted a higher antiquity, that agreed with them.

Still more disinterested than the Quakers, they never enter into any law-suit. One may cheat, rob, and abuse, them, without being exposed to any retaliation, or even to any complaint from them. On them religion has the same effect that philosophy had upon the Stoics: it makes them insensible to every kind of insult.

Nothing can be plainer than their dress. In winter it is a long white gown, from which there hangs a hood, which serves instead of a hat, a coarse shirt, thick shoes, and very wide breeches. The women are dressed very much like the men, except that they have no breeches. Their common food consists wholly of vegetables; not because it is unlawful to eat any other, but because that kind of abstinence is looked upon as more conformable to the spirit of Christianty, which has an aversion from blood.

Each individual follows with cheerfulness the branch of business allotted him; and the produce of all their labours is deposited in a common stock, for the use of the whole. This union of industry has not only established agriculture, manufactures, and all the arts

necessary for the support of this little society, but hath also supplied, for the purposes of exchange, superfluities proportioned to the degree of its population.

Though the two sexes live separate at Euphrates, the Dumplers do not on that account foolishly renounce matrimony; but those who find themselves disposed to it, leave the town, and form an establishment in the country, which is supported at the public expence. They repay this by the produce of their labours, which is all thrown into the public treasury; and their children are sent to be educated in Euphrates, which they consider as their mother-country.—Without this wise privilege, the Dumplers would be no better than monks; and in process of time they would become either savages or libertines. They are at present an innocent, though perhaps deluded, race.

CURIOUS REMARKS CONCERNING THE SAVAGES OF NORTH AMERICA. By Dr. B. Franklin.

THE Indian men, when young, are hunters and warriors; when old, counsellors; for all their government is by the counsel or advice of the sages; there is no force, there are no prisons, no offices to compel obedience, or inflict punishment. Hence they generally study oratory; the best speaker having the most influence. The Indian women till the ground, dress the food, nurse and bring up the children, and preserve and hand down to posterity the memory of public transactions. These employments of men and women are accounted natural and honourable. Having few artificial wants, they have abundance of leisure for improvement by conversation. Our laborious manner of life, compared with theirs, they esteem slavish and base; and the learning on which we value ourselves, they regard as frivolous and useless.

Having frequent occasions to hold public councils, they have acquired great order and decency in conducting them. The old men sit in the foremost ranks, the warriors in the next, and the women and children in the hindmost. The business of the women is to take exact notice of what passes, imprint it in their memories, for they have no writing, and communicate it to their children. They are the records of the council, and they preserve tradition of the stipulations in treaties a hundred years back; which, when we compare with our writings, we always find exact. He that would speak, rises. The rest observe a profound silence. When he has finished, and sits down, they leave him five or six minutes to recollect, that if he has omitted any thing he intended to say, or has any thing to add, he may rise again, and deliver it. To interrupt another, even in common conversation, is reckoned highly indecent.

The politeness of these savages in conversation, is indeed, carried to excess; since it does not permit them to contradict, or deny the truth of what is asserted in their presence. By this means they indeed avoid disputes; but then it becomes difficult to know their minds, or what impression you make upon them. The missionaries who have attempted to convert them to Christianity, all complain of this as one of the great difficulties of their mission. The Indians hear with patience the truths of the gospel explained to them, and give

give their usual tokens of assent and approbation: you would think they were convinced.—No such matter; it is mere civility.

A Swedish minister having assembled the chiefs of the Susquehanah Indians, made a sermon to them, acquainting them with the principal historical facts on which our religion is founded; such as the fall of our first parents by eating an apple; the coming of Christ to repair the mischief; his miracles, and suffering, &c.—When he had finished, an Indian orator stood up to thank him. "What you have told us," says he, "is all very good. It is indeed bad to eat apples. It is better to make them all into cyder. We are much obliged by your kindness in coming so far, to tell us those things which you have heard from your mothers. In return, I will tell you some of those we have heard from ours.

In the beginning, our fathers had only the flesh of animals to subsist on; and if their hunting was unsuccessful, they were starving. Two of our young hunters having killed a deer, made a fire in the woods to broil some parts of it. When they were about to satisfy hunger, they beheld a beautiful young woman descend from the clouds, and seat herself on that hill which you see yonder among the Blue Mountains. They said to each other, It is a spirit that perhaps has smelt our broiling venison, and wishes to eat of it: let us offer some to her. They presented her with the tongue: she was pleased with the taste of it, and said, your kindness shall be rewarded. Come to this place after thirteen moons, and you will find something that will be of great benefit in nourishing you and your children to the latest generations. They did so, and to their surprise, found plants they had never seen before; but which, from that ancient time, have been constantly cultivated among us, to our great advantage. Where her right hand had touched the ground, they found maize; where her left hand had touched it, they found kidney-beans; and where her backside had sat on it they found tobacco." The good missionary, disgusted with this idle tale, said, "What I delivered to you were sacred truths; but what you tell me is mere fable, fiction, and falsehood." The Indian offended, replied, "My brother, it seems your friends have not done you justice in your education; they have not well instructed you in the rules of common civility. You saw that we, who understand and practise those rules, believed all your stories, why do you refuse to believe ours?"

When any of them come into our towns, our people are apt to croud round them, gaze upon them, and incommode them where they desire to be private; this they esteem great rudeness, and the effect of the want of instruction in the rules of civility and good-manners. "We have," say they, "as much curiosity as you, and when you come into our towns, we wish for opportunities of looking at you; but for this purpose we hide ourselves behind bushes where you are to pass, and never intrude ourselves into your company."

Their manner of entering one another's villages has likewise its rules. It is reckoned uncivil in travelling strangers to enter a village abruptly, without giving notice of their approach. Therefore, as soon as they arrive within hearing, they stop and hollow, remaining there till invited to enter. Two old men usually come out to them, and lead them in. There is in every village a vacant dwelling, called the strangers house. Here they are placed, while the old men go round from hut to hut, acquainting the inhabitants that strangers

are arrived, who are probably hungry and weary; and every one sends them what he can spare of victuals, and skins to repose on. When the strangers are refreshed, pipes and tobacco are brought; and then, but not before, conversation begins, with enquiries who they are, whither bound, what news, &c. and it usually ends with offers of service; if the strangers have occasion for guides, or any necessaries for continuing their journey; and nothing is exacted for the entertainment.

The same hospitality, esteemed among them as a principal virtue, is practised by private persons; of which Conrad Weiser, our interpreter, gave me the following instance. He had been naturalized among the Six Nations, and spoke well the Mohock language. In going through the Indian country, to carry a message from our governor to the council at Onondaga, he called at the habitation of Canassetego, an old acquaintance, who embraced him, spread furs for him to sit on, placed before him some boiled beans and venison, and mixed some rum and water for his drink. When he was well refreshed, and had lit his pipe, Canassetego began to converse with him: asked how he had fared the many years since they had seen each other, whence he then came, what had occasioned the journey, &c. Conrad answered all his questions; and when the discourse began to flag, the Indian, to continue it, said, "Conrad, you have lived long among the white people, and know something of their customs; I have been sometimes at Albany, and have observed, that once in seven days they shut up their shops, and assemble all in the great house; tell me what it is for?—What do they do there?" "They meet there," says Conrad, "to hear and learn *good things*." "I do not doubt," says the Indian, "that they tell you so; they have told me the same: but I doubt the truth of what they say, and I will tell you my reasons. I went lately to Albany to sell my skins, and buy blankets, knives, powder, rum, &c. You know I generally used to deal with Hans Hanson; but I was a little inclined this time to try some other merchants. However, I called first upon Hans, and asked him what he would give for beaver. He said he could not give more than four shillings a pound: but, says he, I cannot talk on business now; this is the day when we meet together to learn *good things*, and I am going to the meeting. So I thought to myself, since I cannot do any business to-day, I may as well go to the meeting too; and I went with him.—There stood up a man in black, and began to talk to the people very angrily. I did not understand what he said; but perceiving that he looked much at me and at Hanson, I imagined he was angry at seeing me there; so I went out, sat down near the house, struck fire, and lit my pipe, waiting till the meeting should break up. I thought too, that the man had mentioned something of beaver, and I suspected it might be the subject of their meeting. So when they came out, I accosted my merchant.—'Well, Hans,' says I, 'I hope you have agreed to give more than four shillings a pound?' 'No,' says he, 'I cannot give so much; I cannot give more than three shillings and six-pence.' I then spoke to several other dealers, but they all sung the same song, three and six-pence, three and six-pence. This made it clear to me that my suspicion was right; and that whatever they pretended of meeting to learn *good things*, the real purpose was, to consult how to cheat Indians in the price of beaver. Consider but a little, Conrad, and you must

must be of my opinion. If they met so often to learn *good things*, they certainly would have learned some before this time. But they are still ignorant. You know our practice. If a white man, in travelling through our country, enters one of our cabins, we all treat him as I treat you; we dry him if he is wet, we warm him if he is cold, and give him meat and drink, that he may allay his thirst and hunger; and we spread soft furs for him to rest and sleep on: we demand nothing in return. But if I go into a white man's house at Albany, and ask for victuals and drink, they say, Where is your money? And if I have none, they say, Get out, you Indian dog. You see they have not yet learned those little *good things*, that we need no meeting to be instructed in, because our mothers taught them to us when we were children; and therefore it is impossible their meetings should be, as they say, for any such purpose, or have any such effect; they are only to contrive *the cheating of Indians in the price of beaver*."

