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As anything relating to our one staple—Sugar—is always of interest to the planters of this colony I feel that I cannot do better than reproduce here some observations by T. L. Phipson Ph. D., F.C.S., on the agricultural chemistry of the sugar cane. This article was published first in 1875 as a pamphlet and has lately been copied in the Bulletin of the Botanical Department of Jamaica for March 1896.

JOHN R. BOVELL,
Superintendent.

OBSERVATIONS OF THE AGRICULTURAL CHEMISTRY OF THE SUGAR-CANE.

By T. L. PHIPSON, PH. D., F.C.S.

I

About the year 1 a remarkable man, named Columella, left his native town of Gades, now called Cadiz, and travelled through Spain, Gaul, Italy, Greece, and Asia Minor, in order to collect facts for a great treatise on Agriculture. He even extended his journeys to the coast of Africa, and finally settled at Rome, where he produced his work, "De re rustica," in twelve books and a preface. The latter, I must confess, is that portion of the work which has interested me more than the rest; for after an interval of nearly 2,000 years, I find his words as full of truth and wisdom as they were at that distant period above-mentioned.

Whilst deploring the degraded state of Agriculture in his time, he exclaims: "I see around me schools for preachers, dancers, musicians, and tumblers; cooks and barbers are also in vogue; houses of ill-fame and gambling establishments everywhere attract the imprudent youth; but as to the Art which teaches how to fertilize the earth, it has neither professors, pupils, justice, nor protection. * * * And if I complain of this neglect I am told that the soil has become barren * * * !"

It is hard to think that little progress has been made in Agriculture since the year 1; but we must concede that whatever has been done since that remote epoch has been achieved almost entirely within the last fifty years. We have now several schools of Agriculture properly so-called, but we find the professors, devoting much of their time to commercial analyses, instead of employing their precious moments to unveil the hidden secrets of the earth. It seems to be of greater importance to them to determine whether a sample of artificial manure is adulterated or not by the maker, than to discover why a field of canes is productive in one case and unproductive in another.

To the sugar-planter the question of soils and manures is doubtless becoming more important every day, and any practical observations upon a subject which affects to so great an extent the future prosperity of our West Indian Colonies cannot fail, I believe, to have a certain degree of interest at the present time.

II.

It is not very long ago since the great chemist, Justus von Liebig, showed that by burning a plant and analysing the ash we not only learnt what that plant derived from the soil, but the food necessary to render it luxuriant in a given soil. However, when Liebig asserted that the mineral ingredients found in plants were its only true and natural food, Professor Boussingault, who, with Dr. Mulder and Sir H. Davy, must be looked upon as one of the fathers of Agricultural Chemistry, simply refuted the theory by applying the ashes of farmyard manure and an equivalent of farmyard manure itself, side by side upon the land. The latter gave luxuriant crop; the former produced nothing. In fact, I have convinced myself that "the burning of a vegetable to procure the ash renders the mineral food it naturally contains almost useless as manure."

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More recently the laborious experiments of Lawes and Gilbert have weakened the faith of agriculturists in mineral manures, though Lawes himself has long been a manufacturer of them, and at the outset of his agricultural researches took out a patent for making superphosphate. The results obtained by these gentlemen have not overthrown the fact origially proclaimed by Liebig, that the mineral substances found in the soil and in the crops are of the greatest importance to the agriculturist; they have merely shown once more that nitrogen is likewise necessary, and after some twenty years of experiments have arrived at the conclusion that the largest crops were obtained when the mineral and nitrogenous manures were employed together.

This applies more particularly to the wheat plant, which belongs, however, to the same family as the sugar-cane. Both are plants of the grass tribe; but the one is cultivated for the seed, and the other for its saccharine juice. Turnips, on the other hand are grown principally for the roots, and it has been found by direct experiments that on most soils acid superphosphate is a very advantageous manure for this crop. But should we send out turnip manure for the sugar-cane? I think not. Direct experiments, extending over a long series of years, have shown that on the average soils superphosphate alone does little or no good to wheat; how can we expect that it will affect the sugar cane? It contains a large amount of free acid, which the cane cannot touch until it is neutralized by the lime or potash of the soil; and long-worked cane soils are for the most part already much too acid.

Sulphate of ammonia, largely employed in Demerara and elsewhere, acts as a powerful stimulant upon all graminaceous plants growing on average qualities of soil. With regard to the sugar cane, its immediate effect is the rapid rise of the green cane, and often the production of a watery juice, poor in sugar. It is, moreover, a highly exhaustive manure, causing the plant to take up lime, potash, and phosphoric acid from soils well-nigh worked out, and giving, for the time, the appearance of extraordinary fertility.

We know also that cane trash is burnt and the ash restored carefully to the soil in almost all the West India Islands and Demerara. Unfortunately for the cause of the sugar-planter, this cane trash is used there as fuel, and we cannot expect to get work twice out of the same material. If it were fermented in a moist heap like stable manure, it would yield its fertilising elements to the soil and the plant; but when burnt its nitrogen is gone, its silica and lime have become almost completely insoluble and unavailable, and it can only supply directly a certain moderate amount of potash. But cane soils lose their lime long before their potash is all gone.

Add to the substances already named Peruvian Guana—not only a very costly manure, but one which, injudiciously applied, is very apt to endanger a crop of sugar—and we have nearly all the auxiliaries to labour which, until recently, the sugar-grower has had at his disposal, and has employed in many cases without sufficient knowledge of the requirements either of the cane or the soils in which it is planted.

III.

Let us now proceed to glance at the requirements of the sugar cane, and those of the long-cultivated soils of our Colonies; the differences presented by the soils of new and old plantations; the manures best suited to restore the soil of partially-exhausted estates, and to ensure the largest yield of sugar in the stiff clays of Demerara, Barbadoes, Jamaica, &c.

The composition of the fully-developed sugar cane may be very fairly represented by the following good average analysis:—

SUGAR CANE.

Water	71.04
Sugar	18.02
Cellulose	9.56
Albumine	0.55
Fatty and colouring matters	0.35
Salts soluble in water	0.12
,, insoluble ,, ...	0.16
Silica	0.20
	100.00

So that a thousand tons' weight of cane takes up from the soil a little more than four tons of mineral ingredients, and if the soil cannot supply these four tons in the proper form—i. e. capable of being assimilated—no crop of sugar can be raised. About one ton of nitrogen is required to form the albuminous matter of one thousand tons of cane.

The next question that presents itself is, what are the nature and relative proportions of these mineral ingredients derived from the soil? This is obtained by careful analysis of the ash of the full-grown cane and its leaves. There exists great discrepancy in the various analyses of cane ash that have hitherto been made, the cause of which I shall allude to immediately; so that for the present I can only give the following rough average of a certain number of analysis of the ash of the ripe cane with its leaves. It will serve us to form at least a very approximate notion of the relative proportions of each substance taken from the soil during the life of the cane:—

ASH OF FULL-GROWN CANE AND LEAVES.

Silica	43.0
Phosphoric acid	6.0
Sulphuric acid	8.0
Chlorine	4.5
Lime	10.0
Magnesia	6.5
Potash	18.0
Soda	2.0
Oxide of iron, maganese, and loss in analysis ...	2.0
	100.0

The largest figures are those of "silica, potash, lime, and phosphoric acid;" but "sulphuric acid and magnesia" appear to have their importance also, whilst "chlorine and soda," though represented by comparatively small figures, are usually present as chloride of potassium and chloride of sodium to the extent of 4 or 5 "per cent." The principal substances required in an available state in a cane soil are, therefore, nitrogen, potash, silica, phosphoric acid, sulphuric acid, lime, and magnesia. We may state at once that oxide of iron and oxide of maganese are, perhaps, also essential, for in a long series of interesting experiments made in 1849 by the Duke of Salem-Horstmar, a chemist of much experience, the conclusion was drawn that a graminaceous plant (the oat) absolutely required for its complete development "all" the mineral substances we have just mentioned.

As to the relative importance of each substance in particular, it is a difficult problem to solve. We know by experience that the composition of the ash of any plant varies very considerably with the period of the year at which the plant is cut, and the parts of the plant that are burnt for analysis; so that it is by no means an easy task to state with scientific accuracy what substances any plant takes in largest quantities from the soil.

It is, however, a fact of the greatest interest that for a given plant the mineral ingredients derived from the soil are constantly found "in the same relative proportions," and the same law holds good for the various portions of a plant, provided that we consider them "in a state of maturity"—*i.e.*, when each portion has done all the work that is allotted to it by nature.

I was requested some time ago to draw up a report upon a number of analyses of sugar cane executed by chemists whose results could be thoroughly relied upon, and to explain, if possible, why they differed so widely with regard to the relative amounts of potash, phosphoric acid, silica, &c., found by each of them, and occasionally by the same chemist. After submitting the matter to careful investigation it was found, not without some difficulty and a voluminous correspondence, that the only conclusion possible was that the canes had been submitted to analysis "at various periods of their growth," consequently the results could not be expected to coincide.

More recently I undertook an extensive series of analyses of the coffee-plant and the soils on which it grew. This furnished me with the counterpart of the above proposition. I was requested to make these analyses in order to ascertain what materials the coffee-tree took from the soils, what the soils supplied in largest quantities, what they were deficient in, and what kind of manure would be requisite to increase the crops of berries without impoverishing the soil of the estates.

I sought in vain through the works and journals which I possess, or have access to, for some analysis of the kind. It was only when the work was finished and my results obtained that a friend found for me an old analysis of coffee-berries, made by an eminent chemist about thirty years ago, and the figures coincided in a most remarkable manner with those I had just obtained. Now these coffee-berries had been grown in the "West" Indies some thirty years before, and mine came from Ceylon! It then struck me for the first time that the analyses of the mineral ingredients of "plants burnt after they have arrived at maturity" must generally coincide, and "can alone teach us accurately what any plant takes from the soil." The reason that the analyses of these coffee-berries gave results so precisely similar was that "the berry in both instances was ripe."

Again, I was exceedingly interested to find that the analysis of the ash of some Virginian tobacco grown in the Royal Botanical Society's Garden in London, and kindly forwarded to me by Colonel Platt, presented precisely the same composition as that grown in America; so that neither change of soil nor of climate had influenced the relative proportion of mineral matter and organic matter, nor that of the principal ingredients. The plant had taken from the soil of London the same materials, and in the same relative proportions that it is found to take them from the soil of Virginia.

IV.

In order to appreciate the actual state of the cane soils in our West Indian Colonies we cannot do better than consider, in the first instance, the composition of two soils (chosen with care from a considerable number that have been analysed by me within the last few years), representing "a new soil" and "an old soil." The first, A, is from an estate in Jamaica now under canes for the first time; the other, B, is from a plantation in Demerara which has been worked more than "fifteen" years consecutively.

It is not difficult to see how valuable a lesson is to be learnt from these two analyses alone, but some others are given further on.

Let me simply add that to the eye of the most experienced planter or chemist there was scarcely any appreciable difference in the aspect of these two soils; the sample A was merely a clay of rather darker colour than B, but nothing in their external appearance could have indicated the widely-different composition which they gave on being carefully analysed:—

TYPES OF CANE SOILS.

	A.	B.
Moisture	12·25	18·72
Organic matter and combined water	15·36	6·03
Silica and insoluble silicates	48·45	68·89
Alumina	13·80	2·50
Oxide of iron	6·72	2·60
Lime	0·99	0·08
Magnesia	0·29	0·25
Potash	0·11	0·10
Soda	0·70	0·09
Phosphoric acid	0·19	0·03
Sulphuric acid	0·30	0·03
Chlorine*	0·51	trace.
Oxide of manganese, carbonic acid, and loss in analysis	0·42	0·68
	100·00	100·00
Nitrogen (in organic matter)	0·31	0·05

To persons accustomed to discuss analyses of soils nothing can be easier than to see that in A we have everything that is requisite to grow canes for a considerable number of years, whilst B is a soil fast approaching to exhaustion. I will merely call attention here to the greater amount of *organic matter* (humus), *nitrogen*, *lime* and *phosphoric acid* in A, and to the important fact that in B the quantity of lime, 0·08 is far below that of the magnesia, 0·25. This I have ascertained to be a very bad sign in cane soils, and it will probably be found to be so in soils devoted to the cultivation of almost any other plant.

