

As a final result the pendulum observations clearly show the tide-producing influence of the sun and moon upon the solid earth.

If we now compare the observed deflections with the values computed for an absolutely rigid earth, it is seen that the observed deflection due to the moon is about two-thirds of the amount for the rigid earth. If the earth were an absolutely nonrigid, homogeneous body, a change in the equipotential surface would result from the deformation of the surface shell produced by the sun's and moon's attraction, and consequently no movement of the pendulum would thereby be produced.

The effect upon the pendulum of the tides in the North Sea, the nearest body of water to Potsdam having appreciable tides, is computed to be 0.0006" for a range of 1 meter in the sea level. As far as known, the nature of the North Sea tides is such as to decrease the above figure; their effect upon the pendulum may therefore be considered negligible. From all that is now known of the Atlantic Ocean tides, their effect upon the pendulum, as the author states, must be very small. The observations clearly yield evidence that, as the author states, "the solid earth does yield somewhat under the influence of the sun's and moon's attraction, yet offers great resistance to deformation."

The observations were analyzed with reference to the existence of a movement of the pendulum corresponding to the sidereal day; but no definite result was reached, except that, if such an effect exists, it must be very small, or, in other words, not measurable.

This series of observations has yielded evidence in good accord with that indicated from other directions, and when we consider the small magnitude of the measured quantities there is sufficient proof of the thoroughness with which the observational work has been executed.

While it is not claimed that the results derived from this series of observations give an exact measure of the earth's actual rigidity, yet they do yield values based upon a direct measurement that must be considered a splendid approximation of the truth, and we are justified in believing that a great step forward has been made in thus definitely adding to our knowledge of an important physical fact.

#### SOME CLIMATIC INFLUENCES IN AMERICAN HISTORY.<sup>1</sup>

By WALTER N. LACY. Dated Cambridge, Mass., June 26, 1908.

"Of all natural forces influencing the life of a nation," says Prof. Edward Channing (2, p. 2), "the climate and rainfall are the most important, because an excess of cold or an absence of rain forbids the development of human activity." In connection with recent studies, the writer has had occasion to note some of these climatic influences in the history of the United States and this paper is an attempt to present some of these influences without chronologically considering the possible climatic controls in every chapter of American history.

Climate is complex and controlled by many factors. Hence, the fact must be borne in mind that whatever influence it has had upon the life of a people, it has not acted independently. Geographic and other factors enter into the controls of history to such an extent that even where any one of them has had an important influence, to it can rarely be attributed the whole cause of the events which have been so vitally affected thereby. The influence of those climatic controls on the history of a nation is, perhaps, too seldom considered, important tho these controls are. It is, therefore, the hope of the writer that this paper may lead to a wider appreciation of climatic influence on history.

<sup>1</sup>A thesis prepared in 1908, under direction of Prof. R. De C. Ward, for an advanced course in climatology at Harvard University.

References to the numbered bibliography are given in the parentheses by heavy-faced numbers.

#### DISCOVERY.

*Why not earlier.*—Whether the American Indian came originally from China or Japan is a question which the historian still leaves to the archeologist. It seems certain, however, that if he did come from Asia, all communication between the American and his Asiatic brother was subsequently terminated. When Columbus first saw the New World in 1492, it was an unknown world—neither Europeans nor Asiatics knew of its existence. Why, it is then natural to ask, had the American Continent not been discovered and made known before? This question seems especially pertinent in view of the close mutual approach of these continental masses at the north. The answer lies, doubtless, in the fact that this proximity was found only at these high latitudes. Had it not been for the rigorous climate which exists along the northeastern coasts of Asia and North America, it seems probable, if not certain, that America would have been known to the rest of the world some centuries prior to the fifteenth. Those were the days when ignorance and superstition, coupled with unseaworthy ships, prevented the mariner from venturing far from the shore; hence, to discover America from either Europe or Asia was possible only by cruising along the coasts, and crossing from one continent to the other where the two most closely approach each other. This was prevented by the hostile climate which had to be encountered, for food supplies could not be secured on these inhospitable coasts. As Professor Shaler has pointed out (13, p. 6), "the scanty food-carrying power of the ancient ships, whether of Europe or Asia, made it almost impossible for an expedition to pass from the Old World to the New World by coasting along the arctic shores, and thus to attain the fertile lands of America in a condition to meet the dangers which newcomers have to face in an unknown land." Under these conditions, had the continent been discovered by Europeans or Asiatics, the discovery could not have been followed by settlement, and the fact of the discovery would probably have been forgotten.