ORIGIN OF PILGRIMAGE.

PILGRIMAGE is a kind of religious discipline, which consists in taking a journey to some holy place in order to adore the relics of some deceased saint. Pilgrimages began to be made about the middle ages of the church; but they were most in vogue after the end of the 11th century, when every one was for visiting places of devotion, not excepting kings and princes themselves; and even bishops made no difficulty of being absent from their churches on the same account. The places most visited were Jerusalem, Rome, Compostelia, and Tours; but the greatest numbers now resort to Loretto, in order to visit the chamber of the Blessed Virgin, in which she was born, and brought up her son Jesus till he was twelve years of age.

In every country where popery was established, pilgrimages were common; and in those countries which are still popish, they continue. In England, the shrine of St. Thomas à Becket was the chief resort of the pious; and in Scotland, St. Andrew's; where, as tradition informs us, was deposited a leg of the holy apostle. In Ireland they still continue; for, from the beginning of May till the middle of August every year, crowds of popish penitents from all parts of that country resort to an island near the centre of Loughfin, or White Lake, in the county of Donnegal, to the amount of three thousand or four thousand. These are mostly of the poorer sort, and many of them are proxies for those who are richer; some of which, however, together with some of the priests and bishops on occasion, make their appearance there. When the pilgrim comes within sight of the holy lake, he must uncover his hands and feet, and thus walk to the water-side, and is taken to the island for sixpence. Here there are two chapels and fifteen other houses; to which are added confessionals, so contrived, that the priest cannot see the person confessing. The penance varies according to the circumstances of the penitent; during the continuance of which (which is sometimes three, six, or nine, days) he subsists on oatmeal, sometimes made into bread. He traverses sharp stones on his bare knees or feet, and goes through a variety of other forms, paying sixpence at every different confession. When all is over, the priest bores a gimlet-hole through the pilgrim's staff near the top, in which he

he fastens a cross peg; gives him as many holy pebbles out of the lake as he cares to carry away, for amulets to be presented to his friends, and so dismisses him, an object of veneration to all other papists not thus initiated; who no sooner see the pilgrim's cross in his hands, than they kneel down to get his blessing.

There are, however, other parts of Ireland sacred to extraordinary worship and pilgrimage; and the number of holy wells, and miraculous cures, &c. produced by them, is very great. That such things should exist in this enlightened age, and in a Protestant country, is indeed strange; but our wonder ceases, when we reflect that it is among the lowest, and perhaps the worst of the people. They who carry external religion to an extreme, and place that confidence in ceremony which belongs only to the spirit of it, are seldom distinguished either for their wisdom or their virtue. We do not deny, however, that they who carry matters to the other extreme, may be equally destitute of real knowledge and genuine morality.

Dr. Johnson, in his Rasselas, gives us some observations on pilgrimage, which are so much to the purpose, that we think we cannot do better than lay them before our readers. "Pilgrimage (said Imlac, into whose mouth the observations are put,) like many other acts of piety, may be reasonable or superstitious according to the principles upon which it is performed. Long journeys in search of truth are not commanded. Truth, such as is necessary to the regulation of life, is always found where it is honestly sought: change of place is no natural cause of the increase of piety, for it inevitably produces dissipation of mind. Yet since men go every day to view the fields where great actions have been performed, and return with stronger impressions of the event, curiosity of the same kind may naturally dispose us to view that country whence our religion had its beginning: and I believe no man surveys those awful scenes without some confirmation of holy resolutions. That the Supreme Being may be more easily propitiated in one place than in another, is the dream of idle superstition; but that some places may operate upon our own minds in an uncommon manner, is an opinion which hourly experience will justify. He who supposes that his vices may be more successfully combated in Palestine, will, perhaps, find himself mistaken; yet he may go thither without folly: he who thinks they will be more freely pardoned, dishonours at once his reason and religion."

POLITENESS, OR THE ART OF PLEASING.

POLITENESS means elegance of manners or good breeding: Lord Chesterfield calls it the art of pleasing. It has also been called an artificial good nature; and indeed good nature is the foundation of true politeness; without which art will make but a very indifferent figure, and will generally defeat its own ends. "Where compliance and assent, caution and candour, (says an elegant essayist,) arise from natural tenderness of disposition and softness of nature, as they sometimes do, they are almost amiable and certainly excusable; but as the effects of artifice, they must be despised. The persons who possess them are, indeed, often themselves dupes of their own deceit, when they imagine others are deluded by it. For excessive

excessive art always betrays itself; and many, who do not openly take notice of the deceiver, from motives of delicacy and tenderness for his character, secretly deride and warmly resent his ineffectual subtilty."

"True politeness (says another author) is that continual attention which humanity inspires us with, both to please others and to avoid giving them offence. The surly plain-dealer exclaims loudly against this virtue, and prefers his own shocking bluntness and Gothic freedom. The courtier and fawning flatterer, on the contrary, substitute in its place insipid compliments, cringings, and a jargon of unmeaning sentences. The one blames politeness, because he takes it for a vice; and the other is the occasion of this, because that which he practises is really so."

Both these characters act from motives equally absurd, though not equally criminal. The conduct of the artful flatterer is guided by self-love, while that of the plain-dealer is the effect of ignorance; for nothing is more certain, than that the desire of pleasing is founded on the mutual wants and the mutual wishes of mankind; on the pleasure which we wish to derive from society, and the character which we wish to acquire. Men having discovered that it was necessary and agreeable to unite for their common interests, they have made laws to repress the wicked, they have settled the duties of social life, and connected the idea of respectability with the practice of those duties; and, after having prescribed the regulations necessary to their common safety, they have endeavoured to render their commerce with one another agreeable, by establishing the rules of politeness and good breeding. Indeed, as an elegant author already quoted remarks, the philosopher who, in the austerity of his virtue, should condemn the art of pleasing as unworthy cultivation, would deserve little attention from mankind, and might be dismissed to his solitary tub, like his brother Diogenes. It is the dictate of humanity, that we should endeavour to render ourselves agreeable to those in whose company we are destined to travel in the journey of life. It is our interest, it is the source of perpetual satisfaction; it is one of our most important duties as men, and particularly required in the professor of Christianity."

It is needless to particularize the motives which have induced men to practise the agreeable virtues; for, from whatever source the desire of pleasing proceeds, it has always increased in proportion to the general civilization of mankind. In a rude state of society, pleasure is limited in its sources and in its operation. When the wants of mankind, and the means of attaining them, are few, personal application is necessary to gratify them, and it is generally sufficient; by which means an individual becomes more independent than can possibly be the case in civilized life, and of course less disposed to give or receive assistance. Confined to the solitary wish of furnishing means for his own happiness, he is little intent on the pleasures of conversation and society. His desire of communication is equal to the extent of his knowledge. But as soon as the natural wants of life are filled up, we find unoccupied time, and we labour hard to make it pass in an agreeable manner. It is then we perceive the advantage of possessing a rational nature, and the delights of mutual intercourse. When we consider society in that state of perfection which enables a great part of the members of it to pursue

at leisure the pleasures of conversation, we should expect, both from the ease of acquitting ourselves to the satisfaction of our associates, and from the advantages arising from this conduct, that the art of pleasing might be reduced to a few plain and simple rules, and that these might be derived from a slight attention to general manners.

The art of pleasing, in our intercourse with mankind, is indeed so simple, that it requires nothing more than the constant desire to please in all our words and actions; and the practice of it can neither wound a man's self-love, nor be prejudicial to his interest in any possible situation.

But, though this be certain, it is undoubtedly less attended to than in reason it ought to be. Each particular man is so zealous to promote his own ends or his own pleasure, as to forget that his neighbour has claims equal to his own; that every man that enters into company gives up for the time a great many of his peculiar rights; and that he then forms part of an association, met together not for the particular gratification of any one, but for the purpose of general satisfaction.

The qualities essential in the art of pleasing, are virtue, knowledge, and manners. All the virtues which form a good and respectable character in a moral sense are essential to the art of pleasing. This must be an established principle, because it depends on the wants and mutual relations of society. In all affairs of common business, we delight in transacting with men in whom we can place confidence, and in whom we find integrity; but truth is so naturally pleasing, and the common affairs of life are so interwoven with social intercourse, that we derive abundantly more satisfaction from an honest character than from specious manners. "Should you be suspected (says Chesterfield) of injustice, malignity, perfidy, lying, &c. all the parts and knowledge of the world will never procure you esteem, friendship, and respect."

The first of virtues in our commerce with the world, and the chief in giving pleasure to those with whom we associate, is inviolable sincerity of heart. We can never be too punctual in the most scrupulous tenderness to our moral character in this respect, nor too nicely affected in preserving our integrity.