It appears, indeed, from the results of a numerous series of analyses carried on in my laboratory for some years past, that *the degree of exhaustion which a cane soil has undergone can to a great extent be ascertained* by comparing the relative amounts of *lime* and *magnesia* yielded to analysis. Here are four examples from the *same estate* in British Guiana, from *various portions* of which the samples are taken:—

	Cultivated.			
	10 to 15 years.		Upwards of 60 years.	
Lime (per cent.)	0·44	0·64	0·11	0·40
Magnesia	0·32	0·50	0·36	0·51

I might, perhaps, have found still more striking examples, but these will suffice to show how the *lime* has disappeared (from the *same soil*) by prolonged cultivation of the cane, whilst the *magnesia has* remained pretty much as it was.

In coffee soils from Ceylon I have found that the same thing occurs also, but that the magnesia is more taken than with the cane. This is natural enough, since it forms an important ingredient among the mineral matters of the seed of the coffee-plant, which seed is carried away from the soil after each crop. However, even in coffee soils the magnesia diminishes less rapidly by cultivation than the lime. It is quite possible in some cases to judge very approximately of the number of years a soil has been in canes by the inspection of a careful analysis of this soil, more especialy when the analysis can be compared with one made of the same soil from some uncultivated spot on the borders of the plantation.

When the quantity of lime has diminished so much by prolonged culture as to be present to the extent of only 0·1 per cent., and then only one-third that of the magnesia present (knowing that in the origin the lime was not only equal to, but higher than, the magnesia), we may rest assured that the crops of cane on this soil will fall off year by year, and that the most careful system of manuring will be necessary to place it again in its former lucrative condition.

I am sorry to say that such a state of things actually exists over a very considerable portion of British Guiana and Barbadoes; and though Jamaica and the other islands appear somewhat more fortunate in this respect yet we have here and there examples of long-wrought soils which are in quite as bad a condition as the most exhausted plantations in Demerara.

It it both difficult and laborious to choose from a very considerable number of analyses of cane soils those which may be considered to represent the actual state of things in the West Indies. I have nevertheless given, on the adjoining page, a few which represent some very extensive plantations, the owners of which have kindly permitted me to publish them. These, with the few remarks appended to them, will enable me to pass on to another important portion of our subject.

* The quantity of chlorine is unusually high, which is accounted for by the proximity of a salt spring. Such springs are by no means uncommon in the island.

ANALYSIS OF CANE SOILS.

	Demerara.								*Barbados.*		*Queensland.*
	A	B	C	D	E	F	G	H	I	J	K
Moisture	26·00	23·00	26·70	14·12	25·00	13·88	22·64	16·00	19·00	13·00	23·10
Organic matter and combined water... ...	5·90	5·30	8 30	6·17	8·86	32·39	7·06	7·88	9·11	10·50	12·56
Silicate of alumina and silica	61·68	64·44	58·02	68·08	57·49	46·50	68·00	68·22	65·00	60·00	41·42
Lime	0·64	0·11	0·47	0·17	0·28	0·48	0·45	0·22	0·25	0·30	0·56
Magnesia	0·50	0·36	0·50	0·37	0·36	0·30	0·31	0·30	0·30	0·47	0·26
Sulphuric acid	0·01	trace.	0·01	0·16	0·04	0·04	0·20	0·12	0·03	0·03	0·04
Phosphoric acid	0·08	0·05	0·19	0·07	0·09	0·03	0·16	0 10	0·07	0·06	0·06
Potash and soda...	0·11	0·10	0·12	0·54	0·26	0·24	0·30	0·10	0·10	0·16	0·20
Chlorine	trace.	0·02	0·01	...	0·01	0·06	0·05	trace.	trace.	trace.	0·02
Oxide of iron, alumina, manganese, &c...	5·08	5·62	5·68	10·32	7·61	6·08	0·83	7·06	6·14	15·48	21·78
	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00

Observations.—A, B, and C are soils in adjacent plantations of the same estate. A has been in canes about five year; C for a somewhat longer period—10 to 15 years; and B for about 60 years. D and E are from adjacent estates, far distant from the former; they have been in canes 20 to 25 years. F is a new soil, now growing ferns only. It is about to be planted with canes as an experiment. This soil when it has been dried burns like peat. G and H are from plantations only separated 100 feet from each other by a canal. G is a new soil; H has been in canes about 15 years. I and J are good average specimens of Barbadoes soils, and K is a sample of red clay soil from Queensland, Australia.

It is commonly held that soils in hot countries, especially in tropical climates, contain more organic matter than those of our latitudes: but it is evident from the above analyses that such is not the case for cane soils. The figure which includes organic matter and combined water owes a great deal to the latter, which is driven off by heat with the organic matter. In fact, putting aside soils of a peaty nature, it is rare that we meet with cane soils yielding more than from 2 to 4 per cent. of *humus* or *vegetable mould*; and the loss of this organic matter has been proved a source of sterilty in Java by causing a want of porosity, of nitrogen, and of carbonic acid. Hence the danger of applying lime to these soils, much as most of them require it, since it tends to destroy the *humus* in a very short space of time. In our own climates lime is always "backed up," if I may use the expression, by a liberal supply of organic manure; and this is even more essential in Demerara than with us.

V.

The Java and Demerara clays when properly drained and worked will, from the moment they are put under cultivation, yield good crops of canes without manure for at least ten or twelve years. In Jamaica the same kind of clay will yield well for about fifteen years, and the red porous clay of South Australia for fifteen or twenty years. After this period the yield will become less and less each season; and for some years past it has been customary to dose the soils with sulphate of ammonia or Peruvian guano, which will usually raise the produce for the next two or three seasons; but after this their stimulating effect will cease almost completely, and the soil will be then in a worse condition than before. It is preferable in most cases to endeavour by a rational system of cu ture to restore these partially exhausted soils before they have gone too far, rather than to take in new land farther and farther from the boiling-houses.

When a soil has got into this partially exhausted state, no manure hitherto known, with the exception of good stable manure, well-fermented farmyard dung, or the urban manure made from excreta, can restore the equilibrium in favour of the planter. The reason of this appears to reside in the fact that these manures are *natural* products, and not only contain *all that the plant requires* as is shown by analysis, but *in the proper state for assimilation.*

Anyone who will take the trouble of perusing the accounts of the old experiments made by Giobert, Lampadius, and others will soon be convinced that very little *practical* knowledge has been added to what was perfectly well-known prior to the year 1820 regarding the effects of manures upon the soil. Giobert mixed together silica, alumina, magnesia, and lime, in the proper proportions, as he thought, to constitute a fertile soil, he planted vegetables therein, and watered them, but none of them grew until he moistened his artificial soil *with water from a dunghill.* Lampadius varied the experiment by forming several compartments, which he filled each with a different substance. The plants which he caused to grow in these extraordinary soils "did so because he watered with the liquor which exuded from a dunghill."

These are some of the oldest experiments on manures, and were made, as we see, with the most perfect manure yet known—*stable manure.* Centuries before this the natives of Peru used guano, and the manner in which *night-soil* came to be known as a most active fertilizer is so lost in the mist of bygone ages, that we can only conjecture with Loudon that man found it necessary to bury it in the earth in order to avoid its disagreeable odour, and immediately observed its effects on vegetation.

The idea of rendering phosphoric acid more available to plants by partially dissolving various kinds of phosphate of lime in sulphuric acid does not appear to be based upon very sound philosophy. At any rate the manure thus procured has, according to Professor John's researches, *little or no beneficial action upon graminaceous plants,* though it acted well on turnips.* Moreover, this process of making artificial manure (superphosphate) implies some ignorance of the methods by which the roots of plants absorbs the mineral portion of their nourishment. It appears tolerably well proved that this is effected by the secretion of some vegetable acid, and was well shown by plates of marble exhibited in the Austrian department of the last French exhibition, where the rootlets of wheat, maize, etc., had left their traces eaten in the marble. Again, M. Closz, in his recent experiments, caused grain to germinate on blue litmus paper, the course of the rootlets being well marked by permanent red streaks, which did not disappear on drying, and were therefore not caused by carbonic acid. Moreover, I have observed that all cane soils are naturally more or less acid, and appear to become more so as they approach a state of complete exhaustion. Lastly, it is shown by Professor Déherain ('Annuaire Scientifique,' 1868) that the most insoluble of mineral phosphates, reduced to powder and strewn upon soils deficient in phosphates, increase the yield of the fields at once; whilst if applied upon soils which contain a due proportion of phosphates, no increase of the crops occurs. The latter fact points very clearly to the importance of knowing something about the natural resources of a soil from which the crops of every kind are regularly raised.

VI.

In laying down rules to ensure the highest degree of fertility in our cane soils, we must remember that we are dealing with the *life* of the plant, and that the phenomena of life are mysteries that no one can solve completely. Hence the danger of adhering too firmly to a favourite theory; hence, also, the philosophy of following the indica-

tions of Nature as closely as possible. In other terms, we must allow ourselves to be guided by direct experiments independently of any theory. Such, for instance, are these remarkable trials made by Professor Polstorff, in which he found that *of all manures known, that derived from the excreta of animals gave by far the highest results.* † All who have devoted their time to this subject are of opinion that rich, well prepared farmyard manure is the most perfect fertiliser known. 'We must never forget,' says Dr. William Gregory, "*that the best and most economical of all manures is farmyard manure or, what is the same thing, the night-soil and urine of inhabited places.*" ‡ The reason of this is because it contains all the ingredients that a plant can require, because its action is certain, because it gives up these ingredients in a proper state, in a readily assimilable form; and the more closely any artificial product approaches it, the more valuable is the action of such a manure upon the land.

But farmyard manure has one great drawback: it contains an enormous amount of water—60 to 80 *per cent.* of its weight; hence it can only be used on the spot where it is produced; carriage to any distance is out of the question. Within the last few years, however, a product has been obtained from night-soil, and urine, at Bloxwith, in Staffordshire, which may be well compared by its composition and eminent fertilising qualities to concentrated farmyard manure. It is got by evaporating the excreta of large towns as nearly as possible to the dry state, and forms, I believe, the most perfect manures actually known—that, indeed, which Nature evidently intended for our use. Instead of containing 60 to 80 per cent. of water, it contains only 12 to 16 per cent.; therefore its transportation to considerable distances can be effected as with guano. Upon analysis it is shown to contain all the ingredients of rich farmyard manure in a concentrated state, and in the same assimilable form.

Various kinds of costly apparatus have been erected at Bloxwitch and Churchbridge by the Urban Manure Company in order to get this valuable product, and specimens of it have been submitted to the Royal Horticultural Society in London—the superintendents of whose gardens experimented with it as early as 1868 or 1869—and to myself. The former have drawn up an official report, sanctioned by the Council of the Society, upon its effects. This report coincides completely with the resuls of my own experience on a smaller scale, and both confirm once more the older experiments of Professor Polstorff, made in 1847, alluded to above.

Since then, being anxious to learn the effects of this new product upon the cane soils of our West Indian Colonies, with whose composition I was acquainted, I applied to my talented friend, Mr. W. Bancroft Espeut (who informed me that he had used it in Jamaica), and he replied that he had obtained most excellent results.

The able manager of the works above mentioned, Captain Hall, to whose skill and perseverance agriculture is mainly indebted for the possibility of obtaining so valuable a product, has also forwarded to me several letters from the cane-growers of Barbadoes, Demerara, and Mauritius, showing clearly that the urban manure is giving ample satisfaction, and is now very largely used. But for some time previously I had never hesitated to recommend it as the best manure for the long-worked Demerara soils.