*The Northmen.*—While it is doubtless true that America was an unknown continent in the fifteenth century, nevertheless, Columbus can not lay claim to the honor of being the first white man to see its shores. Here, again, climatic influences have played an important part. Climatic and other geographic conditions had made the people of Scandinavia a sea-faring people. A thousand years ago Iceland was a European colony, and a settlement had been planted near the southern end of Greenland. Ivar Bardsen, steward of the Garder Bishopric in the latter half of the fourteenth century, recorded that there had been a gradual southward extension of drifting ice and of the Greenland ice-cap, and the fact that "herds of cattle were kept which even yielded produce for exportation to Europe," (quoted in 6), has further led to the conclusion that Cape Farewell had a slightly milder climate a thousand years ago than it has to-day. But whether or not this was the case, it seems certain that a colony of Northmen flourished for a time near this place.

"With the Northmen once in Greenland, the discovery of the American Continent was almost inevitable" (6, p. 178). However mild the climate of Greenland may have been, the land does not seem to have been well-wooded, and Laing has pointed out how natural it was that the colonists there should seek the abundant and cheap fuel supply which the driftwood, floating from the southwest, indicated was to be found in that direction. With the prevailing westerly winds and the Gulf Stream, it is highly probable that driftwood from the American forests was floated across the sailing route between Greenland, Iceland, and Scandinavia, and in quest of this lumber the Northmen may have ventured. Or a storm, setting in fiercely from the northeast, would easily have driven these bold sailors from their courses, and landed them on the western coast of the Atlantic.

But whatever the cause, weather influences were important, and it seems reasonably certain that this continent was visited by the Northmen as early as the year 1000. Ridpath (9, p. 51), tells us that the continent was first seen by whites in the year 986, when "Herjulfson, sailing from Iceland to Greenland, was caught in a storm and driven westward to Newfoundland or Labrador;" but he adds that "no landing was made or attempted." Channing believes that there is "little doubt that Lief Ericson was the first Northman to see Vinland, and that he made his voyage in the year 1000, or just before." (2, p. 20). Precisely who did make the first discovery, and when it was made, are not matters of great importance in the question under consideration; the importance of the matter for us lies in the fact that the discovery was not followed up by settlements, and the continent proper was not made known to the Old World. The location of Vinland is still an unsolved problem, but these Northmen seem to have found a land where the climate was unpleasant and even, doubtless, harsh, and hence any attempts at colonization, if made, were early abandoned.

*Why discovered.*—Why the New World was discovered at the time and in the manner in which it was, is a problem as interesting as, and perhaps more important than the one just considered. Europe had long carried on an extensive trade with eastern Asia, and any interruption to that trade would necessarily be an important factor in European life. This trade was carried on by boat and caravan across Egypt, or thru western and central Asia, to the rich markets of India, China, and the East Indies. The rise of the Saracen power in the seventh and eighth centuries, the later invasion of the Seljukian Turks, and the capture of Constantinople in 1453, closed the three trade routes from Europe, and necessitated the establishment of a new route to the East. Hence, there appeared in southern Europe in the late fifteenth century a few men who believed that a sea route to the eastern markets was possible, either westward, circumnavigating the earth, which some now believed to be a sphere, or southward around the unknown extension of the African Continent.

*The conception of climatic zones.*—Few minds were willing to forsake the old idea that the earth is a plane, and hence the route around Africa seemed perhaps the more logical, altho even to this insuperable difficulties seemed to present themselves. The Mediterranean was the center of human activity and intellectual advance. The people living in this basin were accustomed to the cold northerly breezes and knew by report something of the frigid conditions in the far north, while on the other hand they had perhaps too often experienced the hot blasts which swept north from the Sahara Desert.