The peculiar modes even of the fashionable world, which are founded in dissimulation, and which on this account have induced several to recommend the practice, would not prevent a man of the highest integrity from being acceptable in the very best company. Acknowledged sincerity gives the same ornament to character that modesty does to manners. It would abundantly atone for the want of ridiculous ceremony, or false and unmeaning professions; and it would in no respect diminish the lustre of a noble air, or the perfection of an elegant address.

If integrity be the foundation of that character which is most generally acceptable, or which, in other words, possesses the power of pleasing in the highest degree, humanity and modesty are its highest ornaments.

The whole art of pleasing, as far as the virtues are concerned, may be derived from the one or other of these sources. Humanity comprehends the display of every thing amiable to others; modesty removes or suppresses every thing offensive in ourselves.

This

This modesty, however, is not inconsistent with firmness and dignity of character: it arises rather from the knowledge of our imperfection compared with a certain standard, than from conscious ignorance of what we ought to know. We must therefore distinguish between this modesty and what the French call *mauvaise honte*. The one is the unaffected and unassuming principle which leads us to give preference to the merit of others, the other is the aukward struggling of nature over her own infirmities. The first gives an additional lustre to every good quality; while some people, from feeling the pain and inconveniency of the *mauvaise honte*, have rushed into the other extreme, and turned impudent, as cowards sometimes grow desperate from excess of danger. The medium between these two extremes marks out the well-bred man; he feels himself firm and easy in all companies, is modest without being bashful, and steady without being impudent.

A man possessing the amiable virtues is still farther prepared to please, by having in his own mind a perpetual fund of satisfaction and entertainment. He is put to no trouble in concealing thoughts which it would be disgraceful to avow, and he is not anxious to display virtues which his daily conversation and his constant looks render visible.

The next ingredient in the art of pleasing, is to possess a correct and enlightened understanding, and a fund of rational knowledge. With virtue and modesty we must be able to entertain and instruct those with whom we associate.

The faculty of communicating ideas is peculiar to man, and the pleasure which he derives from the interchange alone is one of the most important of his blessings. Mankind are formed with numberless wants, and with a mutual power of assisting each other. It is a beautiful and happy part of the same perfect plan, that they are likewise formed to delight in each other's company, and in the mutual interchange of their thoughts. The different species of communication, in a highly polished age, are as numerous as the different ranks, employments, and occupations, of men; and indeed the knowledge which men wish to communicate takes its tinge from their peculiar profession or occupation.

Thus commercial men delight to talk of their trade, and of the nature of public business; men of pleasure, who wish merely to vary or quicken their amusements, are in conversation light, trifling, and insincere; and the literati delight to dwell on new books, learned men, and important discoveries in science or in arts. But, as the different classes of men will frequently meet together, all parties must so contrive matters, as to combine the useful and agreeable together, so as to give the greatest delight at the time, and the greatest pleasure on reflection. An attention to these principles would make the man of pleasure and the man of learning meet together on equal terms, and derive mutual advantage from their different qualifications. With due attention to such ideas, we proceed to mention the kinds of knowledge which are most fitted for conversation. Those who wish to please should particularly endeavour to be informed in those points which most generally occur. An accurate or extensive knowledge on learned subjects is by no means sufficient: we must also have an accurate and extensive knowledge of the common occurrences of life.

It is the knowledge of mankind, of governments, of history, of public characters, and of the springs which put the great and the little actions of the world in motion, which give real pleasure and rational instruction. The knowledge which we communicate must in some shape be interesting to those to whom we communicate it; of that nature, that the desire of receiving it may overbalance every kind of disgust, excited too often on the score of envy and self-love, against those who happen to possess superior endowments; and at the same time of that importance, as to elevate the thoughts somewhat above the actions and the faults of the narrow circle formed in our own immediate neighbourhood. On this account it is recommended by an author who fully knew mankind, as a maxim of great importance in the art of pleasing, to be acquainted with the private character of those men who, from their station or their actions, are making a figure in the world. We naturally wish to see such men in their retired and undisguised moments; and he who can gratify us is highly acceptable. History of all kinds, fitly introduced, and occasionally embellished with pleasing anecdotes, is a chief part of our entertainment in the intercourse of life. This is receiving instruction, without exciting much envy; it depends on memory, and memory is one of those talents the possession of which we least grudge to our neighbour. Our knowledge of history, at the same time, must not appear in long and tedious details; but in apt and well-chosen allusions, calculated to illustrate the particular subject of conversation. But the knowledge most necessary is that of the human heart. This is acquired by constant observation on the manners and maxims of the world, connected with that which passes in our own minds. This leads us from the common details of conduct, from slander and defamation, to the sources and principles of action, and enables us to enter into what may be called the philosophy of conversation. We may see both the practicability of this kind of discourse, and the nature of it, in the following lines of Horace:

Sermo oritur, non de villis domibusve alienis;
Nec male necne Lepos saltet: sed quod magis ad nos
Pertinet, & nescire malum est, agitamus: utrumne
Divitiis homines, an sint virtute beati?
Quidve ad amicitias, usus rectumne, trahat nos?
Et quæ sit natura boni, summumque quid ejus? &c.

By this means constant materials are supplied for free, easy, and spirited, communication. The restraints which are imposed on mankind, either from what their own character may suffer, or from the apprehension of giving offence to others, are entirely taken off, and they have a sufficient quantity of current coin for all the common purposes of life.

In addition to virtue and knowledge, which are the chief ingredients in the art of pleasing, we have to consider graceful and easy manners. Lord Chesterfield indeed considers these as the most essential and important part; as if the diamond received its whole value from the polish. But, though he is unquestionably mistaken, there is yet a certain sweetness of manners which is particularly engaging in our commerce with the world. It is that which constitutes the character which the French, under the appellation of *l'amiable*, so much talk of, and so justly value. This is not so easily described as

as felt. It is the compound result of different things; as complaisance, a flexibility but not a servility of manners, an air of softness in the countenance, gesture, and expression, equally whether you concur or differ with the person you converse with. This is particularly to be studied when we are obliged to refuse a favour asked of us, or to say what in itself cannot be very agreeable to the person to whom we say it. It is then the necessary gilding of a disagreeable pill. But this, which may be called the *suaviter in modo*, would degenerate and sink into a mean and timid complaisance and passiveness, if not supported by firmness and dignity of character. Hence the Latin sentence, *suaviter in modo, fortiter in re*, becomes a useful and important maxim in life.

Genuine easy manners result from a constant attention to the relations of persons, things, time, and places. Were we to converse with one greatly our superior, we are to be as easy and unembarrassed as with our equals; but yet every look, word, and action, should imply, without any kind of servile flattery, the greatest respect. In mixed companies, with our equals, greater ease and liberty are allowed; but they too have their proper limits. There is a social respect necessary. Our words, gestures, and attitudes, have a greater degree of latitude, though not an unbounded one. That easiness of carriage and behaviour which is exceedingly engaging, widely differs from negligence and inattention, and by no means implies that one may do whatever he pleases; it only means, that one is not to be stiff, formal, and embarrassed, disconcerted and ashamed; but it requires great attention to, and a scrupulous observation of, what the French call *les bienseances*; a word which implies "decorum, good-breeding, and propriety." What we ought to do, is to be done with ease and unconcern; whatever is improper, must not be done at all. In mixed companies, also, different ages and sexes are to be differently addressed. Although we are to be equally easy with all, old age particularly requires to be treated with a degree of deference and regard. It is a good general rule, to accustom ourselves to have a kind feeling to every thing connected with man; and, when this is the case, we shall seldom err in the application. Another important point in the *bienseances* is, not to run our own present humour and disposition indiscriminately against every body, but to observe and adopt theirs. And, if we cannot command our present humour and disposition, it is necessary to single out those to converse with who happen to be in the humour the nearest to our own. Peremptoriness and decision, especially in young people, is contrary to the *bienseance*: they should seldom seem to dissent, and always use some softening mitigating expression.

There is a *bienseance* also with regard to people of the lowest degree; a gentleman observes it with his footman, and even indeed with the beggar in the street. He considers them as objects of compassion, not of insult; he speaks to neither in a harsh tone, but corrects the one coolly, and refuses the other with humanity.

The following observations perhaps contain the sum of the art of pleasing:

1. A fixed and habitual resolution of endeavouring to please, is a circumstance which will seldom fail of effect, and its effect will every day become more visible as this habit increases in strength.

2. This resolution must be regulated by a very considerable degree of good sense.

3. It is a maxim of almost general application, that what pleases us in another will also please others in us.

4. A constant and habitual attention to the different dispositions of mankind, to their ruling passions, and to their peculiar or occasional humours, is absolutely necessary.

5. A man who would please, must possess a firm, equal, and steady, temper. And,

6. An easy and graceful manner, as distant from bashfulness on the one hand as from impudence on the other. "He who thinks himself sure of pleasing (says Lord Chesterfield), and he who despairs of it, are equally sure to fail." And he is undoubtedly in the right. The one, by his assuming vanity, is inattentive to the means of pleasing; and the other, from fear, is rendered incapable of employing them.

ACCOUNT OF THE CAPE OF GOOD HOPE.