In 1871 some hundreds of tons were experimentally mixed with bone meal and precipitated phosphate for the soils in British Guiana, which had been found wanting in lime and somewhat deficient in phosphoric acid, and have produced the most satisfactory results. I will give here three analyses of some large bulks of this kind that have been shipped, 1 to Demerara, 2 and 3 to different estates in the islands, and by the side of these I place an average analysis of good farmyard manure for comparison:

	Urban Cane Manure.			Farmyard Manure.
	No. 1.	No. 2.	No. 3.	No. 4.
Water	10.50	12.14	12.00	66.17
Organic matter, &c.	31.10	40.00	26.60	28.24
Phosphoric acid ...	8·70	10·41	11·61	0·27
Sulphuric acid ...	11·76	8·89	9·80	0·11
Chlorine	1·50	1·20	2·40	trace.
Lime	18·06	14·21	17·59	2·18
Magnesia	0·80	1·14	2·50	0·10
Potash }	5·64	{2·21	2·00	0·60
Soda }		{1·10	1·70	0·07
Oxide of manganese	0·75	—	0·30	—
Oxide of Iron and alumina	2 19	2·25	4·00	0·20
Soluble silica ...	1·00	0·45	0 44	0·04
Sand, &c.	8·00	6 00	9 06	1·12
	100·00	100·00	100·00	100·00
Nitrogen, equal to } [ammonia }	2·85	3·58	2·40	0·87

There is a test by which the urban manure can be distinguished from any other (except farmyard manure,) namely its property of yielding a certain amount of its organic

* John, "Journ. für Prak. Chemie," vol. 50, p. 57 (1843 to 1845); see also Lawes and Gilbert's "Exp. on Growth of Wheat," 1864.

† Polstorff, "Annalen der Chemie," lxii., p. 180 (1847).

‡ Gregory, "Handbook of Organic Chemistry," 3rd edit., p. 497.

substance to strong alcohol (rectified spirits of wine), and forming therewith a dark-coloured solution.

The above is an *ultimate* analysis of three cargoes of this urban cane manure prepared especially for certain estates, the soils of which had been previously submitted to me for analysis. The *immediate* analysis of this product shows that it contains all the ingredients, or compounds, *found in well-made farmyard* manure; and if we suppose the latter deprived of its abundant moisture, the composition of the two would present a great similarity.

Such, then, is the fertiliser which I more particularly recommend for the long-worked cane soils of our colonies, the action of which, with a proper amount of tillage, will, in the course of three or four seasons prove of the greatest advantage to the planter.

VII.

The refuse of distilleries, and all other refuse collected during the concentration and clarifying of the juice, should be put together into a large *compost heap* where these materials should be mixed with the megass, ash, leaves, straw, pen manure, stable manure, &c., and a heap of this kind should be attached to every plantation. It should be piled high, so that its ingredients may well be pressed together; it should be protected from the rain, and any liquid that drains from it should not be wasted, but carried on to the ground with the manure itself, or soaked up by dry leaves or cane ash.

The best method of using the acid superphosphate manures would be to mix them intimately with one-quarter their weight of good Peruvian guano and one-quarter their weight of cane ash, and apply the mixture at the rate of 5 to 8 cwt. per acre, according to the mechanical condition of the soil and its more or less effective drainage.

The mixture of sulphate of ammonia, *choloride of potassium*, and superphosphate, recommended formerly by my learned friend Dr. Anderson, of Glasgow University, to whom Scotch agriculture and chemical science generally owe so much, besides being very expensive, is too soluble and too acid for the Demerara clays; neither does it supply any *humus* or organic matter, in which so many of these soils are very deficient. Nevertheless it is quite equal to the very expensive chemical manure of Professor Ville, which is merely a similar mixture of mineral salts, and certainly not calculated to have much effect on sugar-cane crops, whatever results it may be said to have upon the highly-cultivated beet-root soils in Europe. In British Guiana such mixtures of nitrates, sulphates, and chlorides are washed out of reach of the cane roots by a single tropical shower, and in dry weather it is not certain that they would be absorbed.

A better mixture would consist of Peruvian guano, cane ash (or burnt trash), and stable manure or compost heap to which mixture one quarter its weight of gypsum might be add for most Demerara soils.

Sulphate of ammonia, applied by itself in large quantities, acts as a poison to plants; in smaller doses it action is that of a powerful stimulant, somewhat as sulphate of quinine acts upon a delicate child. I have stated above that its use is to be avoided except in conjunction with relatively large quantities of other manures, or, better, as a powerful auxiliary to the compost heap.....

Hitherto manufactured manures, as is well know, have not been intended as perfect restoratives, and land treated with them alone generally fails in a few years to yeild a heavy crop. They are rightly looked upon as auxiliaries in a system of farming—as a kind of supplement to a limited supply of farmyard dung. But in the urban cane manure above described we have a perfect restorative—the first of its kind—a manure that will not only cause the soil to yield its utmost when worked with proper care, but will also prevent its ultimate exhaustion.

Another auxiliary of some importance to the West Indian sugar-grower is lime. Even some of the newer soils would benefit by occassional dressings of lime in the shape of *marl* or carbonate lime (not in the burnt or caustic state); and this should be followed at an interval of about two months by a liberal supply of manure.

There are, indeed, three special agricultural difficulties in the direct path of the cane-grower in the West Indies. The first is that he is dealing almost everywhere with a stiff clay soil, difficult to work even were labour more plentiful than it is; the second is a remarkable deficiency of lime in many districts; and the third is the very imperfect nature of the manures hitherto imported, and the implicit faith placed in the restoration of the megass ashes.

A certain amount of tillage is of course necessary, however perfect the manure applied. Perhaps we shall never possess a manure that will enable us to dispense with labour altogether; for putting aside the question of weeding, *air* is one of the most necessary ingredients in the soil, and the more air can be enclosed the quicker the manure will disappear, and the more efficacious will be its action in a given time. I have insisted upon this point and several others in many of my papers contributed to "The Sugar Cane" magazine.

Marl or sandy limestone spread over these stiff clays at various intervals, as in the process which we call in England "top-dressing" will be carried down into the soil during the rainy season, and greatly improve its quality. Each application might be most advantageously alternated by a similar application of urban cane manure; for as the roots of the cane rarely extend to more than a foot in depth, we may, in many cases, trust to the rain to carry the fertilising ingredients within their reach.

It is evident that to grow the largest amount of *sugar* is the essential part of our

problem. For this we do not require stimulants and incomplete manures, which will produce only a temporary gain of short duration and leave the land in a worse condition than before, but a careful application of those scientific principles which have been deduced from direct experiment and observation. This alone can claim to rank as true philosophy and must serve as our guide in practice.

In giving professional advice upon these subjects I have never failed to bear this in view. Moreover, I have been anxious to prove an assertion published many years ago, to the effect that Agricultural Chemistry, in spite of the dogmatic and conflicting statements of some of its more enthusiastic cultivators, is quite capable, when conscientiously applied to any cultivated plant, of increasing to a very great extent the yield of that plant upon soils which have suffered from long cultivation. This is equally true whether the plant be cultivated for its saccharine juice, its seed, its bark, its leaf, or its fibre; and as a soil, however rich, must sooner or later lose its fertility by constant work, the most essential element in the problem is the discovery of the proper kind of manure for the plant in question.

If my efforts should hereafter be found to have realised this point for the sugar cane, I shall be amply repaid for the time I have devoted to its study.

METEOROLOGICAL REPORT OF DODDS BOTANICAL STATION 1895—HEIGHT ABOVE SEA LEVEL 210 FEET.

MONTHS.	BAROMETRIC PRESSURE.			TEMPERATURE.									TENSION OF VAPOUR.			HUMIDITY.			WIND.		
	9 a. m.	3 p. m.	Mean.	Maximum, mean.	Minimum, mean.	Maximum, extreme.	Minimum, extreme.	Maximum blackened bulb 4ft. from ground in vacuo.	Mean for month.	Range.	Dew Point 9 a. m.	Dew Point 3 a. m.	9 a. m.	3 p. m.	Mean.	9 a. m.	3 p. m.	Mean.	Velocity, miles per hour.	Rainfall for 1895.	Number of wet days.
January	29·976	29·895	29·935	81·2	74·2	84·6	69·9	149·8	77·7	14·7	68·8	68·3	·704	·692	·698	72·9	68·5	70·7	...	7·64	15
February	29·988	29·914	29·951	82·0	75·2	84·3	69·5	133·0	79·7	14·8	66·7	66·5	·655	·650	·652	67·2	63·9	65·5	...	1·80	10
March	29·982	29·906	29·944	82·6	75·4	85·5	70·0	136·2	79·0	15·3	67·7	67·2	·678	·666	·672	67·8	63·4	65·6	...	1·89	15
April	29·995	29·921	29·958	84·0	75·9	86·3	70·0	...	79·9	15·5	68·4	68·1	·694	·687	·690	65·9	62·3	64·1	12·4	3·48	10
May	29·991	29·929	29·960	84·0	75·7	86·7	70·4	...	79·8	16·3	71·6	70·7	·774	·751	·762	73·7	68·3	71·0	12·0	2·72	16
June	30·025	29·969	29·997	84·5	76·9	87·1	72·3	156·4	80·7	14·8	72·1	71·8	·788	·779	·783	71·8	69·9	70·8	11·6	1·74	16
July	30·003	29·951	29·977	85·5	76·8	87·4	69·4	157·2	81·2	18·0	71·7	71·0	·777	·759	·768	70·2	65·4	67·8	10·2	2·13	19
August	29·926	29·865	29·895	85·9	76·9	88·8	71·0	158·7	81·4	17·8	73·5	72·8	·826	·807	·816	75·2	70·2	72·7	8·3	10·59	24
September	29·926	29·856	29·891	85·7	76·5	88·0	70·0	158·9	80·6	16·0	74·9	73·9	·865	·837	·851	80·0	74·6	77·4	6·7	14·93	21
October	29·902	29·826	29·864	84·3	77·2	86·7	71·8	159·4	80·7	14·9	74·3	73·0	·848	·812	·830	77·6	72·9	75·2	6·4	8·38	15
November	29·917	29·839	29·878	83·0	76·8	86·6	70·0	158·5	79·9	16·6	73·2	72·6	·818	·801	·809	78·4	76·5	77·4	7·3	13·31	20
December	29·921	29·838	29·879	82·5	77·3	84·9	70·7	156·5	79·9	14·2	71·4	71·2	·769	·764	·766	75·4	77·5	73·9	6·5	4·71	12
	29·963	29·892	29·927	83·8	76·2	86·4	70·4	152·4	80·0	15·9	71·2	70·6	·766	·750	·758	73·0	69·4	71·0	9·0	73·32	193

The Maximum Solar Thermometer was broken by an accident and consequently no readings could be taken until a new instrument was procured from England.
The Anemometer was only started at the beginning of April.

JOHN R. BOVELL, Superintendent.

BARBADOS RAINFALL FROM JANUARY TO DECEMBER 1895.