Hence, they naturally conceived the idea that "in the extreme north the country must be frozen and the country uninhabitable by reason of the cold; contrariwise, in the far south the ocean must be boiling hot and the country inhabitable only by gnomes and salamanders." (6, p. 306.) To circumnavigate Africa would necessitate a voyage thru these boiling seas, and so men turned their attention to the possibilities of the westward route.

Christopher Columbus had spent some time during the years 1474-1480 in writing a treatise on "the five habitable zones," with the purpose of refuting the conceptions of uninhabitable climatic belts. It is evident, therefore, that he did not hold the ideas then prevalent concerning the circumnavigation of Africa; but being possess of a somewhat more advanced belief in the rotundity of the earth than was held by most of his contemporaries, and vastly underestimating the size of the globe, Columbus was the first who actually set out to seek the East by sailing westward.

*Winds and currents.*—If erroneous conceptions of climatic belts delayed the discovery of the southern passage, on the other hand meteorological conditions favored the attempt to find the western route. Spanish and Portuguese navigators

had been sailing between their home ports and the Cape Verde Islands for about fifty years, and it is probable that Columbus had learned from them something of the northeast winds that blow so steadily in those latitudes. Setting sail from Cadiz on August 3, 1492, Columbus took advantage of the northeast trade winds and dropt down to the Canary Islands. In this latitude these winds blow from an almost easterly direction in September, and the ocean currents, largely controlled by the atmospheric circulation, flow in a westerly direction. With these aids to navigation, the daring explorer sailed from the Canaries just a month after leaving Cadiz, and was wafted westward until he reached one of the islands off the southeast coast of North America. Had Columbus sailed from the vicinity of the British Channel, comments Professor Shaler (11, p. 191), the prevailing westerlies "would probably have insured the failure of his adventurous voyage." The meteorological conditions of the North Atlantic Ocean not only determined the part of the world to which Columbus was to come, but actually made possible, it seems, the discovery of America by Europeans at that time.

*Cabot's failure.*—Knowing that land could be reached by sailing westward, John Cabot, setting out from Bristol, England, in 1497, was not deterred by the head winds which he had to encounter in his effort to reach the New World. But climatic conditions put the stamp of failure on his expedition. He landed not on the balmy shores to which his predecessor had come, but on the less attractive shores of Cape Breton Island (or at some other point between Labrador and Cape Cod), where he found a harsh and inhospitable climate, far different from and much more severe than that which he had expected.

Thus it is seen that meteorological conditions have been important factors in the discovery of North America. These conditions helped to keep the New World unknown until trade with Asia necessitated the discovery of a new route; they favored the attempt to find a western rather than a southern route; they made possible the voyage of Columbus and determined his arrival at a part of the world where the climate was attractive and favorable for exploration and settlement; and they resulted in the failure of Cabot's voyage, thus determining the early settlement of the tropical portion of the continent.

#### EARLY SETTLEMENT.

The settlement and colonization of what is now the United States did not commence until nearly a century had elapsed after the first voyage of Columbus. The Spaniards had been the first to find the New World, and not mere chance had brought them to the tropical and semitropical parts of the world. To these, during the century that had past, their attention had been confined, while the vast rich areas farther north remained almost unknown, so that these regions were left to the French, the English, and the Dutch—people more capable of developing themselves and the country than those who had come from the warm and sunny land of Spain.

*The Spaniards' position.*—The Spaniards remained south of the thirtieth parallel of north latitude for several reasons. Columbus had followed, and had shown to those who followed him the easy route westward in the belt of the trade winds, which brought them directly to the tropical regions of the New World. The return route from this American mediterranean was almost as favorable, for sailing slightly north of the westward course Spanish vessels could be carried eastward in the southernmost part of the belt of prevailing westerlies and reach their home ports by a short cruise southward along the coast of Portugal. Again, Spain, as the first to come to the New World and the first to attempt colonization here, naturally chose for her colonies those regions which were most pleasing. Coming from a semitropical land where they had not needed to overcome the rigors of a severe climate,

these people selected for settlement lands where the climate was even more genial and the soil more productive than in those they had left; here, except for the hostility of the savages, life would be fairly free from toil and care, and thus well suited to the Spanish nature. Finally, the tropical regions of America remained in Spanish hands because the other nations had been excluded from these parts to some extent by a papal bull, "and even more effectively \* \* \* by the currents of the air and sea" (11, p. 191), which, sweeping northward along the coast, confined the English and French to the more northern shores after they had once gained a foothold there.

