PROCEEDINGS AND TRANSACTIONS

OF THE

METEOROLOGICAL SOCIETY

OF

MAURITIUS

1901

EDITED BY THE SECRETARY

VOL. II:—(NEW SERIES)

MAURITIUS,

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1902

METEOROLOGICAL SOCIETY

OF

MAURITIUS

1901

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CONTENTS OF VOLUME II (NEW SERIES).

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MAURITIUS.

MEETING OF THE METEOROLOGICAL SOCIETY.

Thursday, 1901, March 21.

THE HON. SIR VIRGILE NAZ, K.C.M.G., *President*, in the Chair.

Secretary: T. F. CLAXTON, F.R.A.S.

The Minutes of the last meeting were read and confirmed.

The following gentlemen were nominated for election as members of the Society:

The Right Reverend P. A. O'Neill, D.D., Bishop of Port Louis; The Honorable G. de Coriolis, Surveyor General; The Honorable J. J. Brown, Receiver General; The Honorable W. T. A. Emtage, M.A., Director of Public Instruction; The Honorable L. Souchon, Member for Rivière du Rempart; The Honorable G. A. Ritter; The Reverend Canon Pendavis, M.A., Civil Chaplain of Port Louis; L. E. Pitot, Esq., General Manager of Railways; F. A. Gibson, Esq., Acting Assistant Colonial Secretary; Dr. J. I. Paddle, M.D., Superintendent, Beau Bassin Asylum; Dr. G. Barbeau, M.B., Assistant Sanitary Warden; F. V. Descroizilles, Esq., Assistant Receiver General; Capt. H. A. Cary, Marine Surveyor; J. Minty, Esq., Manager, Mauritius Estates & Assets Company; A. Daruty de Grandpré, Esq., Superintendent of the Museum; G. Guibert, Esq., K.C., Barrister-at-law; W. P.

Ebbels, Esq., Manager, Beau Séjour Sugar Estate; H. Ducray, Esq., G. Mayer, Esq., and T. Dell, Esq.

The *Secretary* then read a paper on the recent drought, from which it appeared that the deficit of rainfall for the whole Island, during the period 1899 November to 1900 December, had been 30ins.64, or 35 °/₀ below the average; varying from 43 °/₀ in the Northern part of the Island to 27 °/₀ in the South Central, and South-Eastern (Inland) districts. From an agricultural point of view, in the north of the Island it had apparently been the severest drought on record, while for the whole Island it ranked third in the list of 7 severe droughts experienced since 1862, the year in which systematic rainfall observations were commenced in different parts of the Island. This result was arrived at after subjecting the statistics of each drought to an analysis, which took into consideration.

(1) *a.* The time during which the rainfall was below the average.
b. The month in which the drought commenced.
(2) The total deficit of rainfall.
(3) *a.* Any specially severe portion of the drought.
b. The months in which it occurred.
(4) *a.* Whether the drought was broken by normal or abnormal rains.
b. The month, or months, in which such rain occurred.

For each of the above items a rough scale of marks was constructed. A fifth item, the daily distribution of rainfall, it was found impossible to treat numerically.

The method appeared to supply a long felt want in comparing the severity of different droughts, from an agricultural point of view; but was at present admittedly imperfect, seeing that the scale of marks had been constructed by a person by no means well acquainted with the exact effect of droughts and floods at different seasons of the year; and that whatever the effect, it would probably be different, not only in different districts, but at different altitudes in the same district.

What was wanted was a record over several well defined areas, for a considerable number of years, of the dates of planting the cane, the resulting crop, and the rainfall from month to month during its growth.

The President remarked the importance of accurate rainfall records in showing the occurrence of droughts and floods, and replying to *Mr. O'Connor*, who said that it would be interesting to note the prevailing direction of the wind during these droughts, he thought that for the last two months it would be difficult to say what the prevailing direction of the wind had been ; he had frequently noticed of late that in different parts of the Island the wind was blowing from different directions, and that clouds of apparently the same altitude were blowing in vastly different directions ; also that the rain-bearing clouds showed a tendency to avoid the southern parts of the Island, with the result that whereas the northern districts had been more or less flooded, very little rain had fallen in Savanne and the lower parts of Grand Port.