Name of Station.	Elevation.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Totals.	
	Feet.	Days.	Inches.	Days.	Inches.	days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
I.—District A. St. Michael. (Lowlands).																											
Lower Estate	237	15	8·58	13	1·78	16	2·39	11	3·67	17	4·33	15	2·47	14	2·91	23	11·36	...	15·11	...	6·52	...	10·18	...	3·76	124	72·46
agget Hall	152	19	6·86	11	1·98	16	1·63	10	1·71	15	3·91	14	2·16	13	2·03	23	11·56	21	13·80	21	6·28	22	15·11	11	3·64	196	69·97
Clapham	216	13	4·24	7	1·75	11	1·03	7	1·44	10	2·84	14	2·41	10	1·96	15	9·95	18	8·89	14	4·67	22	10·60	11	3·69	152	58·47
Lears	320	14	9·52	15	1·55	19	2·92	15	3·04	14	4·96	11	1·84	17	3·14	22	10·38	23	15·42	22	5·99	22	10·97	9	3·09	203	72·88
Government House	90	19	5·72	12	1·38	18	1·47	10	1·32	18	3·05	15	2·41	18	2·10	25	13·37	24	15·5	24	5·99	21	14·33	14	4·40	218	71·05
District A	97	17	3·45	11	1·30	19	1·53	10	1·50	15	3·80	15	2·11	17	1·85	22	12·20	21	11·17	20	4·77	21	11·67	12	4·31	198	58·96
Bush Hall	110	14	4·87	11	·97	18	1·61	8	1·17	15	2·47	13	1·55	17	1·99	22	10·77	22	12·06	20	5·49	24	10·30	15	3·72	199	56·97
Whitehall	223	10	5·52	4	·60	9	1·85	6	1·78	11	3·40	7	1·57	9	2·56	17	11·95	21	13·09	15	7·69	16	11·53	11	4·68	136	66·22
Grazotts	70	15	5·11	8	·92	13	1·30	8	1·42	10	2·07	12	1·59	11	1·56	19	10·54	21	13·28	17	5·86	20	10·86	13	3·97	167	58·48
Dayrells	...	12	8·17	8	1·35	17	2·30	8	2·73	17	5·06	7	1·67	14	2·95	22	10·28	23	14·47	20	6·17	18	11·70	10	3·47	175	70·32
Fairfield	...	10	4·70	4	1·20	8	1·31	6	1·51	9	2·55	11	2·06	10	1·53	16	10·53	18	11·73	12	5·57	13	11·77	8	2·96	125	57·72
Total	...	158	66·74	104	14·78	164	19·34	99	20·69	151	36·74	132	21·84	150	24·88	226	122·39	211	144·84	185	65 00	199	129·02	114	4) ·69	1,833	708·45
Average	...	14·36	6·07	9·45	1·34	14·91	1·76	9·00	1·88	13·73	3·34	12·00	1·99	13·64	2·26	20·55	11·17	21·10	13·17	18·50	5·91	19·90	11·73	11·40	3·79	178·54	64·41
II.—District B. Christ Church. (Lowlands.)																											
Woodbourne	150	10	8·64	7	2·09	6	1·36	5	2·03	11	3·07	12	2·63	11	2·43	17	10·96	22	16.24	18	8 97	21	12·42	9	3·47	149	74·31
Lowthers	220	11	8·43	10	1·04	13	1·88	6	2·20	16	3·58	20	2·90	19	3·01	21	10·68	22	14·86	20	8·98	21	11·54	12	3·26	191	72·36
Seawell	...	11	7·90	8	1·12	10	2·16	6	2·29	11	5·76	9	3·50	11	2·72	18	12·36	18	14·25	11	7·16	19	13·50	9	4·91	141	76·87
Coverley	254	12	7·71	8	1·26	11	1·55	10	2·61	9	3·90	14	3·59	15	3·32	25	13·10	24	15·60	18	9·25	24	15·82	16	4·39	186	82·16
Hannays	183	13	8·19	7	2·63	6	1·83	8	2·68	14	3·49	10	2·20	9	2·32	17	10·31	21	18·15	14	10·14	15	11·27	10	3·07	144	76·23
Searles	283	13	6·70	7	1·54	6	1·34	7	2·36	8	3·01	17	2·96	17	3·21	21	11·11	22	16·31	23	8·91	22	12·99	13	4·03	176	74·47
Balls	270	15	5·74	18	1·42	14	1·71	13	1·98	15	3·64	18	3·20	17	2·99	20	12·54	22	14·47	22	7·68	25	12·66	15	3·87	207	72·10
Gibbons	195	16	6·73	13	1·60	14	2·29	13	2·26	15	5·04	14	2·93	15	2·93	20	12·07	23	13·71	13	6·48	23	12·89	16	3·65	194	72·58
Lower Greys	...	16	7·88	11	2·02	17	1·52	9	1·85	12	2·71	17	1·71	13	1·81	21	11·24	22	17·14	17	9·97	20	12·60	14	2·96	189	73·56
Newton	...	11	6·89	9	2·58	13	1·54	10	3·00	16	4·32	10	3·47	13	3·15	15	11·60	25	16·52	19	8·29	23	13·44	15	4·21	179	77·92
Bannatyne	207	12	7·53	9	3·09	6	1·41	5	2·33	9	4·36	9	3·13	9	2·79	13	12·15	18	17·06	10	7·87	17	12·80	8	4·00	125	78·42
Maxwells	20	12	4·69	9	1·56	13	1·70	8	1·97	11	4·74	10	2·82	13	2·68	18	11·61	19	12·86	12	7·02	19	12·34	11	3·83	155	67·82
Hastings	...	14	2·77	9	1·16	14	1·43	11	1·60	17	4·77	15	2·52	19	1·94	22	10·61	25	10·01	21	4·15	24	10·16	14	4·00	205	55·12
Durants	...	12	5·02	9	1·49	11	1·70	8	1·50	10	4·45	4	2·55	10	2.37	15	12·46	17	12·02	10	6·64	15	10·44	9	4·50	130	65·34
Ridge	362	16	7·55	8	2·94	7	1·84	6	2·91	13	2·96	12	3·28	11	2·48	17	11·85	19	16·35	18	8·87	20	12·86	6	3·26	153	76·19
Bentley	169	16	7·56	10	1·51	9	1·41	8	2·81	12	3·70	14	1·79	13	1·79	20	11·42	21	19·59	19	9·58	20	12·56	12	3·12	174	76·84
Maynards	...	13	5·71	10	2·05	11	1·64	8	2·01	13	4·21	8	3·08	11	2·73	16	12·46	16	11·70	16	7·98	22	12·50	11	4·19	154	70·26
Spencers	...	8	8·30	4	·77	6	1·08	3	1·80	9	2·67	8	3·48	7	1·78	8	11·48	15	14·99	8	7·41	11	12·20	5	4·37	99	70·33
Wilcox	...	16	6·48	12	·97	15	1·90	9	1·80	16	4·86	16	3·02	16	2·55	20	12·17	22	13·92	16	6·48	23	13·20	13	3·30	194	70·65
Little Foursquare	...	11	7·54	8	1·74	10	1·60	7	2·04	11	9·82	8	2·19	10	2·49	24	10·22	19	14·81	19	7·61	22	12·47	10	2·24	159	68·87
Total	...	258	137·82	181	34·78	212	32·89	160	41·98	247	78·66	245	56·95	259	51·49	368	232·34	411	300·56	324	159·44	406	250·72	228	74·57	3,299	1,452·20
Average	...	12·90	6·89	9·05	1·74	10·60	1·64	8·00	2·10	12·35	3·93	12·25	2·85	12·95	2·57	18·40	11·62	20·55	15·03	16·20	7·97	20·30	12·54	11·40	3·73	164·95	72·61
St. George. (Highlands.)																											
Lemon Arbor	720	7	11·66	6	1·90	6	2·93	5	4·35	8	4·28	3	2·48	8	4·15	14	9·53	18	20·38	10	9·82	14	12·84	5	2·80	104	87·18
Ashbury	...	13	12·29	13	2·05	13	2·68	11	3·70	13	3·26	12	2·16	16	3·86	23	9·37	22	17·81	20	10·91	20	11·49	13	4·04	189	83·62
Cottage	720	14	11·67	10	1·63	18	3·52	14	4·09	15	5·48	10	2·35	18	4·29	19	10·41	24	18·50	17	12·46	21	11·76	12	3·74	192	90·80
Groves	747	15	14·36	11	2·32	16	4·33	10	4·77	15	5·73	13	3·00	20	4·89	22	11·47	25	20·74	22	13·79	20	14·26	12	4·24	201	103·90
Moonshine	537	12	10·99	7	1·65	15	2·68	2	3·39	14	4·68	11	2·13	14	3·24	18	8·48	22	15·10	19	8·24	20	12·37	10	3·18	171	75·98
Golden Ridge	877	17	13·55	11	1·91	17	3·49	15	3·94	17	4·15	12	2·48	17	4·66	21	11·22	26	19·00	22	10·83	20	12·17	11	3·41	204	91·11
Woodland	...	16	8·56	15	1·48	21	2·04	14	3·43	19	3·46	13	1·86	19	2·75	21	9·12	24	16·92	24	10·22	22	12·16	13	3·93	221	75·93
Farm	...	14	11·23	9	2·12	20	3·48	12	4·63	16	5·30	14	3·94	17	4·06	21	11·42	22	19·13	22	10·66	21	13·78	12	4·11	200	93·26
Total	...	108	94·31	82	15·06	126	25·05	88	33·20	117	36·59	88	19·80	129	31·90	159	81·02	188	147·58	156	86·93	158	100·83	88	29·51	1,482	701·78
Average	...	13·50	11·79	10·25	1·88	15·75	3·13	11·00	4·15	14·62	4·57	11·00	2·47	16·12	3·99	19·87	10·13	22·87	18·45	19·50	10·87	19·75	12·60	11·00	3·69	185·25	87·72

BARBADOS RAINFALL FROM JANUARY TO DECEMBER 1895—CONTINUED.