*The French in Canada.*—The St. Lawrence River proved to be the gate of entrance to America for the French. In an important way the history of these people in America is largely the result of climatic factors. In her admirable book (10, p. 26) on the geographic conditions of American history, Miss Semple says of the land to which the French came: "The glaciated soil of eastern Canada could promise no great fertility, its bleak climate no luxuriant vegetation; but there was money in peltries." And she further points out the fact that the furs, which the Canadian climate made possible, formed the all-important product which could furnish the large profits necessary for the survival of an infant colony. This very factor not only greatly helped the French colonies in America, but also determined in large measure the nature of those colonies. The soil barred agricultural communities, geographical conditions prevented the development of manufacturing cities such as sprang up in New England. Their trade led the trapper and the hunter far to the west and the south, and they founded small scattered settlements over wide tracts of the country, thus hastening the exploitation of the great interior of North America.

In these facts lies much of France's failure to develop her American possessions. It has frequently been said that "in unity there is strength." The weakness of Canada lay partly in this lack of unity of sentiment, purpose, and settlement; a sparsely populated country, with its few inhabitants widely scattered and ever on the move, is not one likely to possess the elements of strength. Furthermore, a country to be self-supporting, must be able to produce its own agricultural necessities, and this, it has been pointed out, Canada was unable to do. Hence, the colonists had to depend on the mother country, and it was often difficult to maintain the close connection which would be necessary if the growth of the colony were to be healthy and progressive. Mr. Thwaites (15, p. 125) has expressed this difficulty, with special reference to the centering of the colony at Quebec, in these words: "The entrance to the Gulf of St. Lawrence is so far northward that storms and ice floes endanger navigation during half of the year. Colonial possessions over seas can not be maintained unless the mother country possesses the means of easy and frequent communication with them."

*Virginia.*—The first permanent English settlement in America was made at Jamestown in 1607. The causes which led to the settlement of Virginia were numerous, but among them climatic influences were not lacking.

Eggleston (17, p. 75), has pointed out the fact that "the only maxim of political economy accepted in that day was that a nation was enriched by getting money from abroad and keeping it at home." Following this maxim, it was to the advantage of Great Britain to own possessions which could furnish her with those products for which she had been sending to Mediterranean and Scandinavian ports. Such products could not be raised in the British Isles, and from the first, it has been claimed, there was the hope that the climate of Virginia was sufficiently mild to allow the production of those things which the English had had to import from the Mediterranean Basin. Moreover, there were forests in Virginia

which rivalled those of Scandinavia, and if lumber, in addition to the more tropical products, could be obtained, Great Britain could maintain herself independently of the rest of Europe.

However this hope may have stimulated the early settlement of Virginia, it was never fully realized, for the climatic conditions were not all that had been hoped. We are told (16, p. 794), that "there were some English people, who after they had understood the calmness of the Climate, and goodness of the Soyle, did upon the instigation of some Gentlemen of England, voluntarily offer themselves, even with their wives and children, to go into those parts to inhabite." But the climate was not as mild, perhaps, as these people had been led to believe, for in "An Account of Virginia" written in 1618, (14, p. 202, 203), we find the following description of the climate and its effects upon the early settlers:

The sommer here is hot as in Spaine, the winter cold as in Fraunce or England; the heate of the sommer is in June, July, and August, but commonly the cool breezes asswage the vehemency of the heat; the chief of winter is half December, January, February, and half March.

The temperature of this country doth well agree with the English constitutions, being sometimes seasoned in the same, which hath appeared unto us by this, that, albeit, by many occasions, ill lodging at the first \* \* \* , hard fare, and their owne judgements and safeties instructing them to worke hard in the fainte tyme of sommer, (the better to be accommodated and fitted for the wynter,) they have fallen sick, yet have they recovered agayne.