The Secretary stated that the velocity of the wind had been considerably below the average during the month of February, and that frequently, of late, alternate land and sea breezes had overcome the feeble Trades, and this would account for the very marked difference of wind directions in different parts of the Island.

Portions of a paper on the cyclone of January 9-16 were read, but as the majority of the members had to attend a meeting of the Chamber of Agriculture, the reading of the paper was postponed until the next meeting.

MEETING OF THE METEOROLOGICAL SOCIETY.

Thursday, 1901, April 11.

THE HON. SIR VIRGILE NAZ, K.C.M.G., *President*, in the Chair.

Secretary : T. F. CLAXTON, F.R.A.S.

The Minutes of the last meeting were read and confirmed.

The following gentlemen were elected members of the Society :

The Right Reverend P. A. O'Neill D.D., Bishop of Port Louis ; The Hon. G. de Coriolis, Surveyor General ; The Hon. J. J. Brown, Receiver General ; The Hon. W. T. A. Emtage M.A., Director of Public Instruction ; The Hon. L. Souchon, Member for Rivière du Rempart ; The Hon. G. A. Ritter ; The Rev. Canon Pendavis, M.A., Civil Chaplain of Port Louis ; L. E. Pitot, Esq., General Manager of Railways ; F. A. Gibson, Esq., Assistant Colonial Secretary ; Dr. J. I. Paddle M.D., Superintendent Beau Bassin Asylum ; Dr. G. Barbeau M.B., Sanitary Warden ; F. V. Descroizilles Esq., Assistant Receiver General. ; Capt. H. A. Cary, Marine Surveyor ; J. Minty Esq., Manager, Mauritius Estates and Assets Company ; A. Daruty de Grandpré Esq., Superintendent of the Museum ; G. Guibert Esq., K.C.J, Barrister-at-Law ; W. P. Ebbels Esq., Manager, Beau Séjour Sugar Estate ; H. Ducray Esq. ; E. Mayer Esq. ; and T. Dell Esq.

The Secretary : As we have among us to-day several new members of the Society, a few remarks on the objects for which it was established, and how far these objects have been accomplished, may not be out of place.

The Meteorological Society of Mauritius was established on the first day of August 1851, under the auspices of Governor Higginson, for the purpose of promoting meteorological science in general, and especially that branch of it called Cyclonology, or the law of storms. The objects of the Society may be stated more particularly as follows :

1. To procure instruments of the best description, as standards of compa-

rison, and to endeavour to keep a supply of other instruments, at moderate prices, for the use of persons in the Colony and its Dependencies, and of Commanders and Masters of Vessels.

2. To provide for Meteorological, Magnetical, and Tidal observations being made in Mauritius and its Dependencies, Rodrigues, Seychelles, Diégo Garcia, etc.; and to aim at the establishment of a permanent Meteorological and Magnetical Observatory.

3. To tabulate Meteorological observations taken daily on board vessels in the Indian Ocean.

4. To collect, or procure extracts from any Meteorological records existing in the archives of the Colony, or in the hands of private individuals.

5. To encourage Masters of Vessels trading to this Island, to make and record observations on the state of the weather, tides, and currents as experienced in the course of their respective voyages; and to communicate such observations to the Society.

6. To correspond and exchange observations with similar Societies in other countries.

7. To collate, arrange, and publish the information that may be obtained from the above sources.

Some of the above objects have been carried to a successful issue, while others can only be accomplished by the continued labour of the Society, and the co-operation of its members.

Perhaps the most important achievement of the Society has been the establishment of the Royal Alfred Observatory, in which the objects cited above are now being carried out as far as possible.

We possess Standard Meteorological and Magnetical instruments, and a small stock of thermometers, raingauges and barometers. Every ship-captain coming to Mauritius can have his meteorological instruments and his chronometers corrected, free of charge. A clerk employed by the Society boards every vessel admitted into the harbour and presents the following circular to the officer of the watch.

CIRCULAR.

To Commanders of Vessels arriving at Mauritius.

SIR,

I have the honor to request that you will allow the officer who hands you this letter to bring your Log-Book on shore, and enable the Secretary of the

Meteorological Society to make such extracts from it as may further the advancement of Meteorological Science which is so intimately bound up with Maritime and Commercial Interests.