THE Cape of Good Hope has been generally esteemed the most southerly point of Africa, though it is not truly so. In Philip's Voyage to Botany Bay, we are told, that the land which projects farthest to the south is a point to the east of it, called by the English *Cape Lagullus*; a name corrupted from the original Portuguese *das Agulhas*, which, as well as the French appellation *des Aiguilles*, is descriptive of its form, and would rightly be translated Needle Cape.

On approaching the Cape, a very remarkable eminence may in clear weather be discovered at a considerable distance; and is called the *Table-mountain* from its appearance, as it terminates in a flat horizontal surface, from which the face of the rock descends almost perpendicularly. In the mild or summer season, which commences in September, and continues till March, the Table Land or Mountain, is sometimes suddenly capped with a white cloud, by some called the *spreading of the Table-cloth*. When this cloud seems to roll down the steep face of the mountain, it is a sure indication of an approaching gale of wind from the south-east; which generally blows with great violence, and sometimes continues a day or more, but in common is of short duration. On the first appearance of this cloud, the ships in Table Bay begin to prepare for it, by striking yards and top-masts, and making every thing as snug as possible.—A little to the westward of the Table Land, divided by a small valley, stands on the right hand side of Table Bay a round hill, called the Sugar Loaf; and by many the Lion's Head, as there is a continuance from it contiguous to the sea, called the Lion's Rump; and, when you take a general view of the whole, it very much resembles that animal with his head erect. The Sugar Loaf or Lion's Head, and the Lion's Rump, have each a flag-staff on them, by which the approach of ships is made known to the governor, particularising their number, nation, and the quarter from which they come. To the eastward, separated by a small chasm from the Table Land, stands Charles's Mount, well known by the appellation of the Devil's Tower, or Devil's Head; and so called from the violent gusts of wind

wind ſuppoſed to iſſue from it when it partakes of the cap that covers the Table Land, though theſe guſts are nothing more than a degree of force the wind acquires in coming through the chaſm. When this phenomenon appears in the morning, which is by no means ſo frequent as in the evening, the ſailors have a ſaying, as the Devil's Tower is almoſt contiguous to the Table Land, that the old gentleman is going to breakfaſt; if in the middle of the day, that he is going to dinner; and, if in the evening, that the cloth is ſpread for ſupper. Table-mountain riſes about three thouſand five hundred and ſixty-ſeven feet above the level of the ſea; the Devil's Tower, about three thouſand three hundred and ſixty-eight; and the Lion's Head, two thouſand ſeven hundred and ſixty-four. In the neighbourhood of the latter lies Conſtantia, a diſtrict conſiſting of two farms, wherein the famous wines of that name are produced.

The above-deſcribed high lands form a kind of amphitheatre about the Table-valley, where the Cape Town ſtands. This is ſituated at the bottom of the middle height, or Table-mountain; and almoſt in the centre of the Table Bay, ſo called from that mountain.—This Bay, it is obſerved in Philip's Voyage, "cannot properly be called a port, being by no means a ſtation of ſecurity; it is expoſed to all the violence of the winds which ſet into it from the ſea; and is far from ſufficiently ſecured from thoſe which blow from the land. The guſts which deſcend from the ſummit of Table-mountain are ſufficient to force ſhips from their anchors, and even violently to annoy perſons on the ſhore, by deſtroying any tents or other temporary edifices which may be erected, and raiſing clouds of fine duſt, which produce very troubleſome effects. A gale of this kind, from the ſouth-eaſt, blew for three days ſucceſſively when Captain Cook lay here in his firſt voyage; at which time, he informs us, the Reſolution was the only ſhip in the harbour that had not dragged her anchors. The ſtorms from the ſea are ſtill more formidable; ſo much ſo, that ſhips have frequently been driven by them from their anchorage, and wrecked at the head of the Bay. But theſe accidents happen chiefly in the *quaade mouſſon*, or winter months, from May 14 to the ſame day of Auguſt; during which time few ſhips venture to anchor here. Our fleet, arriving later, lay perfectly unmoleſted as long as it was neceſſary for it to remain in this ſtation.—Falſe Bay, on the ſouth-eaſt ſide of the Cape, is more ſecure than Table Bay during the prevalence of the north-weſt winds, but ſtill leſs ſo in ſtrong gales from the ſouth-eaſt. It is, however, leſs frequented, being twenty-four miles of very heavy road diſtant from Cape Town, whence almoſt all neceſſaries muſt be procured. The moſt ſheltered part of Falſe Bay is a receſs on the ſide, called Simon's Bay."

The lateſt and moſt particular as well as apparently the moſt juſt account of the Cape Town, concerning which voyagers have differed very much from one another in their repreſentations, is that given by Mr. White in his Journal of a Voyage to New South Wales. From the ſhipping, he obſerves, the town appears pleaſantly ſituated, but at the ſame time ſmall; a deception that ariſes from its being built in a valley with ſuch ſtupendous mountains directly behind it. On landing, however, you are ſurpriſed, and agreeably diſappointed, to find it not only extenſive, but well built, and in a good ſtyle; the ſtreets ſpacious, and interſecting each other at right angles with great

great precision. This exactness in the formation of the streets, when viewed from the Table Land, is observed to be very great. The houses in general are built of stone, cemented together with a glutinous kind of earth which serves as mortar, and afterwards neatly plastered and whitewashed with lime. As to their height, they do not in common exceed two stories, on account of the violence of the wind, which at some seasons of the year blows with great strength and fury. For the same reason thatch has been usually preferred to tiles on shingles; but the bad effects that have proceeded from this mode, when fires happen, has induced the inhabitants in all their new buildings to give the preference to slates and tiles. The lower parts of the houses, according to the custom of the Dutch nation, are not only uncommonly neat and clean in appearance, but they are really so; and the furniture is rather rich than elegant. But this is by no means the case with the bed-rooms or upper apartments; which are very barely and ill furnished. The streets are rough, uneven, and unpaved. But many of the houses have a space flagged before the door; and others have trees planted before them, which form a pleasant shade, and give an agreeable air to the streets.

The only landing-place is at the east end of the town, where there is a wooden quay running some paces into the sea, with several cranes on it for the convenience of loading and unloading the scoots that come along-side. To this place excellent water is conveyed by pipes, which makes the watering of ships both easy and expeditious. Close to the quay, on the left hand, stands the castle and principal fortress; a strong extensive work, having excellent accommodations for the troops, and for many of the civil officers belonging to the company. Within the gates, the company have their principal stores; which are spacious as well as convenient. This fort covers and defends the east part of the town and harbour, as Amsterdam fort does the west part. The latter, which has been built since Commodore Johnston's expedition, and whereon both French and Dutch judgment have been united to render it effectual and strong, is admirably planned and calculated to annoy and harrass ships coming into the Bay. Some smaller detached fortifications extend along the coast, both to the east and west, and make landing, which was not the case before the late war, hazardous and difficult. In a word, Cape Town is at this time fortified with strength, regularity, and judgment.

The governor's house is delightfully situated, nearly in the centre of an extensive garden, the property of the Dutch East-India company, usefully planted, and at the same time elegantly laid out. The governor's family make what use they please of the produce of the garden, which is various and abundant; but the original intention of the company in appropriating so extensive a piece of ground to this purpose was, that their hospital, which is generally pretty full when their ships arrive after long voyages, may be well supplied with fruits and vegetables, and likewise that their ships may receive a similar supply. This garden is as public as St. James's Park; and for its handsome, pleasant, and well-shaded, walks, is much frequented by persons of every description, but particularly by the fashionable and gay. At the upper end of the principal walk is a small space walled in for the purpose of confining some large ostriches and

and a few deer; and a little to the right of this is a ſmall menagery, in which the company have half a dozen wild animals and about the ſame number of curious birds.

There are two churches in the town; one large, plain, and unadorned, for the Calviniſts, the prevailing ſect; and a ſmaller one for the Lutherans. The hoſpital, which is large and extenſive, is ſituated at the upper end of the town, cloſe to the company's garden; where the convaleſcents reap the benefit of a wholeſome pure air, perfumed with the exhalations of a great variety of rich fruit-trees, aromatic ſhrubs, and odorous plants and flowers; and likewiſe have the uſe of every production of it.

Beſides their hoſpital, the Dutch Eaſt-India company have ſeveral other public buildings, which tend to improve the appearance of the town. The two principal of theſe are, the ſtables and a houſe for their ſlaves. The former is a handſome range of buildings, capable of containing an incredible number of horſes: thoſe they have at the Cape are ſmall, ſpirited, and full of life. The latter is a building of conſiderable extent, where the ſlaves, both male and female, have ſeparate apartments, in a very comfortable ſtyle, to reſide in after the fatigues and toil of the day; and there are ſeveral officers placed over them, who have commodious apartments, and treat them humanely.

The inhabitants of the Cape, though in their perſons large, ſtout, and athletic, have not all that phlegm about them which is the characteriſtic of Dutchmen in general. The phyſical influence of climate may in ſome degree account for this; for it is well known that in all ſouthern latitudes the temper and diſpoſition of the people are more gay, and that they are more inclined to luxury and amuſements of every kind, than the inhabitants of the northern hemiſphere. The ladies are lively, good-natured, and familiar; and, from a peculiar gay turn, they admit of liberties that would be thought reprehenſible in England, though perhaps they as ſeldom overleap the bounds of virtue as the women of other countries.