The early settlers in Virginia were largely those whose training had been toward a life generally free from manual labor, for a large part of the population of that colony during the first half century of its history were "gentlemen." As climatic conditions had attracted the easy-going Spaniard to the tropical parts of the New World, so, doubtless, the same influence had induced the English gentlemen to settle in the genial land of Virginia. Once settled here, where the soil and the climate alike combined to favor considerable agricultural holdings, the settlers were scattered on large estates, and the "landed aristocracy" retained the characteristic temperament of the English gentleman. Hence, when colonial history closes, we find a widely scattered population in Virginia settled on large estates, with little concentration in cities; and what was true of Virginia was true in a large way also of Maryland, Georgia, and the Carolinas.

*Delayed English settlement in the North.*—Our climate becomes more and more rigorous from Chesapeake Bay northward, and we find that successful settlements by the English were not made as early as on the more southern parts of the American coast. Several early attempts at settlement proved failures: such were the voyages of the Cabots, already referred to; such was the attempted colony on the Sagadahoc River, made in the same year that Jamestown was settled. One reason for these and other failures in these parts has been suggested by Professor Channing, who attributes it partly to the fact that the early explorations were made in the summer when the climatic differences between Europe and America were at a minimum, leading the explorers to carry home extremely favorable reports. Colonists coming later had to experience the unforeseen severities of the New England winter, which so disheartened them that they abandoned their new home and returned to England.

*Sagadahoc.*—The failure of the colony on the Sagadahoc is best described by Grahame (7, p. 159), who says: "The winter proved extremely severe, and confined this small remnant<sup>2</sup> to their miserable dwelling and a helpless contemplation of the dreary waste that surrounded it." Several colonists died during this winter. Supplies came in the spring, but with them news that Chief Justice Popham and Sir John Gilbert, the most powerful patrons of this Plymouth Company Colony,

<sup>2</sup> All but 45 of the original 100 had already returned to England because of the barrenness of the region.—W. N. L.

had died. "Their resolution was completely subdued by so many misfortunes," continues Grahame, "and unanimously exclaiming against longer continuance in those dismal scenes, they forsook the settlement and returned to their native land, which they filled with the most disheartening accounts of the soil and climate of Northern Virginia" (in what is now a part of Maine).

*Why the Pilgrims landed at Plymouth.*—The first permanent English settlement north of Maryland was made by the Pilgrims at Plymouth, Mass., in 1620. Religious conditions in England had inspired these people with the purpose of going to America, where they could believe as they wisht; meteorological factors determined the planting of the colony on the shores of Massachusetts Bay. Sailing from Plymouth, England, the Pilgrims intended to found their new home near the mouth of the Hudson River. For sixty-three days their little craft was buffeted about by the winds and waves, and the storms so far carried them from their course that the first land sighted was Cape Cod. Even then, perhaps, their original purpose might have been effected had not a "contrary wind" driven them back in their further effort to reach the Hudson.

Delayed by accidents when they first sailed from England, and turned from their original destination, these Pilgrims landed at a time and place when the elements of the climate were decidedly against them. The first winter may have been unusually mild, since some of the settlers appear to have written (8, p. 40) that it was "as severe as that of England." But whether that first winter on the shores of Massachusetts Bay was unusually mild or not, it was certainly too severe for the sturdy band who were unprepared for its severities, and "if an early spring had not brought relief, the colony must have perished to a man" (9, p. 91), for already the winter had swept off half the population of the infant colony. But "out of the snows of winter, the desolation of disease, and the terrors of death, the faith of the Puritan had come forth triumphant" (9, p. 123).

Here it may be in order to note that the maintenance and development of a strong colony on this northern shore was possible chiefly because of the character of the colonists who settled there. Had the easy-going colonists of Virginia settled on the shores of Massachusetts Bay, the history of that settlement might have simulated that of the colony on the Sagadahoc River. On the other hand, what would have been the history of Virginia, and what the character of their descendants had the Pilgrims and Puritans landed on the shores of the James or the Rappahannock?

*John Smith's attempt.*—Before the *Mayflower* sailed for America John Smith had planned a colony in New England, but his plans were overthrown. The third and last time that he tried to carry out his designs, meteorological factors intervened, for the steady blowing of westerly winds kept him at Plymouth, England, for three months, when he finally abandoned his project. This delay probably gave New England a history far different from what it might have had had John Smith been the one to plant the first colony on its shores.