Meteorology is now taking an eminently practical turn, and Mauritius is most advantageously placed for collecting information ; but the Society can do but little without the hearty and earnest co-operation of Commanders of Vessels.

Any Log-Book entrusted to the Secretary of the Society will be taken the the greatest care of, and after a few days be returned on board, either to the Commander of the Vessel personally, or, in his absence, to one of the Officers.

The Observatory is always open to Commanders of Vessels in this Port, and should you have leisure to visit it during your stay, your will find many valuable Charts and Books on Meteorological subjects, the inspection or perusal of which may prove interesting.

I have the honor to be,
Sir,
Your most obedient servant,

T. F. CLAXTON,
Hon. Sec. Mauritius Meteorological Society
and Director of the Observatory.

All the Meteorological information contained in the log book is copied into a daily journal, a form ruled into 15 columns. The first is for the number of the vessel in the Society's register ; the 2nd. and 3rd. for the latitude and longitude at noon ; the 4th., 5th. and 6th. for the direction and force of the wind during the first, middle, and last parts of the day respectively ; the 7th. and 8th. for the reading of the barometer at noon and midnight ; the 9th. and 10th. for the temperature of the air at noon and midnight ; the 11th. and 12th. for the direction and rate of the currents ; the 13th. for the state of the sea ; the 14th. and 15th. for general remarks about the weather, the type of cloud prevalent, swell of the sea, etc. In addition to this daily journal a detailed account of bad weather is kept in storm books.

The ship's barometer is read by the Society's clerk when boarding each vessel, and the reading, together with the time of observation, is forwarded to the Observatory. A correction to the Mauritius Standard is then deduced, on the assumption that the atmospheric pressure at the Observatory, reduced to sea-level is the same as in Port Louis Harbour. This is not

always true, but the method appears to present less objections than others which necessitate the transport of barometers to and from the Observatory, and seeing that more than half the ship's barometers are aneroids, it is probable that the present method is the most accurate ; it is certainly the most simple, and since the beginning of March steps have been taken to obtain two barometer readings, one on receiving the log book and one on returning it ; so that we now have not only increased accuracy, but a measure of the degree of accuracy.

With regard to the Tidal observations mentioned in article 2 I regret to say that up to the present very little has been done in this direction at Mauritius, and nothing at all in the dependencies. I believe that eye observations for about one year were made some 25 years ago and discussed by Lord Kelvin, but I am unable to say where, or by whom the observations were conducted, nor have I had the opportunity of seeing Lord Kelvin's discussion of them.

The establishment of a registering Tide Gauge on the East and West sides of the island is a matter to which I would earnestly call the attention of the Society. The harmonic analysis of such records in connection with those of the Milne seismograph, now at work at the Royal Alfred Observatory, would be of the greatest scientific interest and value. The initial outlay would not be less than £ 100, and in the present state of its finances the Society would not be justified in devoting so large a sum for one particular object to the detriment of others equally important ; but it is possible that assistance might be obtained from Government if it could be shown that the benefits to be derived from such observations would be proportionate to the expenses incurred. With regard to observations in the dependencies, so far as I am aware the only stations at which systematic observations have been made are Port Mathurin, (Rodrigues) since 1876 ; Mahé, (Seychelles) since 1887 ; and Six Islands (in the Chagos Archipelago) since 1897. At each of these of these stations observations of the atmospheric pressure, temperature of the air, rainfall, direction and

force of the wind, swell of the sea, and weather generally, are made twice daily, and the results forwarded to the Royal Alfred Observatory for reduction and publication.

Attempts to establish an observing station at St. Brandon have not, up to the present, been successful, but Mr. Souchon, one of our new members, has promised to do all in his power to assist us.

In 1898, March, Mr. Darney, late manager of the Islands, spent two days at the observatory in making himself acquainted with the methods of observations. He proceeded to St. Brandon in April with the necessary instruments, but had to return shortly afterwards and could find no suitable person to take the observations in his absence.