The heavy draft-work about the Cape is moſtly performed by oxen; which are here brought to an uncommon degree of uſefulneſs and docility. It is not uncommon to ſee fourteen, ſixteen, and ſometimes eighteen, in one of their teams; when the roads are heavy, they ſometimes, though rarely, yoke twenty; all which the Hottentots, Malays, and Cape ſlaves, have in the moſt perfect ſubjection and obedience. One of theſe fellows places himſelf on the fore part of the waggon, or, when loaded, on the top of the load, and with a tremendous long whip, which from its ſize he is obliged to hold in both his hands, manages theſe creatures with inexpreſſible addreſs. When he finds expedition needful, he can make them keep whatever pace he chooſes, either trot or gallop (a gait performed or kept up with difficulty by European oxen), and that with as much eaſe as if he was driving horſes. They likewiſe manage horſes with the ſame dexterity; and to ſee one of them driving three, four, five, and ſometimes ſix, pair, in hand, with one of theſe long whips, would make the moſt complete maſter of the whip in England cut a deſpicable figure. Carriages are not very numerous at the Cape, as the inhabitants in general travel in covered waggons, which better ſuit the roughneſs of the country.

DESCRIPTION OF LE GLACIER DE BOIS, AND LE MONTANVERD, AMONG THE PENNINE ALPS.

[From Beaumont's Tour to the Pennine Alps.]

THOSE who are curious in observing the grand and more sublime phenomena of Nature, will doubtless pay a visit to the Valley of Ice at the foot of the Pennine Alps; to attain which, it is necessary to ascend the Montanverd, or Green Mountain, so called from its verdure. I shall not undertake to describe the beauty of that enormous glacier called Le Glacier de Bois, or the sensations I experienced at the sight of it. No better idea can be conveyed to the mind than by imagining a stormy sea suddenly surprized by a frost.

The mountains which surround the valley are, 1st, Mount Charmos on the right; 2d, Mount Mallet in the back ground; 3d, Periades; 4th, the Great Jorra, of an extraordinary height; 5th l'Aiguille du Moine; 6th, that of Dru, which is opposite to the little hermitage, where people commonly stop to dine on the provisions they carry with them. This mountain (Montanverd) is very curious, being half covered with ice and snow, and, in intermediate spaces, with excellent pastures, where cattle feed.

Although it be difficult to ascertain the length and breadth of the sea of ice, as objects appear nearer on high mountains than in valleys, where the air is more dense, yet it fairly might be conjectured to be three quarters of a league broad and five leagues long; that is to say, the space which the eye comprehends from Montanverd; for the sea of ice may extend about twelve leagues.

A more curious, and at the same time a more dreadful, scene than this cannot be conceived, at once presenting the image of the frozen sea and the verdure of the temperate zone. It is possible to descend from the Montanverd on the sea of ice, and even to cross it, but the dangers are many on account of the large crevices which it is necessary to step over, that are more than an hundred feet deep; however, I did it myself. It is matter of much surprise, on coming to this place, to find the waves, which at some distance appear inconsiderable, to be more than eighty or an hundred feet in height.

From Blair's Hospital there is a very steep and narrow path, through a forest of firs and larches, which takes about an hour to descend, in order to return to a place on a level with the Priory, where there is a little wooden bridge to cross over the Arveron; when another almost astonishing object presents itself, an entire mountain of ice, formed by the fall of the glacier, seen from the Montanverd, which descends into the valley. High mountains of granite surround these glaciers, and form, by their irregular strata, superb cascades, mixing their waters with the Arveron, which issues from a most beautiful grotto above an hundred feet high, composed entirely of ice. —The wonderful effects of masses of ice contrasted with the impending woods and rich pastures that crown this grand and uncommon scene, added to the frightful noise so frequently heard of enormous bodies of it breaking off from the mountain and dashing themselves to pieces in the Arveron, must create an admiration and surprise more readily felt than expressed, and highly deserving the attention of every traveller.

DESCRIP-

DESCRIPTION OF THE VOLCANO OF MORNEGAROU.

MORNEGAROU is a very remarkable volcanic mountain on the island of St. Vincent's in the West Indies. It was visited by Mr. James Anderson, surgeon, in the year 1784, who is the only person that ever ascended to the top of it, and from whose account, in the Philosophical Transactions, Vol. LXXV. the following is taken.

The mountain in question is situated on the north-west part of the island, and is the highest in it. It is constantly reported to have emitted volcanic eruptions; and the ravins at the bottom seem to corroborate the tradition of the inhabitants in this respect. The structure of it, when viewed at a distance, appears different from that of any other mountain in the island, or that Mr. Anderson had seen in the West Indies. He could perceive it divided into many different ridges, separated by deep chasms, and its summit appeared quite destitute of every vegetable production. Several ravins, that run from the bottom a great way up the mountain, were found quite destitute of water, and pieces of pumice-stone, charcoal, and several earths and minerals of a particular quality, found in them, plainly indicated some very great singularity in this mountain. Some very old men also informed our author, that they had heard it related by the captain of a ship, that between this island and St. Lucia he saw flames and smoke rising from the top of the mountain, and next morning his decks were covered with ashes and small stones.

Mr. Anderson's curiosity was so much excited by these circumstances, that he formed a resolution of going up to the top; but was informed that this was impossible, nor could he find either white man, Caribbee, or negro, who would undertake to shew him the way. Having observed the basis as well as he could, with a view to discover the most proper place for attempting an ascent, he found several dry ravins that seemingly ran a great way up, though he could not be certain that they were not intersected by rocks or precipices lying across. Having examined the mountain with a good glass, he thought he perceived two ridges by which there was a possibility of getting up; and, though they appeared to be covered for a great way with wood, he hoped by a little cutting to open a way through it.

On the 26th of February, 1784, our author began his journey, having been furnished by a Mr. Maloune, who lives within a mile of the foot of the mountain, with two stout negroes, and having another boy who waited on himself. They arrived at the bottom of the mountain a little before seven in the morning, having each a good cutlass to cut through the woods, or to defend themselves in case of an attack from the Caribbees or runaway negroes. Before they could get at either of the ridges, however, they had a rock to climb upwards of forty feet high. Having scrambled up this with great difficulty, they found themselves in the bottom of a deep and narrow ravin, which having ascended a little way, they arrived at the habitation of Mr. Gasco a Frenchman. Mr. Anderson expresses his surprise, that a young and healthy man, and a good mechanic, should sequestrate himself from the world among woods and precipices, where he was besides in continual danger of being swept

away with his whole habitation by the torrents occasioned by the rains. He found him, however, an intelligent man, and was hospitably entertained by him.

"The difficulty (says Mr. Anderson) in going through woods in the West Indies, where there are no roads or paths, is far beyond any thing an European can conceive. Besides tall trees and thick underwood, there are hundreds of different climbing plants twisted together like ropes, and running together in all directions to a great extent, and even to the tops of the highest trees. They cannot be broken by pushing on; and many of them are not to be cut without difficulty. Besides these, a species of grass, the *schœnus lithospermos*, with serrated leaves, cuts and tears the hands and face terribly."

By reason of these obstructions, it was upwards of two hours before they got upon the ridge; but here they found their passage more difficult than before. They were now surrounded by a thick forest, rendered more impracticable by the large piles of trees blown down by the hurricanes; which obliged them in many places to creep on their hands and feet to get below them, while in others it was necessary to climb to a considerable height to get over them; at the same time that, by the trunks being frequently rotten, they often tumbled headlong from a great height, and could not extricate themselves without great difficulty.

The fatigue of cutting their way through the woods soon became intolerable to the negroes; so that about four in the afternoon he could not prevail on them to go any farther. Mr. Anderson therefore perceiving it was impossible to get to the summit that night, and his water being totally expended, returned to Mr. Gasco's, where he spent the night, determining to try another route next morning. The hospitable Frenchman entertained him in the best manner he could; but though he parted with his own hammock to him, and slept on a board himself, Mr. Anderson found it impossible to shut his eyes the whole night by reason of the cold. "His hut (says he) was built of *roseaux* or large reeds, between each two of which a dog might creep through, and the top was covered with dry grass. It is situated in the bottom of a deep gully, where the sun does not shine till nine in the morning nor after four in the afternoon. It is surrounded by thick wood; and during the night the whole of the mountain is covered with thick clouds, from which it frequently rains, and which makes the night-air exceedingly cold."