NAME OF STATION.	Elevation.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Totals.	
	Feet.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
II.—DISTRICT B.—Contd.																											
St. George. (Lowlands.)																											
District B...	...	16	9·32	8	1·95	15	1·63	11	2·05	13	3·72	12	2·21	17	1·78	28	12·70	22	15·65	24	9·80	17	14·86	11	3·94	189	79·61
Carmichaels	...	13	8·07	7	1·82	8	1·94	6	2·47	14	3·59	10	2·59	12	1·91	19	11·20	20	15 2·1	18	8·55	20	14·14	11	3·17	163	74·53
Constant	194	14	7·10	7	1·89	9	1·77	7	1·94	11	3·23	8	2·50	12	2·40	25	12·67	23	15·25	17	8·49	18	13·91	9	3·48	160	74·53
Valley	162	10	7·27	7	1·90	14	2·15	6	1·75	10	3·74	14	2·04	15	2·40	21	12·90	16	14·65	17	7·27	18	12·31	11	3·58	159	71·96
Brighton	...	17	9·69	8	1·86	12	2·13	8	2·85	15	3·04	12	2·12	15	2·43	22	12·69	18	19·84	17	10·22	18	14·95	11	3·90	173	85·70
Total...	...	70	41·48	37	9·42	58	9·62	38	11·06	63	17·32	56	11·37	71	10·92	110	62·16	99	80·61	88	44·33	91	70·17	53	18·07	834	386·49
Average	...	14·00	8·29	7·40	1·88	11·60	1·92	7·60	2·21	12·60	3·46	11·20	2·27	14·20	2·18	22·00	12·43	19·80	16·12	17·60	8·87	18·20	14·03	10·60	3·61	166·80	77·27
III.—DISTRICT C.																											
St. Philip. (Highlands.)																											
District C	505	16	9·82	9	1·42	14	1·79	9	2·91	16	2·87	18	1·90	20	2·22	21	9·70	22	15·96	19	8·81	22	15·31	18	5·42	193	78·83
Clifden	...	18	10·39	11	2·52	20	2·61	13	3·64	20	2·95	13	1·99	14	2·58	22	9·96	24	13·18	22	8·94	21	16·11	15	4·35	213	84·31
Hill View	507	13	10.90	13	2·59	19	2·50	9	3·18	14	2·58	14	1·95	15	2·40	21	9·89	21	15·58	18	9·13	20	13·40	14	4·14	191	78·19
Total	...	47	31·11	33	6·53	53	6·90	31	9·73	50	8·40	40	5·85	49	7·20	64	29·55	67	49·67	59	26·88	63	44·82	47	13·91	603	241·33
Average	...	15·67	10·37	11·00	2·18	17·67	2·30	10·33	3·24	16·67	2·80	3·33	1·94	16·33	3·63	21·33	9·85	22·33	16·56	19·67	8·96	21·00	14·94	15·67	4·64	201·00	80·41
ST. PHILIP. (Lowlands.)																											
Bayleys	128	12	8·28	5	1·03	8	·96	4	1·54	10	1·57	9	1·21	13	1·99	18	6·95	22	12·42	16	7·13	18	10·94	13	3·68	147	57·70
Mapps	150	13	8·70	8	1·30	9	1·46	6	2·17	11	2·00	8	1·49	10	1·92	21	7·57	19	13·98	17	7·63	22	12·92	10	3·92	154	65·05
Golden Grove	113	20	9·59	13	1·50	19	1·48	11	2·26	16	2·19	16	2·21	20	2·05	24	7·80	25	14·28	19	7·21	21	11·88	15	4·33	219	67·68
Eastbourne	...	12	8·73	10	1·36	12	1·53	9	2·54	15	2·32	11	1·64	18	2·32	20	8·23	21	13·82	15	6·85	20	13·79	9	3·58	172	69·71
Wiltshires	121	14	10·62	5	1·15	9	1·09	6	2·55	11	2·20	10	2·18	7	1·64	15	8·48	17	16·69	12	6·58	15	15·14	10	4·98	131	76·25
Three Houses	135	12	8·61	7	1·37	11	1·47	7	2·54	13	2·24	11	2·33	15	2·98	21	7·91	20	14·60	17	7·39	16	13·34	13	5·36	163	70·14
Sandy Hill	125	8	6·29	7	·99	6	1·17	4	2·46	15	2·95	14	1·69	12	2·36	22	9·18	21	14·35	15	6·21	19	14·22	9	3·29	152	66·66
Kirton	74	11	7·76	9	·91	15	1·67	5	2·68	16	3·01	19	2·42	16	2·40	23	10·48	25	18·75	18	7·60	24	13·29	12	4·54	193	75·51
Fortescue	150	12	8·81	10	1·11	14	1·42	10	2·64	13	2·62	13	2·20	18	3·21	19	7·50	22	12·46	19	8·07	18	13·40	18	5·31	186	68·65
Thicket	243	13	9·12	6	1·44	8	1·51	7	2·54	12	2·29	11	2·02	17	3·15	21	8·48	21	15·67	20	8·21	17	13·96	16	5·02	168	73·39
Bushy Park	161	17	7·60	10	1·23	12	1·84	8	3·07	15	2·13	11	1·62	16	2·15	24	10·10	23	15·00	20	7·95	24	14·59	14	4·07	194	71·25
Congo Road	119	15	6·68	9	1·39	13	1·53	7	2·62	14	2·33	11	1·61	13	1·96	23	10·78	22	14·33	21	6·81	22	13·47	9	3·24	179	66·77
Senhouse Grove	105	10	6·59	7	1·23	7	1·32	5	2·98	13	3·06	13	1·81	12	2·20	20	11·00	23	17·44	19	8·21	21	14·38	9	4·74	158	74·96
Oughterson	291	15	7·88	12	1·48	15	1·82	10	2·84	16	2·14	15	1·85	18	2·37	22	8·70	24	13·34	25	7·91	21	12·54	14	4·62	207	67·49
Dodds	210	15	7·64	10	1·80	15	1·89	10	3·48	16	2·72	16	1·74	19	2·13	24	10·59	21	14·93	15	8 38	20	13·31	12	4·71	193	78·32
Sunbury	...	14	7·4	9	1·82	13	1·86	6	2·95	12	2·91	10	1·67	10	1·76	20	11·34	23	16·24	16	8·36	20	13·11	10	3·9	163	73·39
Hampton	193	13	7·54	6	2·10	16	1·72	5	2·82	14	3·50	10	1·94	13	1·96	20	10·49	23	16·67	18	9·16	18	14·92	10	3·67	166	75·89
Carringtons	110	14	8·03	9	2·10	18	1·98	11	3·87	17	4·12	19	2·34	18	2·61	20	11·78	22	19·40	19	10·32	19	14·94	9	1·23	195	86·99
Chapel	228	11	9·8	13	2·08	11	2·19	8	3·70	15	3·40	11	1·99	13	2·40	20	11·10	21	18·05	17	10·44	20	15·01	10	4·25	170	84·49
Halton	264	17	10·59	15	2·27	20	2·32	14	3·68	19	3·36	16	2·00	20	2·75	25	10·83	26	17·18	21	9·29	21	14·04	17	4 30	231	82·61
Edgecombe	207	18	8·85	8	1·70	10	1·91	8	3·06	13	3·86	8	2·29	12	2·36	24	11·50	20	20·12	16	10·51	20	14·68	10	2·98	167	83·82
Foursquare	...	15	8·82	10	1·22	13	1·98	6	2·51	13	3·61	19	3·83	17	2·47	24	11·06	22	17·62	19	9·51	24	13·70	12	4·19	193	73·58
Summervale	...	15	8·09	11	1·63	11	1·75	8	2·90	16	2·20	11	1·81	17	2·33	22	9·88	23	14·60	18	8·44	18	13·66	14	4·71	184	71·35
Marchfield	..	19	8·00	12	2·40	16	2·14	7	3·37	15	3·60	9	2·21	16	2·32	21	12·15	21	17·07	17	8·74	18	13·74	8	4·81	179	80·55
Total	..	334	200·19	221	36·91	301	40·01	182	67.77	340	66·33	289	46·77	360	57·69	513	283·83	527	379·01	429	198·91	476	328·27	282	102·51	4,264	1,758·20
Average	...	13·95	8·84	9·21	1·54	12·54	1·67	7·58	2·82	14·17	2·76	12·46	1·95	15·00	2·40	21·38	9·74	21·96	15·79	17·88	8·29	19·83	13·68	11·75	4·27	177·68	73·25

BARBADOS RAINFALL FROM JANUARY TO DECEMBER 1895—CONTINUED.

NAME OF STATION.	Elevation.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Totals.	
	Feet.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
III.—DISTRICT C.—Contd.																											
ST. JOHN. (Highlands.)																											
Stewarts Hill	580	13	10·23	8	1·12	16	1·35	9	2·40	16	2·74	14	2·27	16	2·61	15	6·47	19	13·44	17	7·19	18	12·56	15	5·72	175	68·10
Mencrieffe	552	14	10·45	6	1·40	15	1·98	9	2·89	19	2·90	13	2·05	17	3·13	20	9·17	23	17·66	21	7·99	21	14·91	17	6·86	184	81·89
Society	570	15	11·88	9	1·65	15	2·52	12	3·06	11	2·27	17	3·90	15	3·49	15	6·84	25	16·94	14	6·31	20	14·28	14	5·47	182	78·56
Guinea	538	19	11·60	17	1·85	21	1·98	15	3·46	21	3·34	18	2·73	19	3·50	21	10·32	27	18·62	23	9·31	20	12·70	18	6·23	219	85·64
Cliff	534	17	10·23	15	2·15	17	2·12	16	3·93	19	3·60	16	3·17	15	3·84	19	9·91	22	18·17	20	8·85	18	14·57	14	5·46	208	86·00
Colleton	767	17	13·28	12	2·32	13	2·21	11	3·35	18	3·28	15	2·78	14	3·83	19	9·13	24	18·95	21	10·80	23	15·56	18	5·15	204	90·59
Ashford	606	17	10·39	11	2·16	16	2·29	10	3·19	14	3·95	17	3·16	17	3·36	18	8·18	24	18·92	21	9·29	21	13·99	17	4·14	204	83·72
Pool	716	15	11·14	11	1·92	18	2·47	12	3·86	19	3·93	17	3·27	17	3·41	22	9·12	28	18·89	20	11·09	22	14·58	14	4·81	215	88·49
Henley	553	15	12·16	12	2·01	17	3·32	10	4·72	16	3·69	12	3·16	18	3·80	18	10·07	23	18·45	20	11·28	19	15·56	12	5·11	192	93·33
Todds	641	16	10·87	12	1·75	19	3·47	13	4·14	22	4·34	17	2·93	16	3·83	22	9·88	25	19·52	18	10·83	20	15·48	9	4·48	211	91·72
Hothersal	742	14	12·16	12	2·26	16	3·40	13	4·15	14	3·48	13	2·71	13	3·71	19	9·09	23	18·80	21	12·27	22	16·90	13	5·20	192	94·43
Haynesfield	707	14	10·87	13	1·75	13	2·87	17	5·35	18	3·36	9	2·89	14	3·88	21	12·92	22	22·50	17	15·33	20	14·54	6	1·94	179	98·10
Malvern	900	15	10·91	13	2·48	17	2·00	14	3·90	12	2·86	17	2·86	11	2·92	20	9·92	23	18·83	19	14·49	23	15·43	15	5·08	199	91·88
Kendal	544	15	11·22	8	1·99	16	2·63	10	3·99	16	3·96	12	2·85	12	3·41	15	10·04	23	18·36	18	9·66	19	14·82	13	5·46	177	88·41
Claybury	750	17	10·79	10	1·85	16	3·27	12	5·25	16	4·37	16	3·59	17	3·29	24	10·36	24	19·02	20	10·91	24	14·21	14	4·04	210	91·23
Bowmanston	521	17	11·53	15	2·22	21	3·02	13	4·28	16	4·89	16	3·45	17	4·24	22	10·28	24	20·76	23	11·76	21	16·49	18	5·51	223	98·36
Total	...	252	180·46	184	30·88	265	40·90	196	61·93	263	58·90	237	51·77	248	56·25	310	151·70	379	297·83	313	167·46	330	236·58	2·27	80·96	3,203	1,409·45
Average	...	15·75	11·28	11·50	1·93	16·56	2·56	12·25	3·87	16·37	3·68	14·81	3·99	15·50	3·52	19·37	9·48	23·69	18·61	19·56	10·46	20·62	14·79	14·19	5·06	200·18	88·09
ST. JOHN. (Lowlands.)																											
Codrington College	...	13	9·60	5	1·38	12	1·61	7	2·53	14	2·34	9	1·01	13	3·39	19	6·56	26	15·27	19	6·21	20	13·95	17	5·68	174	70·78
College	...	13	7·29	4	·74	10	1·60	7	1·98	11	1·99	9	·83	11	2·59	13	6·07	18	11·48	16	5·21	14	9·81	11	3·34	131	53·41
Newcastle	238	13	9·60	14	1·74	16	2·11	13	3·48	15	2·62	15	1·33	16	3·35	25	8·23	25	16·66	17	9·21	23	13·21	17	4·38	209	76·51
Total	...	39	26.19	23	3·81	38	5·32	27	7·94	40	7·05	33	3·17	40	9·33	57	20·86	69	43·41	46	20·72	57	36·47	45	13·40	514	200·70
Average	...	13·00	8·73	7·67	1·27	12·67	1·77	9·00	2·65	13·33	2·35	11·00	1·06	13·33	3·11	19·00	6·95	23·00	14·47	15·33	6·91	19·00	12·16	15·00	4·47	171·33	66·91
IV.—DISTRICT D.																											
ST. THOMAS. (Highlands.)																											
Mount Wilton	987	10	11·30	13	2·18	14	3·50	10	5·62	18	4·05	11	2·98	14	4·01	19	11·29	22	20·01	19	12·41	18	11·64	13	4·31	180	93·38
Bloomsbury	1035	12	13·66	7	2·39	18	3·97	13	6·38	16	3·97	14	3·81	13	4·03	22	10·98	25	20·26	22	13·62	21	13·65	10	3·86	195	100·58
Sturges	905	17	15·40	15	2·81	23	4·29	16	7·53	21	5·49	23	5·42	21	4·70	27	11·91	28	23·25	26	14·01	23	15·80	17	4·57	257	114·19
Westwood	1002	16	13·10	15	3·15	19	3·59	15	6·93	19	4·40	17	3·44	18	4·13	25	11·05	24	21·12	22	12·87	23	14·39	15	4·78	227	104·10
Lion Castle	900	17	12·57	12	3·06	19	3·62	16	6·63	19	4·36	16	3·14	20	3·88	27	10·56	26	20·19	24	12·32	23	12·62	14	3·43	230	96·23
Canefield	1024	14	11·57	12	2·66	20	4·19	13	4·57	18	4·52	18	3·71	18	4·10	28	9·75	25	20·24	23	11·73	25	13·99	16	4·53	229	95·34
Dunscombe	850	13	10·53	12	2·25	15	3·03	10	4·89	17	4·09	15	3·08	16	4·37	20	9·57	26	22·72	23	13·23	25	16·92	16	4·65	241	100·11
Farmers	903	12	11·58	8	2·52	12	4·40	10	5·74	12	5·79	11	3·81	15	5·59	19	9·68	21	22·15	23	15·00	21	15·56	10	4·25	174	103·56
District D	678	17	10·86	15	2·50	21	4·32	17	5·54	22	5·08	22	5·61	21	4·02	27	10·57	26	20·04	25	11·66	25	12·36	16	4·65	254	91·55
Lowis	602	13	9·25	12	1·81	15	2·86	10	4·33	11	4·39	14	3·71	15	3·86	19	8·27	26	19·46	20	11·81	23	14·15	11	4·10	191	86·06
Ashford	...	18	11·56	16	3·23	23	3·01	14	5·68	19	5·21	20	4·91	20	4·00	26	12·03	23	20·49	27	11·79	23	13·87	16	4·15	251	97·96
Total	...	158	131·25	137	28·20	199	41·19	132	61·70	184	50·75	180	46·45	191	46·49	254	116·32	276	230·23	254	133·58	250	153·35	156	46·97	2,952	1,086·05
Average	...	14·36	11·94	12·45	2·57	18·09	3·74	12·91	5·61	17·01	4·62	16·36	4·23	17·36	4·23	23·09	10·57	25·27	20·93	23·09	12·78	22·73	13·94	14·18	4·27	217·72	98·73

BARBADOS RAINFALL FROM JANUARY TO DECEMBER 1895—CONTINUED.