It is hoped that Agalega also will soon be included in our list of observing stations. Through the courtesy of M. Bertho, the head of the Port Department at Bourbon, we are now receiving monthly meteorological returns from St. Denis, Pointe de Galets, and St. Pierre : All of these are coast stations, and as such have the same general characteristics of weather, but the effect of local influence at each is very marked, particularly with respect to the direction and force of the wind.

From Bourbon we naturally turn to two of its dependencies, the Islands of Amsterdam and St. Paul, in latitude 38° S. and longitude 78° E., and I propose that enquiries should be made as to the possibility of obtaining meteorological returns from one or other of these stations.

The annual number of vessels trading at Mauritius has decreased from 787 in 1878 to 283 in 1900, and as the percentage of steamers to sailing vessels has increased considerably, the decrease in the number of days'observations tabulated is even more serious than the above figures seem to indicate, on account of the quicker voyages made by steamers. It will be seen, therefore, how much more imperative the establishment of fixed observing stations is becoming as the number of our floating observatories grows gradually but steadily less. Observations from Amsterdam or St. Paul would be of special value in connection

with the study of extra-tropical gales, and the passage of their accompanying anti-cyclonic systems from the Cape of Good Hope towards Australia.

Item No. 6 of the Society's objects is to correspond and exchange observations with similar Societies in other countries. This object has also been carried out, but in a manner which may appear to some members to be unsatisfactory. In order to explain this it is necessary to state briefly the connection between the Observatory and the Meteorological Society. There is no doubt that the Royal Alfred Observatory owes its origin to the Meteorological Society, but is supported entirely from Government funds. The Society also receives a grant of Rs. 1000, the control of which is in the hands of its Council, there being a tacit understanding that it shall be employed for promoting the objects for which the Society was established. There is the further connection that the Director of the Observatory has always been the Secretary of the Society, though not ex-officio, according to rule X.

All the publications addressed to the Secretary of the Society are forwarded to the Observatory at Pamplemousses, and there stored and catalogued, as the Society possesses no building suitable for a Library. In some cases two copies are received, one for the Observatory and one for the Society, so that the Society possesses a Library at Pamplemousses, which consists principally of duplicate copies of the Observatory Library.

The members of the Society can have access to both Librairies daily at any time between 9 a.m. and 4 p.m.,but the journey from Port Louis is a considerable hindrance. It would be more convenient to members to have their Library at the Institute, Port Louis, where the meetings are held, provided sufficient space could be found, but this would necessitate the employment of a librarian. A more satisfactory state of affairs would be to have the Observatory in a healthier part of the Colony, within easy access of the members of the Society and with a special room set apart for their use. Here the meetings might be held after

business hours, and meteorological questions discussed with mutual benefit, and more enthusiasm than can be expected under present conditions. Then indeed might new life be infused into the Society and its influence largely increased, for much remains to be done and the difficulties to be contended against are many.

Finally there remains Item No. 7 " To collate, arrange and publish the information obtained."

The publications now on the table before you, will show to a certain extent what has been done in this direction. The cyclone Tracks were published in 1891, and the synoptic charts a few years earlier. These publications have received honorable recognition from distinguished meteorologists in all parts of the world, and are accepted as standard works. The amount of labour bestowed on the synoptic charts especially was enormous, and reflects the greatest credit on the Society and on its most distinguished member, Dr. Meldrum.

In addition to the above must be mentioned the Transactions and Monthly Notices of the Society, and also the annual publications of the Observatory, which give the results of the magnetical, meteorological, and seismological observations made at the Royal Alfred Observatory, and of the meteorological observations made at Bourbon, Rodrigues, and Seychelles.

An important work has recently been commenced at the Observatory, under the auspices of the Society, namely :— the tabulation, into 5° squares, of all the information collected from log books of vessels traversing the Indian Ocean since 1854. This will furnish material for the construction of a meteorological atlas of the South Indian Ocean, and will, it is hoped, be of much practical use to sailors.

Thus it will be seen that some at least of the aims of the Society have been realized. Our greatest and perhaps least expected misfortune has been the steady decrease in the number of vessels trading with Mauritius. The material for daily synoptic weather charts, meagre at the best of times, is now so scanty that the construction of these charts has been discon-

tinued except during cyclone weather ; they are then used for determining, as far as possible, the tracks of cyclones ; but for obtaining a correct representation of the atmospheric conditions over the Indian Ocean, with a view to studying the sequence of weather changes, they are now well nigh useless.