Early next morning Mr. Anderson set out in company with the negro boy who continued very faithful to him during the whole of the journey. He now determined to take his course up the ravin, and proceeded for about a mile and an half without any considerable obstruction. It now, however, began to narrow fast; there were numbers of rocks and precipices to climb over, with many bushes and vines which could scarcely be got through. At last the ravin terminated at the bottom of a very high precipice. It was impossible to know the extent of this, as the top was covered with thick wood; but from the bottom upward, as far as he could see, was loose sand with ferns and tufts of grass, which as soon as he took hold of them came up by the roots. Though the ascent was plainly at the risk of his life, Mr. Anderson resolved to attempt it; and therefore telling the boy to keep at some distance behind, lest he should tumble and drive him down, he began to ascend, digging holes with his

cutlass

cutlass to put his feet in, and taking hold of the tufts of grass as lightly as possible. Notwithstanding all his care, however, he frequently slipped down a considerable way; but, as it was only loose sand, he could easily push his cutlass into it up to the handle, and thus by taking hold of it recover himself again. At last he got up to some wild plantains, which continued all the way to the place where the trees began to grow. Here he rested for some time, waiting for the boy, who got up with much less difficulty than he had done. On getting up to the top of the precipice, he found himself on a very narrow ridge, covered with wood, and bounded by two ravins, the bottoms of which he could not see, the descent to them appearing nearly perpendicular, though all the way covered with thick wood. Proceeding onwards, they found the ridge exceedingly narrow, in many places not six feet broad; with a tremendous gulf on each side, into which they were every moment in danger of falling; so that Mr. Anderson was obliged to lie down on his belly with great caution, in order to see through the bushes how the ridge tended.

Here a sulphureous smell, or rather one like gun-powder, began to be perceived; which, Mr. Anderson knew, must proceed from the top of the mountain, as the wind then blew that way; and as it plainly grew stronger as he advanced, he was in hopes that the top could not be very far distant. Perceiving a rising before him, he imagined, that, by getting upon it, he might have a view of the top of the mountain; but when this was done, he could only see a peak on the north-west side of the mountain, to which, by appearance, he judged himself very little nearer than when at the bottom.

The woods now became very difficult, great quantities of fallen trees lying buried among the grass; and, being rotten, he was frequently buried very deep among them when he thought himself walking upon firm ground. About noon he was alarmed with a rustling among the bushes, and something like a human voice behind him; but as he was preparing to defend himself against Caribbees or runaway negroes, he was agreeably surprised with the sight of those who had formerly left him, with three others, sent by Mr. Maloune with plenty of provisions. Encouraged by this assistance, after refreshing themselves, they renewed their labours with fresh vigour, and Mr. Anderson thought himself sure of reaching the top before night. In a little time he had a fair view of the ravin on the left, which was of prodigious depth, and ran from near the top of the mountain to the sea. Its bottom seemed to be a rock nearly resembling lava in colour, and it seemed as if there had been vast torrents of sulphureous matter running upon it for some time.—He now regretted much that he knew not of this ravin before he commenced his excursion, as, by passing a headland in a canoe, and getting into it, he might have gained the summit without all those delays and difficulties he had encountered.

About four in the afternoon he had no prospect of the top mountain, but imagined that, if he could get into the ravine before night, he might easily reach it next morning. After cutting through wild plantains for a great way, however, he found himself at sunset on the brink of a precipice, over which he prevented himself from falling by catching hold of some shrubs. They were now about half way down, but all the rest of the way seemed a perpendicular preci-

pice, which it was impossible to pass; the top of the mountain was yet a great way off, and there was no other resource than to attempt the ridge they had left. The evening was now so far advanced, that they were obliged to take up their residence where they were; and there was only time to place two or three sticks against the stump of a tree, and slightly to cover them with plantain leaves for a night's habitation.—Their situation, however, was extremely uncomfortable: it began to rain and blow violently, which prevented them from getting a fire made, so that they were almost chilled with cold. As soon as they could see, they renewed their work with great alacrity, and in a short time had the satisfaction to perceive that the woods became thin. About eleven o'clock they obtained a full view of the top, about a mile distant. It seemed to be composed of six or seven ridges, very much broken in the sides, as if they had suffered great convulsions; and they were divided by excessively deep ravins without any water in them. Mr. Anderson directed his course towards a high peak that overlooked a large excavation where the ridges met, and which he supposed to be the crater of the volcano. In his way, he found the last wood composed of a most beautiful species of trees. After that, he entered into a thick long grass intermixed with fern, which branched and ran in every direction. Through this they were obliged to cut their way with almost as much difficulty as they had done through the woods, and it seemed to continue very near to the top of the mountain. The fatigue of this work soon reduced them to such a situation, that they were scarcely able to stand; and they were obliged to quench their thirst, which was excessive, by chewing the leaves of the begonia obliqua, there being no water to be had in the place. Two of the negroes returned, and the rest refused to proceed any farther; so that Mr. Anderson himself was obliged to abandon the enterprise, and they all began to descend about half an hour after twelve; and, as there was now a clear path all the way down, they arrived at Mr. Gasco's by sunset; and, notwithstanding his extreme weariness, Mr. Anderson continued his journey to Mr. Maloune's, where he arrived between six and seven at night.

Our traveller having rested himself until the 4th of March, in order to sustain the fatigues of his journey the better, set out about four that morning in company with a Mr. Frazier, who had resolved to accompany him. They met with little difficulty till they came to the place whence they had formerly returned. Here, however, they were obliged for a quarter of a mile to cut their way through the grass and ferns already mentioned; which being done, they met with no further obstruction. When they came within a quarter of a mile of the top, they found the climate suddenly altered, the air very cold, and the vegetable productions changed, the whole summit of the mountain being barren. On the confines of the grassy and barren regions, however, he found some beautiful plants; and he observes, that this is the only place in the West Indies where he ever found moss: but here it grows in such plenty, that he frequently sunk in it up to the knees. About noon they reached the summit, and were instantly surprised with the sight of a most extraordinary cavity. It is situated in the very centre of the mountain, at the place where all the ridges meet. Its diameter is something more than a mile, and its circumference to appearance a perfect circle. Its depth from the surrounding margin is above a quarter of a mile, and it

it narrows a little, but very regularly, to the bottom. Its sides are very smooth, and for the most part covered with short moss, except towards the south, where there are a number of small holes and rents. This is the only place where it is possible to go down to the bottom; and the descent is very dangerous on account of the numberless small chasms. On the west side is a section of a red rock, like granite, cut very smooth, and having the same declivity with the other parts. All the rest of the surrounding sides seem to be composed of sand, which has undergone the action of an intense fire. It has a crust quite smooth, and about an inch thick, almost as hard as rock; on breaking through which we meet with nothing but loose sand. In the center stands a burning mountain about a mile in circumference, of a conic form, "but quite level." Out of the middle of the summit rises a small eminence eight or ten feet high, and perfectly conical; from the apex of which a column of smoke constantly issues. It is composed of large masses of red granite-like rock, of various shapes and sizes, which appear to have been split into their present form by some terrible convulsion of nature; and are piled up very regular. Great quantities of smoke issue from most parts of the mountain, especially on the north side, which appears to be burning from top to bottom; and the heat is so intense, that it is impossible to ascend it. It is even very dangerous to go round the base, as large masses of rock are constantly splitting with the heat and tumbling down. At the bottom, on the north side, is a very large rock split in two. Each of these halves, which are rent in all directions, are separated to a considerable distance from each other, and the crevices have glossy efflorescences tasting like vitriol. There are also beautiful crystallizations of sulphur; and on all parts of the mountain are great quantities of sulphur, also allum, vitriol, &c.

From the external appearance of this mountain, Mr. Anderson conjectures that it had but lately begun to burn; as on several parts of it he saw several small shrubs and grass, which looked as if they had been but lately scorched and burnt. There were also several holes on the south from which the smoke issued, that appeared to have broken out but lately, the adjacent bushes being but lately burnt. On two opposite sides, the east and west, of the burning mountain, are two lakes of water, about a stone's throw in breadth. They appear to be deep in the middle, and have a bottom of a kind of clay. The water is a chalybeate, and has a pleasant taste. These lakes probably derive their existence in a great measure if not totally from the rain-water running down the sides of the crater. On the north side Mr. Anderson observed the traces of great torrents, that to appearance had conveyed vast quantities of water to these lakes; and by the stones at the bottom he could perceive that absorption or evaporation, or both, went on very fast. The greater part of the bottom of the crater is very level; and on the south side are some shrubs and small trees. Some pieces of pumice-stone were met with, and many stones about the size of a man's fist, rough, and blue upon one side, are scattered all over the mountain.

The motion of the clouds on the top of this mountain was very singular. Though there were several parts higher than the crater, yet the clouds seemed always to be attracted by the latter. After entering on its east or windward side, they sunk a considerable way

into

into it; then mounting the opposite side, and whirling round the north-west side, they ran along a ridge which tended nearly north-east, and afterwards sunk into a deep ravin dividing this ridge from another on the north-west corner of the mountain, and the highest on it, lying in a direction nearly north and south. They keep in this ridge to the south end, and then whirl off in their natural direction.

From the situation of these islands to one another, and to the continent of South America, Mr. Anderson conjectures, that there are submarine communications between the volcanoes in each of them, and from them to those in the high mountains of South America. He observes, that the crater in this island lies nearly in a line with Souffriere in St. Lucia and Morne Pelée in Martinico; and probably from thence to a place of the same kind in Dominique, and from thence to the other islands; there being something of the kind in each, Barbadoes and Tobago excepted.

ACCOUNT OF THE DÆMONIACS, OR SPIRITS ENTERING THE HUMAN BODY.