NAME OF STATION.	Elevation.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Totals.	
	Feet.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
V.—DISTRICT D.—Contd.																											
ST. THOMAS.																											
(Lowlands.)																											
Fisherpond	725	14	12·32	14	1·99	14	2·87	11	4·09	20	4·34	14	2·58	16	3·53	22	12·53	24	18·17	19	11·14	21	12·88	11	3·11	200	89·35
Bushy Park	700	16	13·01	16	2·64	16	4·03	9	5·29	17	4·74	10	2·05	10	2·55	20	11·88	27	21·66	23	13·73	21	13·89	19	4·21	204	99·68
Olive Branch	680	14	9·74	14	4·24	22	3·70	14	4·66	16	5·35	18	4·04	18	5·38	16	13·92	26	21·24	21	11·39	26	13·31	19	6·08	232	102·90
Selkirks	616	17	14·99	14	2·71	22	4·00	12	4·55	21	5·22	10	3·09	16	4·91	23	12·69	27	21·62	25	11·49	24	13·48	15	3·88	228	101·67
Clifton	756	...	12·25	...	1·96	...	3·20	...	5·62	..	4·99	...	3·68	...	4·12	...	14·70	...	15·57	...	10·85	...	9·73	...	3·93	...	86·60
Hopewell	534	15	11·54	14	2·73	18	4·00	12	5·13	17	5·38	12	3·24	20	4·95	26	11·24	28	19·07	22	7·98	25	12·09	15	3·93	224	90·68
Edghill	453	11	8·39	4	·98	9	2·68	7	4·01	11	4·22	6	2·08	15	2·94	23	9·76	23	16·84	22	7·80	24	10·87	11	3·37	166	73·64
Welches	398	12	6·62	10	·63	12	1·88	8	2·18	16	4·06	9	1·57	15	2·47	22	9·29	20	14·04	20	7·60	20	10·33	15	2·88	179	63·55
Bennetts	350	20	9·17	16	2·19	23	4·14	13	4·18	20	6·15	17	3·18	21	3·99	28	11·21	26	19·39	20	9·82	25	14·67	17	4·20	246	92·20
Bagatelle	...	14	7·45	9	1·02	15	2·43	10	3·20	12	4·44	13	3·17	16	2·94	21	9·63	24	17·89	22	10·09	24	11·54	11	2·93	191	75·73
Grand View	...	12	8·82	10	1·21	12	2·09	12	2·84	13	2·98	12	1·83	15	2·31	22	8·66	22	14·83	21	7·51	23	7·13	15	2·41	189	62·14
Mangrove Pond	...	15	9·53	14	1·93	20	3·99	12	4·57	18	4·48	17	3·17	17	3·88	22	10·53	26	16·84	25	9·35	26	12·40	14	3·58	226	84·25
Strong Hope	590	12	11·35	12	2·09	16	3·01	11	4·44	14	5·04	14	2·87	18	4·39	22	11·60	26	18·57	21	10·07	20	12·82	12	4·07	198	90·38
Exchange	...	14	10·96	12	2·10	18	2·63	9	3·78	17	5·56	15	2·91	16	4·50	21	11·30	25	16·83	28	7·69	23	12·55	11	3·98	204	85·09
Total	...	186	145·14	159	28·42	217	45·55	140	58·44	212	66·95	165	36·96	215	52·42	288	156·02	324	252·56	284	136·51	302	166·99	185	51·91	2,677	1,197·86
Average	...	14·31	10·37	12·23	2·03	16·69	3·25	10·77	4·17	16·31	4·76	12·69	2·64	16·54	3·74	22·15	11·14	24·92	18·04	21·85	9·75	23·23	11·93	14·23	3·71	205·92	85·55
ST. JAMES.																											
(Highlands.)																											
Springhead	860	10	7·58	9	1·15	14	3·85	10	3·54	16	4·39	14	3·32	17	3·03	20	9·48	23	19·28	24	14·86	24	16·24	15	5·39	195	91·61
Taitts	684	15	6·06	9	·98	12	2·50	10	3·70	17	4·52	10	2·43	14	2·40	22	8·76	23	19·98	22	13·88	24	14·24	19	5·53	196	86·89
Sion Hill	618	11	6·78	7	·91	14	2·53	11	4·08	17	5·06	12	3·88	16	3·37	17	9·32	28	22·04	22	16·00	19	16·90	16	5·83	190	96·70
Total	...	36	21·42	25	3·04	40	8·88	31	11·32	49	13·97	36	10·64	47	8·80	59	27·56	73	61·30	68	44·74	67	47·38	50	16·75	581	275·20
Average	...	12·00	7·11	8·33	1·01	13·33	2·79	10·33	3·77	16·33	4·66	12·09	3·55	15·67	2·93	19·67	9·19	24·33	20·43	22·67	14·91	22·33	15·79	16·67	5·58	193·66	91·72
ST. JAMES.																											
(Lowlands.)																											
Blowers	...	10	7·92	9	1·65	14	3·52	10	3·98	13	3·97	9	2·57	18	3·24	21	8·90	26	19·84	21	11·65	23	14·39	14	3·87	187	84·14
Westmoreland	332	13	4·77	8	1·03	15	2·33	7	1·68	12	3·28	14	2·83	14	2·98	20	6·70	28	15·68	26	16·01	25	13·13	16	4·55	195	69·47
Carlton	130	11	5·24	8	·97	16	2·56	10	3·36	13	3·18	13	2·19	19	3·10	22	8·50	26	19·04	28	10·85	23	13·74	17	4·59	209	79·01
Mount Standfast	198	11	4·06	11	1·28	17	3·23	9	2·52	12	3·03	11	2·19	14	2·85	18	6·45	28	12·15	16	7·55	23	10·85	11	2·87	171	58·84
Porters	...	11	4·66	11	·99	17	3·22	8	3·34	14	3·17	13	2·27	16	2·67	20	7·29	24	13·69	19	8·17	21	9·88	14	2·75	181	62·04
Trents	...	12	5·77	12	·86	13	2·82	9	3·83	15	3·60	13	2·52	14	2·92	21	7·41	19	14·05	18	7·59	20	10·71	9	2·66	177	63·52
Hole Town Police Station	...	10	5·73	8	·65	16	3·07	8	2·85	13	3·25	10	1·17	14	2·18	17	6·2	17	10·17	19	7·64	20	7·84	12	2·95	161	54·04
St. Silas Vicarage	589	14	4·57	6	1·86	18	3·55	9	3·65	11	3·78	15	3·87	14	4·43	21	8·45	25	16·27	26	10·47	22	12·35	13	4·15	197	77·40
Plum Tree	...	16	7·90	10	2·23	20	4·19	18	5·65	17	4·02	16	4·50	19	4·56	21	9·06	28	19·97	23	13·52	24	14·77	17	3·90	229	93·35
Apes Hill	...	13	7·37	11	1·88	17	3·82	9	3·27	13	3·67	19	4·61	20	4·72	18	8·12	22	19·42	28	14·42	25	14·29	14	4·79	209	90·26
Total	...	121	87·0	94	13·44	165	32·61	97	33·05	133	35·45	134	29·28	157	33·65	202	76·81	283	166·25	224	101·32	226	132·04	137	36·10	1,92	732·35
Average	...	12·10	8·70	9·40	1·34	16·50	3·26	9·70	3·30	13·30	3·54	13·40	2·97	15·70	3·36	20·20	7·61	28·30	16·62	22·40	10·13	22·60	13·20	13·70	3·61	192·16	73·21

BARBADOS RAINFALL FROM JANUARY TO DECEMBER 1895—CONTINUED.