As a fitting conclusion to these remarks I may perhaps be permitted to read a few extracts from an elaborate essay by Prof. Cleveland Abbé, one of our honorary members, on the Aims and Methods of Meteorogical work—(pp. 222, 225, 232, 233.)

The President :— Gentlemen, I think the Secretary has been well inspired in preparing the remarks he has just read concerning the objects for which the Society was established, and explaining how far those objects have been accomplished.

The Society was established in 1851. Dr. Meldrum F.R.S., C.M.G., was its first Secretary ; he resigned office in 1854, but was again elected Secretary in 1859, and served in that capacity until his departure from the Colony in 1896. For nearly forty years he was the life and soul of the Society. He was the real founder and organizer of the Royal Alfred Observatory, the foundation stone of which was laid by the late Duke of Edinburgh in the year 1870. His remarkable labours, both as Secretary of the Society, and Director of the Observatory, have earned the approval and admiration of many eminent meteorologists in all parts of the world, with a certain number of whom he was in correspondence.

They obtained for him the honor of being elected a Fellow of the Royal Society of London. They have shed lustre upon Mauritius and upon this Society.

Some years ago declining health compelled him to discontinue his labours, and during his illness the meetings of the Society became less frequent and less interesting.

Mr. Claxton, his successor, has since his arrival, shown that he is qualified for his office. As Secretary of the Society

he is willing to work and able to make learned and interesting communications, and also to continue the useful intercourse between the Mauritius Observatory and other Observatories, and between this Society and other Meteorological Societies. He has in Mr. Walter a young but able assistant.

Twenty new members, holding high positions in Mauritius, have been elected to-day, and I have no doubt that we may rely upon their hearty co-operation in the prosecution of our labours. I trust that a new era is opening for the Society, and that its future career of usefulness may be worthy of its past.

His Lordship the Bishop of Port Louis thanked the Society for having elected him one of its members, and promised to do all in his power to promote the interests of the Society.

The Secretary then read a paper on the Cyclone of 1901, January 9-16.

Mr. O'Connor read some interesting facts he had been able to collect showing that the weather of January, 1901, had been of an abnormal character in nearly all parts of the world. In the South Indian Ocean, four cyclones had occurred from 4th.-6th., 9th.-16th. on the 11th., and from the 24th.-26th. On the 3rd. and 4th. a violent storm swept over England, causing many shipwrecks, and much loss of life. On the 9th. an unprecedented blizzard was reported from Russia ; the thermometer fell to –33° C. in some districts. On the 10th. no less than 400 lives were lost on the West coast of Japan, in a typhoon. On the 17th. a cyclone is reported from Natal. On the 22nd. 32 persons were killed during a cyclone at Herro, lat. 69°40′ N. and long. 19°0′ E. and 60 boats sunk in the harbour. On the 23rd. and 25th. cyclones occurred at Noumea, lat. 21°0′ S. and long. 160°0′ E., and Adelaide ; while on the latter date earthquake shocks were felt at Darjeeling in India. On the 26th. violent dust storms occurred at Broken Hill, N. S. W., causing intense darkness for about 30 minutes. On the 28th. waves of red sand dust, estimated to be more than a thousand feet high, were observed in Southern

Australia. A few days later the Bormidar, belonging to the Florido Rubattino Company, encountered a typhoon, after passing Singapore. Throughout Cape Colony the weather during the whole month was of an abnormal character, with exceptionally heavy rain.

Captain Mc Donald remarked that during the months of February and March, the wind at Rose-Hill, (about 6 miles from the west coast) had, on almost every day, been from Westward during the morning hours, and enquired whether a similar circumstance had been noticed at the Observatory, as, during his 12 years experience in Mauritius he (Capt. Mc Donald) never remembered so persistent a break in the normal S. E. trade winds.