THE Greeks and Romans imagined, that their deities, to reveal future events, frequently entered into the prophet or prophetess who was consulted, overpowered their faculties, and uttered responses with their organs of speech. Apollo was believed to enter into the Pythoness, and to dictate the prophetic answers received by those who consulted her. Other oracles besides that of Delphi were supposed to unfold futurity by the same machinery. And in various other cases, either malignant dæmons or benevolent deities were thought to enter into and to actuate human beings. The *Lymphatici*, the *Cerriti*, the *Larvati*, of the Romans, were all of this description; and the Greeks, by the use of the word δαιμονιζομενοι, shew that they referred to this cause the origin of madness. Among the ancient heathens, therefore, it appears to have been a generally-received opinion, that superior beings entered occasionally into men, overpowered the faculties of their minds, and actuated their bodily organs. They might imagine that this happened in instances in which the effects were owing to the operation of different causes; but an opinion so generally prevalent had surely some plausible foundation.

The Jews too, if we may trust the sacred writings of Josephus, appear to have believed in dæmoniacal possession. The case of Saul may be recollected as one among many in which superior created beings were believed by the Jews to exert in this manner their influence over human life. The general tenor of their history and language, and their doctrines concerning good and evil spirits, prove the opinion of dæmoniacal possession to have been well known and generally received among them.

In the days of our Saviour, it would appear that dæmoniacal possession was very frequent among the Jews and the neighbouring nations. Many were the evil spirits whom Jesus is related in the gospels to have ejected from patients that were brought unto him as possessed and tormented by those malevolent dæmons. His apostles too, and the first Christians, who were most active and successful in the propagation of Christianity, appear to have often exerted the miraculous

miraculous powers with which they were endowed on similar occasions. The dæmons displayed a degree of knowledge and malevolence which sufficiently distinguished them from human beings: and the language in which the dæmoniacs are mentioned, and the actions and sentiments ascribed to them in the New Testament, shew that our Saviour and his apostles did not consider the idea of dæmoniacal possession as being merely a vulgar error concerning the origin of a disease or diseases produced by natural causes.

The more enlightened cannot always avoid the use of metaphorical modes of expression; which, though founded upon error, have yet been so established in language, by the influence of custom, that they cannot be suddenly dismissed. When we read in the book of Joshua, that the sun on a certain occasion stood still, to allow that hero time to complete a victory, we easily find an excuse for the conduct of the sacred historian, in accommodating his narrative to the popular ideas of the Jews concerning the relative motions of the heavenly bodies. In all similar instances, we do not complain much of the use of a single phrase, originally introduced by the prevalence of some groundless opinion, the falsity of which is well known to the writer.

But in descriptions of characters, in the narration of facts, and in the laying down of systems of doctrine, we require different rules to be observed. Should any person, in compliance with popular opinions, talk in serious language of the existence, dispositions, declarations, and actions, of a race of beings whom he knew to be absolutely fabulous, we surely could not praise him for candid integrity; we must suppose him to be either exulting in irony over the weak credulity of those around him, or taking advantage of their weakness, with the dishonesty and the selfish views of an impostor. And if he himself should pretend to any connection with this imaginary system of beings, and should claim, in consequence of his connection with them, particular honours from his contemporaries; whatever might be the dignity of his character in all other respects, nobody could hesitate even for a moment to brand him as an impostor of the basest character.

Precisely in this light must we regard the conduct of our Saviour and his apostles, if the idea of dæmoniacal possession were to be considered merely as a vulgar error. They talked and acted as if they believed that evil spirits had actually entered into those who were brought to them as possessed with devils, and as if those spirits were actually expelled by their authority out of the unhappy persons whom they had possessed. They expected, they demanded too, to have their professions and declarations believed, in consequence of their performing such mighty works, and to be honoured as having thus triumphed over the powers of hell. The reality of dæmoniacal possession stands upon the same evidence with the gospel system in general.

Neither is there any thing absurd or unreasonable in this doctrine. It does not appear to contradict those ideas which the general appearance of nature and the series of events suggest concerning the benevolence and wisdom of the Deity, and the counsels by which he regulates the affairs of the universe. We often fancy ourselves able to comprehend things to which our understanding is wholly inadequate: we persuade ourselves, at times, that the whole extent

of the works of the Deity must be well known to us, and that his designs must always be such as we can fathom. We are then ready, whenever any difficulty arises to us, in considering the conduct of Providence, to model things according to our own ideas; to deny that the Deity can possibly be the author of things which we cannot reconcile; and to assert, that he must act on every occasion in a manner consistent with our narrow views. This is the pride of reason; and it seems to have suggested the strongest objections that have been at any time urged against the reality of dæmoniacal possession. But the Deity may surely connect one order of his creatures with another. We perceive mutual relations and a beautiful connection to prevail through all that part of nature which falls within the sphere of our observation. The inferior animals are connected with mankind, and subjected to their authority, not only in instances in which it is exerted for their advantage, but even where it is tyrannically abused to their destruction. Among the evils to which mankind have been subjected, why might not their being liable to dæmoniacal possession be one? While the Supreme Being retains the sovereignty of the universe, he may employ whatever agents he thinks proper in the execution of his purposes: he may either commission an angel or let loose a devil; as well as bend the human will, or communicate any particular impulse to matter.

All that revelation makes known, all that human reason can conjecture, concerning the existence of various orders of spiritual beings, good and bad, is perfectly consistent with, and even favourable to, the doctrine of dæmoniacal possession. It was generally believed through the ancient heathen world; it was equally well known to the Jews, and equally respected by them; it is mentioned in the New Testament in such language, and such narratives are related concerning it, that the gospels cannot well be regarded in any other light than as pieces of imposture, and Jesus Christ must be considered as a man who dishonestly took advantage of the weakness and ignorance of his contemporaries, if this doctrine be nothing but a vulgar error: it teaches nothing inconsistent with the general conduct of Providence; it is not the caution of philosophy, but the pride of reason, that suggests objections against this doctrine.

Those, again, who are unwilling to allow that angels or devils have ever intermeddled so much with the concerns of human life, urge a number of specious arguments in opposition to these.

The Greeks and Romans of old, say they, did believe in the reality of dæmoniacal possession. They supposed that spiritual beings did at times enter into the sons or daughters of men, and distinguish themselves in that situation by capricious freaks, deeds of wanton mischief, or prophetic enunciations. But in the instances in which they supposed this to happen, it is evident that no such thing took place. Their accounts of the state and conduct of those persons whom they believed to be possessed in this supernatural manner, shew plainly that what they ascribed to the influence of dæmons were merely the effects of natural diseases. Whatever they relate concerning the *larvati*, the *cerriti*, and the *lymphatici*, shews that these were merely people disordered in mind, in the same unfortunate situation with those madmen and idiots and melancholy persons whom we have among ourselves. Festus describes the *larvati* as being *furiosi et mente moti*. Horace says,

Hellade

Hellade percussâ, Marius cum præcipitat se,
Cerritus fuit?

Plato, in his *Simæus*, says, οὐδὲις γὰρ ἐνους ἐφαπτεται μανικης ἐνθουσ αληθους. Lucian describes dæmoniacs as lunatic, and as staring with their eyes, foaming at the mouth, and being speechless.

It appears still more evidently, that all the persons spoken of as possessed with devils in the New Testament, were either mad or epileptic, and precisely in the same condition with the madmen and epileptics of modern times. The Jews, among other reproaches which they threw out against our Saviour, said, *He hath a devil, and is mad; why hear ye him?* The expressions *he hath a devil*, and *is mad*, were certainly used on this occasion as synonymous. With all their virulence, they would not surely ascribe to him at once two things that were inconsistent and contradictory. Those who thought more favourably of the character of Jesus, asserted concerning his discourses, in reply to his adversaries, *These are not the words of him that hath a dæmon*; meaning, no doubt, that he spoke in a more rational manner than a madman could be expected to speak. The Jews appear to have ascribed to the influence of dæmons, not only that species of madness in which the patient is *raving and furious*, but also *melancholy* madness. Of John, who secluded himself from intercourse with the world, and was distinguished for abstinence and acts of mortification, they said, *He hath a dæmon*. The youth, whose father applied to Jesus to free him from an evil spirit, describing his unhappy condition in these words, *Have mercy on my son, for he is lunatic and sore vexed with a dæmon; for oft times he falleth into the fire, and oft into the water*, was plainly epileptic. Every thing indeed that is related in the New Testament concerning dæmoniacs, proves that they were people affected with such natural diseases as are far from being uncommon among mankind in the present age. When the symptoms of the disorders cured by our Saviour and his apostles as cases of dæmoniacal possession, correspond so exactly with those of diseases well known as natural in the present age, it would be absurd to impute them to a supernatural cause. It is much more consistent with common sense and sound philosophy to suppose, that our Saviour and his apostles wisely, and with that condescension to the weakness and prejudices of those with whom they conversed, which so eminently distinguished the character of the Author of our holy religion, and must always be a prominent feature in the character of the true Christian, adopted the vulgar language in speaking of those unfortunate persons who were groundlessly imagined to be possessed with dæmons, though they well knew the notions which had given rise to such modes of expression to be ill-founded, and to imagine that diseases, which arise at present from natural causes, were produced in days of old by the intervention of dæmons, or that evil spirits still continue to enter into mankind in all cases of madness, melancholy, or epilepsy.