NAME OF STATION.	Elevation.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Totals.	
	Feet.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches	Days.	Inches.	Days.	Inches.	Days.	Inches.
V.—DISTRICT E.																											
ST. PETER.																											
(Highlands)																											
Nicholas Abbey	824	10	6·29	5	·60	9	1·28	9	2·49	12	4·28	9	1·74	14	3·06	23	8·96	26	23·55	21	13·53	19	9·23	15	5·04	172	80·11
Oxford	436	12	4·70	11	·85	12	1·60	9	1·49	13	3·87	13	1·81	14	2·46	21	7·02	26	18·82	22	13·17	20	7·89	13	4·67	185	68·35
Orange Hill	...	13	4·66	13	1·47	16	3·00	10	2·75	11	3·92	12	2·51	20	3·65	27	11·15	26	21·34	22	13·79	22	13·64	14	4·93	216	86·81
Rock Hall	...	13	7·20	7	1·32	13	2·87	8	3·24	13	4·74	12	3·37	15	4·39	20	11·33	25	23·43	21	18·35	23	17·20	15	5·90	185	103·34
Mangrove	...	15	6·24	10	1·29	16	2·88	11	3·18	12	4·52	12	2·63	16	4·02	20	9·04	25	19·91	20	16·44	18	14·03	13	5·16	186	89·34
Black Bess	581	9	6·21	4	·90	7	2·18	5	2·77	9	3·92	6	2·42	9	3·43	14	8·28	20	18·89	15	14·49	19	13·78	9	3·96	126	81·23
The Castle	700	10	5·68	5	·88	6	1·64	6	2·02	11	4·26	9	1·48	11	2·83	21	7·60	26	20·49	19	13·29	19	9·60	10	4·78	153	74·85
Total	...	82	40·98	55	7·17	79	15·45	58	17·94	80	29·61	71	15·96	99	23·84	146	63·38	174	146·43	140	103·06	140	85·37	89	34·44	1213	583·53
Average	...	11·71	5·85	7·86	1·02	11·29	2·21	8·29	2·56	11·43	4·22	10·14	2·28	14·14	3·41	20·86	9·05	24·86	20·93	20·00	14·72	20·00	12·20	12·71	4·92	173·29	83·36
ST. PETER.																											
(Lowlands.)																											
Whitehall	...	9	4·13	10	·96	13	1·72	5	2·15	9	1·97	8	1·52	11	3·17	15	9·14	18	17·65	18	12·05	13	11·81	8	4·05	131	70·32
Alleyndale	353	11	4·97	7	·80	11	1·81	9	2·28	12	3·63	13	1·98	13	2·54	21	8·11	25	18·69	22	13·68	21	9·76	14	5·91	179	74·11
Bakers	380	10	4·89	6	1·12	10	1·78	7	2·21	7	3·55	8	2·18	12	3·08	17	7·90	20	17·26	17	13·46	21	12·69	6	3·45	141	72·57
Maynards	69	16	4·32	9	·97	11	1·33	10	2·18	11	2·96	14	1·88	13	2·55	22	7·40	26	18·12	21	12·72	22	9·98	15	4·80	190	69·21
District E	150	15	5·69	14	1·35	17	2·13	10	2·70	13	4·08	18	2·85	18	4·19	24	9·79	20	22·88	26	16·83	25	14·51	15	5·62	224	92·62
Ashton Hall	...	11	4·89	11	1·48	12	1·41	7	2·21	11	3·21	15	2·15	16	3·03	24	8·89	26	18·71	23	12·01	22	11·32	16	4·52	194	73·74
Six Mens	...	13	4·21	7	·76	13	1·87	10	2·06	13	2·81	12	1·52	18	2·96	22	7·85	29	17·87	21	12·84	22	10·14	13	3·94	193	68·83
Heywoods	...	13	4·36	7	·89	8	1·24	9	2·30	11	3·12	11	2·15	15	3·19	21	7·48	27	17·94	16	10·77	18	10·67	9	2·98	165	67·10
Gibbes	50	10	5·12	6	·88	12	2·44	6	3·04	8	3·54	10	3·25	11	3·26	19	8·63	21	18·82	18	11·06	18	15·22	8	3·76	147	79·02
Total	...	108	42·58	77	9·21	106	15·78	73	21·13	95	28·88	109	19·43	127	27·97	185	75·10	221	167·94	177	114·42	182	106·10	104	39·03	1,564	667·52
Average	...	12·00	4·73	8·56	1·02	11·78	1·75	8·11	2·35	10·56	3·21	12·11	2·16	14·11	3·11	20·56	8·34	24·56	18·66	19·67	12·71	20·22	11·79	11·56	4·34	173·80	74·17
ST. LUCY.																											
(Lowlands.)																											
Lamberts	950	13	5·99	10	·54	16	1·54	13	1·68	13	4·85	15	2·09	19	2·54	24	6·80	25	16·43	24	10·26	15	6·85	17	4·42	208	63·01
Mount Gay	...	10	6·97	5	·87	10	1·71	9	2·33	10	5·91	11	2·63	14	3·15	20	6·79	23	18·27	21	14·02	18	7·93	15	4·33	166	74·86
Pickerings	...	12	6·24	6	·65	13	1·81	8	2·05	11	5·76	12	2·61	16	3·51	21	8·16	25	21·32	23	15·95	21	8·94	15	5·08	181	82·08
Spring Hall	71	12	4·35	9	·69	11	1·48	8	1·44	12	3·61	11	1·93	18	2·68	22	7·22	25	13·76	21	10·42	19	7·63	12	3·58	180	58·29
Hope	...	9	4·79	7	·78	10	1·60	9	1·41	14	4·55	11	2·23	15	2·84	22	9·12	23	14·75	22	9·55	20	9·49	14	3·38	176	64·49
Checker Hall	...	11	5·10	6	·71	11	1·61	7	1·58	14	3·73	12	1·78	15	2·41	25	7·61	25	15·55	21	11·04	20	7·55	12	3·83	180	62·51
Lowlands	...	7	4·55	5	·54	9	1·60	8	1·29	8	4·39	12	2·80	13	2·24	19	8·24	18	16·52	16	8·59	17	8·44	12	3·97	139	62·67
Husbands	184	6	4·92	1	·45	7	1·42	5	1·72	8	4·14	8	1·61	10	2·61	20	7·12	19	15·56	19	11·70	20	8·02	14	4·16	137	63·43
Collynns	...	7	5·26	1	·17	6	1·84	4	1·92	13	3·27	10	1·82	13	2·90	21	7·81	25	19·80	19	13·26	17	8·77	14	5·06	150	74·08
Total	...	87	48·87	50	5·40	93	14·61	68	15·42	101	41·22	102	18·96	133	24·28	195	68·47	208	151·96	186	104·81	171	73·67	123	37·81	1,517	605·42
Average	...	9·67	5·43	5·56	·60	10·33	1·62	7·56	1·71	11·22	4·58	11·33	2·10	14·78	2·70	21·67	7·61	23·11	16·88	20·67	11·65	19·00	8·19	13·67	4·20	168·57	67·27

BARBADOS RAINFALL FROM JANUARY TO DECEMBER 1895—CONTINUED.

NAME OF STATION.	Elevation.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Totals.	
	Feet.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
VI.—DISTRICT F.																											
ST. JOSEPH. (Highlands.)																											
Buckden	...	12	11·50	13	2·44	17	2·51	9	3·69	12	2·40	13	3·15	22	3·73	24	9·47	30	18·59	18	11·52	23	13·91	10	3·45	203	86·36
Little Island	1030	15	13·07	16	2·10	19	3·11	16	5·20	18	3·32	21	3·69	19	4·19	29	11·36	28	20·48	26	14·88	24	14·73	16	4·85	247	100·98
Blackmans	910	18	12·11	17	2·42	21	3·05	16	5·30	21	4·21	21	3·19	23	4·23	25	11·99	24	22·16	27	14·95	25	13·68	16	5·26	254	102·55
Blackmans House	960	17	13·23	17	2·50	19	3·06	15	5·25	19	4·67	22	3·38	22	4·47	27	11·98	30	23·88	26	15·10	24	12·16	19	5·81	257	109·45
Castle Grant	1079	11	10·96	12	1·35	17	2·65	14	4·23	16	3·19	16	3·03	17	3·66	27	10·35	28	19·46	23	13·30	26	12·45	16	7·02	223	89·65
Andrews	780	19	12·75	9	2·43	19	3·77	14	6·53	20	6·81	19	3·39	18	2·38	24	9·90	24	17·91	21	12·28	21	13·94	10	3·50	218	95·59
Lammings	1040	15	11·42	11	1·73	13	3·03	9	4·86	15	5·17	12	3·06	14	3·42	22	11·78	22	21·16	21	14·49	23	13·78	14	4·99	191	98·89
Retreat	...	18	12·82	15	2·83	20	3·76	17	5·82	17	4·51	20	3·75	19	4·34	26	12·72	25	21·79	25	14·27	23	13·75	15	6·31	240	106·67
Total	...	125	97·86	110	17·80	145	24·94	110	40·88	138	34·28	144	26·64	154	30·42	204	89·55	211	165·43	187	110·79	189	112·86	116	39·19	1,853	790·14
Average	...	15·62	12·23	13·75	2·22	18·12	3·12	13·75	5·11	17·25	4·28	18·00	3·33	19·25	3·80	25·50	11·19	26·27	20·68	23·37	13·85	23·62	14·04	14·50	4·90	229·10	98·75
ST. JOSEPH. (Lowlands)																											
Friezers	...	14	10·39	15	2·15	15	2·29	9	4·30	11	3·28	13	3·06	15	2·91	19	9·51	24	22·39	20	15·49	20	16·45	12	4·22	187	96·44
Mellows	...	9	9·51	11	2·02	10	2·31	12	3·51	10	2·45	9	2·50	14	2·91	20	8·25	28	17·99	21	13·86	19	11·35	16	4·00	174	80·66
Bissex Hill	723	10	8·36	12	2·12	15	3·03	7	3·50	11	3·77	12	3·40	13	2·84	22	10·28	28	22·84	25	16·81	20	15·13	16	4·64	191	96·22
District F	966	10	6·65	7	1·32	16	2·24	9	1·98	11	2·22	14	2·83	17	2·56	22	6·68	27	13·89	21	12·47	21	8·22	13	2·88	188	68·14
Parks	...	13	8·76	10	1·88	12	2·70	11	3·59	12	2·54	11	2·97	10	3·26	16	6·17	25	21·69	21	15·96	22	16·95	15	6·85	178	93·30
Spa	...	9	7·74	8	1·98	13	2·55	8	3·25	12	3·13	12	4·48	12	3·77	15	9·36	24	22·78	24	14·48	25	16·40	13	5·22	175	95·14
Foster Hall	193	11	7·27	10	1·94	18	2·92	9	3·55	14	4·16	19	4·39	17	3·06	18	9·24	26	17·49	21	12·67	21	13·63	12	3·94	196	84·26
Joes River	424	13	8·31	10	2·16	11	2·27	12	4·36	16	3·01	17	3·32	17	3·66	19	9·35	26	21·26	20	14·85	24	15·40	17	4·41	202	92·36
Total	...	89	66·99	83	15·57	110	20·31	77	28·04	97	24·56	107	26·45	115	24·97	151	68·84	203	159·83	173	116·59	172	113·51	114	36·16	14·91	701·82
Average	...	11·12	8·37	10·37	1·95	13·75	2·54	9·62	3·50	12·12	3·07	13·37	3·31	14·37	3·12	18·87	8·60	25·37	19·98	21·62	14·57	21·50	14·19	14·25	4·52	186·38	87·72
ST. ANDREW. (Highlands.)																											
Gregg Farm	...	16	8·28	11	1·69	16	3·19	11	2·78	17	3·07	19	3·41	16	3·18	22	7·85	26	17·79	24	11·91	23	13·24	16	5·32	217	81·66
Swans	...	13	6·12	9	·76	17	2·23	8	2·39	14	3·54	14	2·47	15	2·69	21	8·38	21	17·45	22	15·39	21	11·21	18	4·80	193	77·46
Baxters	...	14	7·93	12	1·40	10	2·93	8	2·85	12	3·62	16	3·56	14	3·15	19	8·71	24	16·59	24	15·86	20	12·59	14	3·79	187	83·18
Spring Vale	...	8	10·39	7	1·28	12	2·52	9	4·00	9	3·00	8	3·85	10	3·54	17	9·21	23	20·71	20	14·42	18	15·63	12	4·91	153	93·96
Bruce Vale	...	12	7·58	9	1·18	18	2·96	9	2·69	13	3·86	17	3·73	18	3·43	20	9·84	20	17·08	18	14·94	15	14·22	12	5·21	181	86·72
Turners Hall	...	8	8·22	5	1·42	14	3·35	7	2·62	9	3·10	10	3·62	9	2·84	17	8·54	21	23·57	22	19·88	17	16·22	14	6·17	153	99·55
Cleland	...	10	6·44	7	·84	15	2·26	4	1·14	12	3·94	11	2·10	13	3·27	24	9·96	25	21·65	19	14·87	18	9·94	13	5·39	171	81·80
Seniors	...	11	7·57	7	1·27	14	2·66	10	2·70	13	3·48	15	3·13	16	3·28	21	8·54	22	17·93	22	15·07	19	13·76	14	4·01	184	83·43
Total	...	92	63·03	67	9·84	116	22·10	66	21·17	99	27·61	110	25·97	111	25·33	161	71·03	182	152·80	171	122·34	151	106·81	113	39·70	1,439	687·73
Average	...	11·50	7·88	8·37	1·23	14·50	2·76	8·25	2·65	12·37	3·45	13·75	3·25	13·87	3·17	20·12	8·88	22·75	19·10	21·37	15·29	18·87	13·35	14·12	4·96	179·84	85·97
ST. ANDREW. (Lowlands.)																											
Morgan Lewis	...	8	5·11	5	1·07	6	1·13	5	1·81	11	3·22	9	1·43	13	2·70	20	8·07	21	19·82	15	7·92	18	9·75	13	4·69	144	66·72
Haggatts	...	8	5·48	2	·31	11	1·69	6	2·02	9	3·07	9	2·43	9	2·78	17	8·54	29	17·66	16	12·57	14	13·04	12	4·71	132	74·80
Boscobel	...	9	4·89	10	·67	10	1·02	8	1·22	6	2·96	8	1·12	10	1·89	16	5·88	23	14·31	15	6·64	17	7·09	14	3·41	146	51·10
Total	...	25	15·48	17	2·05	27	3·84	19	5·05	26	9·25	26	4·98	32	7·37	53	22·49	63	51·79	46	27·13	49	29·88	39	12·81	422	192·12
Average	...	8·33	5·16	5·67	·68	9·00	1·28	6·33	1·68	8·67	3·08	8·67	1·66	10·67	2·46	17·67	7·50	21·00	17·26	15·33	9·04	16·33	9·96	13·00	4·27	140·67	64·04

SUMMARY OF BARBADOS RAINFALL FROM JANUARY TO DECEMBER 1835.