#### CLIMATE AND THE CIVIL WAR.

The civil war marks one of the crises in the history of the United States, and to no slight degree it was the result of climatic controls. The immediate ostensible cause of the conflict between the North and the South was the question of States' rights, but this was the outgrowth of another, which had for years been a national question of grave importance, i. e., the right to hold human beings in slavery.

"Fundamentally, slavery was the result of greed and selfishness" (3, p. 5, note). But Mrs. Dixon adds: "There is certainly nothing to indicate that human selfishness was more lacking in the North than in the South, and there was necessarily a stronger reason than any moral one which made a sectional line of demarcation between slave and free territory."

While the difference between the religious views of the North and those of the South was probably an important factor, yet it is impossible to agree with the sentiment of an English writer who, just prior to the outbreak of the civil war, wrote: "We must look for the cause of the early abolition of slavery in the North to religion alone" (5, p. 10).

*Climate and the early settlers.*—The influence of climate on the early settlement of New England and the South has already been noted. To the South, it has been seen, came the English gentleman, fond of enjoyment, but unaccustomed to a life of strenuous labor; to New England came the sturdy Puritan, seeking freedom of conscience, and prepared by his serious reflective life for some of the hardships of his new environment. Other factors had helped to bring about this difference between the colonies of the Atlantic seaboard, but the difference which first existed between the Pilgrim father and the Georgian planter was fostered and intensified by climatic and geographic factors. The mountain chain which extends parallel to the coast line, and which is broken by only a few difficult passes, confined the colonists for a century to the narrow belt along the Atlantic. This region, extending thru nearly twelve degrees of latitude, afforded a variety of climate which made possible every industry from the fur trading and ship building of the Hudson and Merrimac rivers to the production of rice and cotton on the lowlands of Carolina. This difference in human employments and interests, produced and perpetuated by the climatic differences, accounts in a considerable degree for the diversity of sentiment and character which later divided the North and the South.

*Need of negroes in the South.*—When the southern planters found that rice could be cultivated in the swamp lands of their territory, it became necessary to find laborers who could work with immunity in the hot and malarial districts, and the success with which the few negroes who had been introduced into the colonies from Africa had been used at once created a demand for more African slaves. Mr. Gregg tells us (8, p. 350) that "none but negroes could have cultivated the rice swamps of South Carolina; negroes only were fit for outdoor labor thruout the year upon the low-lying, fertile coast lands of the South Atlantic and Gulf States, or in the lower valley of the Mississippi," and soon all the manual labor in the rice, tobacco, sugar, and cotton fields of the Southern States was performed by negro slaves. The idea of employing these negroes as free men was scarcely considered until years later, when the institution of slavery had become well fixt in the country, for "negro labor in such climates had always depended on, been made available, and managed by slavery." (Ibid).

*Slavery in the North.*—Slavery had existed in the North, but had proved far less profitable than in the South, and it had early been abolished. The climate north of the Ohio and Potomac rivers precluded the cultivation of those products for which the services of the negro were most valuable, while on the other hand its severity compelled everyone to lead an active life for his own comfort. Furthermore, only a few negroes are fitted to work in the northern climate, since it seems to be only after years of acclimatization in America that some have been able to adjust themselves to life in the Northern States. In support of this fact, Mrs. Dixon (3, p. 5, note), has called attention to the difference between the "just-arrived Dahomey negroes who sat shivering in mid-summer at the World's Fair in Chicago, 1893, and the acclimatized negro who has been spreading himself north so regardless of climate."

*Climatic sections.*—The differences which the climate had helped to produce in the character and occupations of the colonists were perpetuated after the colonies became States; and with the western expansion of the nation, the same sentiments and characteristics were carried along the parallels of latitude.

By 1858 the controversy over slavery had become acute and Abraham Lincoln voiced the sentiments of many when he said, "I believe this Government can not endure permanently half slave and half free. I do not expect that the house will fall, but I expect that it will cease to be divided. It will become all one thing or all the other."