Besides, it is by no means a sufficient reason for receiving any doctrine as true, that it has been generally received through the world. Error, like an epidemical disease, is communicated from one to another. In certain circumstances, too, the influence of imagination predominates, and restrains the exertions of reason. Many false opinions have extended their influence through a very

wide circle, and maintained it long. On every ſuch occaſion as the preſent, therefore, it becomes us to inquire, not ſo much how generally any opinion has been received, or how long it has prevailed, as from what cauſes it has originated, and on what evidence it reſts.

When we contemplate the frame of nature, we behold a grand and beautiful ſimplicity prevailing through the whole: notwithſtanding its immenſe extent, and though it contains ſuch numberleſs diverſities of being; yet the ſimpleſt machine conſtructed by human art does not diſplay eaſier ſimplicity, or an happier connection of parts. We may therefore venture to draw an inference, by analogy, from what is obſervable of the order of nature in general to the preſent caſe. To permit evil ſpirits to intermeddle with the concerns of human life, would be to break through that order which the Deity appears to have eſtabliſhed through his works; it would be to introduce a degree of confuſion unworthy of the wiſdom of Divine Providence.

Such are the moſt rational arguments that have been urged on both ſides in this controverſy. Perhaps the dæmonianiſts have the ſtronger probabilities on their ſide; but we will not preſume to take upon ourſelves the office of arbitrators in the diſpute.

On the FORCE of IMAGINATION and ANTIPATHY.

THESE uncommon inſtances of the force of the imagination, are taken from good authorities; and ſomething like them may poſſibly reach the obſervation or experience of every reader.

Louis Vives tells us of a perſon who paſſed ſafely over a plank that lay acroſs a great flood of water in the dark; the next day, when he perceived the danger in which he had been, he fell down dead at the ſight of the peril he had eſcaped.

Fuller mentions, that ſeveral children, loſt in a foreſt, being fatigued with wandering, the perſon with them cut pieces of wood, which he called *horſes*, to ride home; the ſucceſs anſwered the deſign, for, being mounted on theſe wooden ſteeds (ſays our author), the ſtrength of fancy added new mettle to their legs, and they trudged with great ſpirit home.

A Portugueſe, overwhelmed with the melancholy imagination that God would not forgive him his ſins, lived in the moſt diſmal deſpair; at length he was cured of his religious malady by the contrivance of his friends. One who perſonified an angel was admitted through the roof into his chamber; this angelic being having perſuaded him that all his ſins were pardoned, the unhappy religioniſt quickly recovered.

An old writer has given a curious ſtory relative to the force of imagination. A man in a burning fever, leaning over his bed ſide, pointed with his finger to the chamber floor, deſiring thoſe who were preſent to let him ſwim in that lake, and that he then ſhould be cool. His phyſician humoured the conceit; the patient walked carefully about the room, ſeemed to feel the water gradually aſcending to his neck, and at length having ſaid he felt himſelf cool and well, was found in reality to be ſo.

The following inſtances of the effects of the imagination on births merit attention; from their power on the imagination of their ſpectators.

Mallebranche,

Mallebranche, in his *Recherche de la Verité*, liv. II. c. 7. relates a curious instance of the force of the imagination. 'About seven years since (he says), in the hospital for incurables, there was a young man born an idiot, whose body was dislocated in the same places in which those of criminals are broken. He lived twenty years in this condition. The cause of this melancholy accident was a desire his mother indulged of seeing a criminal broken on the wheel.' I give the fact without the visionary principles which the ingenious father has deduced from it. This subject is examined with acute observation in a treatise, entitled, 'A Physical Dissertation concerning the Strength of the Imagination in Women with Child upon the Fœtus, by James Blundel, M. D.'

What follows is a counterpart. The case is given by Bourdelot, who himself examined the little curious monster.

A woman, four months gone with child, would see, in spite of her husband's remonstrances, an ape dressed like a merry andrew. The ape, thus dressed, so forcibly impressed her mind, that she attempted in vain to banish it from her thoughts. At the usual time she laid in of a perfect ape, with the cap and waistcoat of a merry andrew marked on the skin. They were very distinctly defined; the waistcoat was *red*, and went over the arms. It had the folds and the figure of a short coat without skirts; it covered the flesh, and clung to it. The face of the child resembled perfectly that of an ape; his arms, legs, and body, were also like those of this animal. In a word, he looked exactly like the ape dressed in the habit of a merry andrew, except that he had no hair. All these resemblances (observes a friend) are like the Orchis and Mandrake, always assisted by the imagination. And it may be added, that they generally arose from the casual coincidence they bore with some particular occasion. Had they appeared at another time, they would have been described as *lusus naturæ*, which could not be resembled to any thing.

If we were to bewilder ourselves among old writers, there would be no end of collecting similar instances. With these every thing was the effect of the imagination on the fœtus; and Burton, touching on this subject in his 'Anatomy of Melancholy,' says, quoting his authorities, 'If a great-bellied woman see a hare, her child will often have a hare-lip.'—And he tells us that 'Thomas Nickol went reeling and staggering all the days of his life, as if he would fall to the ground, because his mother, being great with child, saw a drunken man reeling in the street!'—I am afraid that Master Nickol was the calumniator of his mother, and that his 'reeling and staggering' was the effect of no other man's drunkenness than his own. Such however once were the facts of which systems of philosophy were composed!

Many have imagined their limbs to be made of glass, of wax, &c. of enormous sizes, and of fantastical shapes; and others have even fancied themselves dead.

In the Memoirs of Count de Maurepas, published last year, we find an account of a most singular hypochondriac in the person of the Prince of Bourbon; he once imagined himself to be a *hare*, and would suffer no bell to be rung in his palace, lest the noise should drive him to the woods; at another time he fancied himself to be a *plant*, and as he stood in the garden insisted on being watered. He sometime afterwards thought he was *dead*, and refused nourishment,

for

for which he ſaid he had no further occaſion. This whim would have proved fatal, if his friends had not contrived to diſguiſe two perſons, who were introduced to him as his grandfather and Marſhal Luxembourg; and who, after ſome converſation concerning the ſhades, invited him to dine with Marſhal Turenne. Our hypochondriac followed them into a cellar prepared for the purpoſe, where he made a hearty meal. While this turn of his diſorder prevailed, he always dined in the cellar with ſome noble ghoſt. We are alſo informed, that this ſtrange malady did not incapacitate him for buſineſs, eſpecially when his intereſt was concerned.

Montaigne has a copious eſſay on 'The Force of Imagination.' He adduces a variety of ſingular inſtances; but it will not be deemed commendable to detail them here; for moſt of them are of a nature which are beſt recommended by his own agreeable and free manner.

Perhaps Cervantes intended to ridicule ſuch almoſt incredible propenſities of this faculty, when he repreſents Don Quixote after his rueful encounter with the Yanguesian carriers, in which his 'ſquire, himſelf, and Roſinante, were all moſt unmercifully beaten, repoſing on an uneaſy pallet in a miſerable inn. While the hoſteſs is plaiſtering him over, ſhe obſerves, that 'the bumps look more like a dry beating than a fall.' Sancho, jealous of his maſter's honour, aſſures her of the contrary; and tells her, that the rock on which he fell had many cragged ends and knobs, every one of which gave his maſter a token of its kindneſs; and by the bye (continues our 'ſquire) I beſeech you to ſave a little of that ſame tow and ointment for me, for I do not know what is the matter with my back, but I fancy I ſtand greatly in want of a little greaſing too.'—'What, I ſuppoſe you fell too' (ſaid the landlady); 'not I', replied Sancho; 'but the very fright that I took to ſee my maſter tumble down the rock, has ſo wrought upon my body, that I am as ſore as if I had been ſadly mauled.'

Perhaps antipathies may not unaptly be placed amongſt the effects of the imagination. Chevreau obſerves, there are certain natural antipathies which appear very extraordinary, of which he gives ſeveral inſtances. There have been perſons who have fainted at the odour of roſes; others, with greater reaſon, quit the table at the ſmell of cheeſe; and I have ſeen more than one perſon tremble before a lap-dog. A man was ſo frightened at the ſight of a hedgehog, that he thought, for more than two years afterwards, that his bowels were gnawed by this animal. The great Eraſmus had ſuch an averſion to fiſh that he could not ſuffer the ſmell without growing feveriſh. If apples were offered to Ducheſne, ſecretary of Francis the Firſt, blood guſhed from his noſe; and a gentleman belonging to the Emperor Ferdinand was convulſed whenever he heard the mewing of a cat. Henry III. of France could not ſit in a room where a cat was. The Duke of Schomberg had the ſame averſion. Vanghneim, the elector's huntſman at Hanover, fainted or run away at the ſight of a roaſted pig. The philoſophical Boyle could not conquer a ſtrong averſion to the ſound of water running through a pipe! La Mothe le Vayer could not ſuffer the ſound of muſical inſtruments, though he experienced a lively pleaſure whenever it thundered. The Turkiſh Spy, who tells us that he would rather encounter a lion in the deſerts of Arabia, provided he had but a ſword in his hand, than feel a ſpider crawling on him in the dark, judiciouſly obſerves, that