Name of Stations.	No. of Stations.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Totals.	
		Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
I.—District A. St. Michael... ... (Lowlands.)	11	14·36	6·07	9·45	1·34	14·91	1·76	9·00	1·88	13·73	3·34	12·00	1·99	13·64	2·26	20·56	11·17	21 10	13·17	15·50	5 91	19·90	11·73	11·40	3·79	178·54	64·41
II.—District B. *a.* Christ Church ... ... (Lowlands)	20	12·90	6·89	9·05	1·74	10·60	1·64	8·00	2·10	12·35	3·03	12·25	2·85	12·95	2·57	18·40	11·62	20·55	15·03	16·20	7·97	20·30	12·54	11·40	3·73	164·95	72·61
b. St. George... ... (Highlands)	8	13·50	11 79	10·25	1·88	15·75	3·18	11 00	4·15	14·62	4·57	11·00	2·47	16·12	3·99	19·87	10·13	22 87	18·45	19·50	10·87	19·75	12·60	11·00	3·69	185·23	87·72
b. St. George... ... (Lowlands)	5	14·0	8·29	7·40	1·88	11·60	1·93	7·60	2·21	12·60	3·46	11 20	2·27	14·20	2·18	22·00	12·43	19·80	16·12	17·00	8·87	18·20	14·03	10·60	3·61	166·80	77·27
III.—District C *a.* St. Philip.. ... ... (Highlands)	3	15·67	10·37	11·00	2·18	17·67	2·30	10·33	3·24	16·67	2·80	13·38	1·94	16·33	2·63	21·33	9·85	22·33	16·56	19·67	8·96	21·00	14·94	15·67	4·34	201·0	80·41
a. St. Philip .. .. (Lowlands)	24	13·92	8·84	9·21	1·54	12·54	1·67	7·58	2·82	14·17	2·76	12·46	1·95	15·00	2·40	21·38	9·74	21·96	15·79	17·88	8·29	19·83	13·68	11·75	4·27	177·6	73·25
b. St. John..... ... (Highlands)	16	15·75	11·28	11·50	1·93	16·56	2·56	12·25	3·87	16·37	3·55	14·81	2·99	15·50	3·52	19·37	9·48	23·69	18·61	19·56	10·46	20·62	14·79	14·19	5·06	200·18	88·09
b. St. John ... ... (Lowlands)	3	13·00	8·73	7·67	1·27	12·67	1·77	9·00	2·65	13·33	2·35	11·00	2·06	13·33	3·41	19·00	6·95	23·00	14 47	15·33	6·92	19·00	12·16	15·00	4·47	171·33	66·91
IV.—District D. *a.* St. Thomas... ... (Highlands)	11	14·36	11·91	12·45	2·57	18·09	3·74	12·91	5·61	17·64	4·62	16·55	3·58	17·36	4·23	23·09	10·57	25·27	22·03	23·09	12·73	22·73	13·94	14·18	4·27	217·72	98 73
a. St. Thomas... ... (Lowlands)	14	14·31	10·37	12·23	2·03	16·69	3·25	10 77	4·17	16·31	4·78	12·69	3·64	16·54	3·74	22·15	11·14	24·92	18·04	21·85	9·75	23·28	11·98	14·23	3·71	205·32	85·55
b St. James..... ... (Highlands)	3	12·00	7·11	8·33	1·01	13·33	2·79	10·33	3·77	16·33	4·66	12·00	3·55	15·67	2·03	19·67	9·19	24·33	20·43	22·67	14·91	22·33	15·79	16·67	5·58	193·66	91·72
b St. James..... ... (Lowlands)	10	12·10	5·79	9·40	1·31	16·30	3·26	9·70	3·30	13·30	3·54	13·40	2·97	15·70	3·86	20·20	7·62	28 30	16·02	22·40	10·13	22·60	12·20	13·70	3·61	192·10	78·21
V. District E. *a.* St. Peter... ... ... (Highlands)	7	11·71	5·85	7·86	1·02	11·29	2·21	8·29	2·56	11·43	4·22	10·14	2·28	14·14	3·41	20·86	9·07	21·86	20·09	20·30	14·72	20·00	12·29	12·71	4·92	173·29	83 36
a. St. Peter... ... ... (Lowlands)	9	12·00	4·73	8·56	1·02	11·78	1·75	8·11	2·35	10·56	3·21	12·11	2·16	14·11	3·11	20·56	8·34	24 56	18·66	19·67	12·71	20·22	11·79	11·56	1·84	173·80	71·17
b. St. Lucy... ... ... (Lowlands)	9	9·67	5·43	5·56	·60	10·33	1·62	7·56	1·71	11·22	4·28	11·33	2·10	14·78	2·70	21·67	7 61	23 11	16·88	20·37	11·65	19·00	8·19	13·67	4·20	168·57	67·27
VI. District F. *a.* St. Joseph..... (Highlands)	8	15·67	12·23	13·75	2·22	18·12	3·12	13·75	5·11	17·25	4·28	18·00	3·33	19·25	3·80	25 50	11·13	26 37	20·68	23·37	13·85	23·62	14·04	14·50	4·30	229·10	98·75
a. St. Joseph..... (Lowlands)	8	11 12	8·37	10 37	1·95	13·75	2·54	9 62	3·50	12·12	3·07	13·37	3·31	14·37	3·12	18·87	8·60	25 07	19 98	21·62	14·57	21·50	14·19	14·25	4·52	186·88	87 72
b. St. Andrew..... ... (Highlands)	8	11·50	7·88	8·37	1·23	14·50	2·76	8·25	2·65	12·37	3·45	13·75	3·25	13·87	3·17	20·13	8·88	22 75	19·10	21·37	15·29	18·87	15·32	14·12	4·96	179·84	85·97
b. St. Andrew..... ... (Lowlands)	3	8·33	5·16	5·67	·68	9·00	1·28	6·33	1·68	8·67	3·08	8·67	1·66	10·67	2·46	17·37	7·50	21·0	17·26	15·33	9·04	16·33	9·90	13·00	4·27	140·67	61·33
Total	189	245·8	156·62	173·08	29·43	265·18	45·07	180·38	59·31	261·04	70·25	240·06	49·35	283·53	58·69	392·26	181·15	441·14	337·11	376·28	207·00	389·03	244·05	253·60	82·54	3,506·79	1521·17
Average	..	12·94	8 24	9 37	1·55	13·97	2 37	9·49	3·12	13·74	3·70	12·63	2·60	14·92	3·09	20·65	9·53	23·22	17·74	19·80	10·93	20·48	12·81	13·35	4·34	184·56	80·05

The average Rainfall for 1892, 1893, 1894 and 1895 as compared with the average of 45 years from 1847 to 1891 inclusive.

MONTHS.	Average for 45 years from 88 stations.	Average for 1892 from 177 Stations.	Average for 1893 from 107 Stations.	Average for 1894 from 162 Stations.	Average for 1895 from 180 Stations.
	Inches.	Inches.	Inches.	Inches.	Inches.
January	3·38	3·24	2·55	2·74	8·24
February	2·33	1·92	1·43	1·56	1·55
March	1·79	2·48	1·14	2·08	2·37
April	2·28	3·87	3·94	2·05	3·12
May	3·45	7·47	4·35	1·22	3·70
June	5·50	14·47	7·21	2·83	2·60
July	5·91	7·52	10·23	4·02	3·09
August	7·45	11·49	12·00	4·20	9·53
September	7·32	13·43	10·10	9·91	17·74
October	8·26	5·55	11·90	7·21	10·93
November	7·52	10·73	6·05	5·77	12·84
December	4·84	4·29	5·28	3·12	4·34
	60·03	86·46	76·18	46·71	80·05

WEEKLY STATEMENT OF COMPARATIVE PRICES OF THE WEST INDIAN GOOD BROWN SUGAR FOR THE FIFTY-TWO WEEKS JANUARY TO DECEMBER.

Weeks.	Average for the years 1882-91.	For the year 1892.	For the year 1893.	For the year 1894.	For the year 1895.	Weeks.	Average for the years 1882—'91.	For the year 1892.	For the year 1893.	For the year 1894.	For the year 1895.
	s. d.	s. d.	s. d.	s. d.	s. d.		s. d.	s. d.	s. d.	s. d.	s. d.
1	14 4·8	13 0	12 9	11 6	7 6	27	14 6·0	11 9	16 9	11 3	9 0
2	14 3·6	13 0	12 9	11 6	7 6	28	14 5·1	11 9	16 3	11 3	9 0
3	14 3·3	13 0	12 9	11 6	7 6	29	14 3·0	12 0	15 9	11 3	9 1½
4	14 2·4	12 9	12 9	11 6	8 0	30	14 2·1	12 0	15 0	11 0	9 0
5	14 0·3	12 9	13 9	11 6	8 0	31	14 1·2	12 0	15 0	10 6	9 0
6	14 0·0	12 9	12 9	11 6	8 3	32	14 0·9	12 0	14 9	10 6	9 0
7	13 11·4	12 9	12 9	11 6	8 3	33	14 0·0	12 0	14 6	10 9	8 9
8	13 11·1	12 6	12 9	11 6	8 3	34	13 11·7	12 0	13 9	11 0	8 7½
9	14 0·9	12 6	12 6	11 6	8 3	35	14 0·9	12 3	13 6	11 0	8 9
10	14 1·9	12 6	12 9	11 6	8 6	36	13 10·8	12 3	13 6	11 0	8 9
11	14 3·0	12 6	12 9	11 9	8 6	37	13 11·7	12 3	14 0	11 0	9 0
12	14 3·9	12 6	13 0	11 9	8 6	38	13 9·6	12 0	14 0	10 9	9 3
13	14 5·4	12 3	13 3	11 9	8 6	39	13 8·1	12 0	14 0	10 6	9 4½
14	14 5·4	12 3	13 9	11 9	8 6	40	13 6·9	12 0	13 0	10 0	9 10½
15	14 7·5	12 3	14 0	11 9	8 4½	41	13 6·9	12 0	13 0	9 6	10 0
16	14 8·4	12 3	14 6	11 6	8 6	42	13 7·2	12 3	12 6	9 0	9 10½
17	14 9·0	12 3	15 0	11 3	9 0	43	13 7·5	12 6	12 3	9 0	9 9
18	14 6·6	12 0	15 6	11 3	9 0	44	13 6·0	12 9	12 0	9 0	9 7½
19	14 8·1	12 0	15 3	11 6	9 0	45	13 5·7	12 6	12 0	8 6	9 7½
20	14 7·8	12 0	15 0	11 0	9 3	46	13 5·1	19 6	12 0	8 6	9 6
21	14 10·2	12 3	15 3	11 3	9 4½	47	13 5·1	12 6	11 9	8 0	9 6
22	14 10·2	12 3	15 6	11 3	9 1½	48	13 5·4	12 6	11 9	8 0	9 6
23	14 9·3	12 3	16 0	11 6	9 1½	49	13 6·6	12 6	11 9	7 9	9 9
24	14 7·5	12 3	16 6	11 9	8 9	50	13 6·6	12 6	11 6	7 6	9 9
25	14 8·4	12 0	16 9	11 9	8 9	51	13 6·3	12 6	11 6	7 6	9 9
26	14 7·5	12 0	16 9	11 6	8 9	52	13 6·9	12 6	11 6	7 6	9 9
Av. for 6 months	14 5·15	12 4·61	14 0·92	11 6·10	8 6·00	Av. for 6 months	13 9·59	12 2·31	13 4·27	9 8·08	9 4·10

The average weekly price for West Indian Good Brown Sugar for the ten years 1882 to 1891 was 14s. 1·37d.; for 1892 12s. 3·46d.; for 1893 13s. 8·6d.; for 1894 10s. 7·1d.; and for 1895 8s. 11·05d.

This table is compiled from returns published in the "Sugar Cane Magazine."