GENERAL CLIMATIC INFLUENCES IN NATIONAL DEVELOPMENT.

What the United States is to-day, she is to a considerable degree because of climatic control. Not only is this true because of the influence of meteorological factors on special events of importance in the history of the nation, but also because of the effect of the climate on the country as a whole. Two of these climatic influences on the development of the country may be mentioned in concluding this paper. "The strength of England," says Professor Shaler (11, p. 119), "and of the English race in North America, the dominance in the world of that peculiar kind of man, depends upon coal." Since that is the case, the strength of the American people and the power of the United States in the world are due in a large way to those climatic conditions which prevailed in North America during Carboniferous times.

But this strength and dominance are due as much to the climate which prevails over the same region to-day. The greatest nations in the world's history have lived between the hot and moist tropical belt and the cold and sterile frigid regions of the Northern Hemisphere. Within this belt lies the United States, extending far enough south to be favored with semitropical products, yet stretching to the north sufficiently far to allow her sons to develop strength in the invigorating climate which makes them energetic men.

The following extracts from the introduction to a book on Weather Influences<sup>3</sup> may serve to present another viewpoint:

It would seem that in general authors attributed to the meteorological climate, properly so called, influences that are probably due to entirely different matters. For instance, the intelligence, industry, frugality, and humanity of the New England people, the enterprise of New York and Pennsylvania, the haughty bearing of the Southern people, are all of them characteristics that marked the ancestors of these same people when they were living under the same climate in their European homes three hundred years ago, and when they migrated from Asia thousands of years earlier still. It simply happened that political and social conditions in England and Holland led to the settlement of three different American colonies by three different classes of the emigrants, and we have no evidence whatever that the slight differences between the climates of Massachusetts, New York, Virginia, Pennsylvania, and Tennessee have had any appreciable influence in either forming or fixing these traits of character.<sup>4</sup>

The restless, ambitious men and women are in the minority even among enterprising nations. They are said to be especially numerous in the New England States, but this we think is principally a result of the fact that our ancestors were restless migrants, and is only partially the result of the severe climate of that region which killed off a large proportion of the early settlers and forces the remainder to live strenuous lives as the essential condition of existence. Agriculture is the principal labor of man, but where his labors are poorly rewarded he, and especially his children, inevitably seek for more favored regions. The mental and physical activities that are absolutely necessary in such climates as that of Great Britain, Canada, and the United States are not likely to develop a class of drones and are not consistent therewith.<sup>5</sup>

We have good foundation for the belief that a race may develop as well in one portion of the globe as in another so far as climate is concerned, after it has once become acclimated. The period over which our most accurate history and observation extends is too short to justify us in anything more than the recognition of the fact that at the present time dominant races are scattered around the North Temperate Zone, some of them in cold, dry, others in warm, moist climates, some in equable, and others in variable climates, and that they hold power over other tribes both in temperate and tropic zones by the power of their guns and powder rather than by any physical superiority; their intellectual development has been essentially the result of breeding and the building up of families by great attention to genealogies. Their

motto has been, "Blood will tell." We must not attribute to climate that which is more likely to be due to inheritance, but having allowed for the latter influence, we may then search among the outstanding discrepancies for that which is properly due to weather and climate.<sup>6</sup>

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DAMAGE BY FROST AT MIDDLEBRANCH, OHIO.

The following letters from the cooperative observer at New Berlin, Ohio, describe some peculiar features of the damage done by frost at Middlebranch, Ohio, on the night of June 15, 1908:

NEW BERLIN, OHIO, June 20, 1908.

MR. J. WARREN SMITH,  
Local Office, Weather Bureau, Columbus, Ohio.

DEAR SIR: You are aware ere this that on the night of 15th instant, or last Tuesday morning, there was frost in Ohio in places. Seemingly in my immediate vicinity not very much damage resulted, except that wheat, if injured, will probably show up at threshing time. The mini-

<sup>3</sup> Weather Influences. E. G. Dexter, with an Introduction by Cleveland Abbe. New York, The Macmillan Co., 1904.

<sup>4</sup> Ibid, p. xii-xiii.

<sup>5</sup> Ibid, p. xv.

<sup>6</sup> Ibid, p. xxx.