The Secretary replied that at the Observatory, Pamplemousses, the breaks in the S. E. trade winds had been more frequent during the months of February and March, but had not been of daily occurrence, and Capt. Mc Donald's remarks pointed very forcibly to the necessity of having more than one anemometer in Mauritius, as he (the Secretary) had suggested on more than one occasion. Through the courtesy of the Military Authorities, meteorological observations were now being taken twice daily at Vacoas by Corporal Bigg, under the superintendence of Capt. J. E. Vanrenen R. E., and if the Society would provide an anemometer, there would probably be no difficulty in obtaining, in addition, daily records of the direction and force of the wind.

In reply to a question by *Captain Mc Donald* whether any observations had been made at St. Brandon during the recent cyclone, the *Secretary* stated that so far as he was aware no observations had been taken, but that he had received a letter from Mr. Albert, manager of St. Brandon, offering to take meteorological observations if, on his return to Mauritius, the Society would present him with the standard barometer which had been in his charge for the past 3 years.

It was very desirable that meteorological observations should be taken at St. Brandon, but it would be advisable to

obtain further particulars from Mr. Albert before the Society could consider his proposal, the general opinion at present was that the St. Brandon barometer was too valuable an instrument to dispose of in this manner, but there would probably be no objection to presenting Mr. Albert with a good barometer, provided the observations extended over a reasonably long period, and were carefully made.

CORRESPONDENCE ON THE SUBJECT OF FREE WEATHER TELEGRAMS FROM RODRIGUES AND KEELING ISLANDS.

To His Honor

Sir Graham Bower, K.C.M.G.,

Officer Administering the Government.

Sir,

I beg to be allowed to call your attention to the conditions concerning the landing rights of the Eastern Telegraph Cy. with reference to their Cable between Mauritius, Rodrigues and the Cocos-Keeling Islands.

This new Cable will undoubtedly prove to be a great boon to the Colony, affording connections with two great Colonies, the Cape and Australia, with which we already have very important commercial relations. Mauritius finds a market every year in these Colonies for a notable portion of its produce ; our exports to South Africa especially have much increased during the last five years ; they amounted to 30,303 tons last year (1899-1900). It is possible that, as soon as the pacification work is over, both the Transvaal and the Orange River Colony will be opened to commerce, and that the prohibitive tariff which prevailed before the war, on the Boer Republic railways, with regard to our produce will disappear, so that our sugar may thus find a new market. Then we shall be able to keep up the struggle under less unfair conditions against the bounty-fed beetroot sugar.

May I therefore suggest to Government, having in view the welfare and the interests of our Colony, that they should avail themselves of the proposal of the Eastern Telegraph Cy., in order to obtain from the Company certain advantages for the Colony ; *i.e.* that the following should be included amongst the conditions of their contract, with regard to the landing of the cable in Mauritius and in our dependency of Rodrigues :—

a. that the Company bind themselves to send a cablegram every week, giving information as to the state of the sugar markets in Australia and in South Africa.

b. and also to furnish a meteorological report every day on the weather at Rodrigues, and at the Cocos-Keeling Islands, where they propose to have a Station.

On being daily informed of the barometric pressure, the temperature, the direction and velocity of the wind at these Islands, the Director of our Royal Observatory will be able to study the course of the cyclones more closely, and probably be in a better position to warn us of their arrival.

We might also be able to afford most useful information for the use of navigation, for example, in showing to the ships leaving our port, the course they should take to avoid these dangerous atmospheric disturbances.

Besides their general utility, these meteorological observations would be of very great scientific value.

I mentioned to Mr. Claxton that I intended writing to you on the subject, and he informed me that he had already spoken of it to one of the agents of the above Company, who happened to be in Mauritius a few weeks ago.

At Rodrigues, the observations might perhaps be taken by the Magistrate, and at Keeling Island by the agent of the Company, provided he receives some kind of remuneration.

By recommending the above suggestions to the Secretary

of State, Your Honour will render a great service to the Colony, and its inhabitants will be very grateful to Your Honour.

I have the honour to be,
Sir,
Your obedient servant,
W. A. EDWARDS, M. D.

10th. August, 1900.

Colonial Secretary's Office,
Mauritius,
16th. November, 1900.

Sir,

With reference to your letter of the 10th. August last, respecting the proposed extension of the Cable of the Eastern Telegraph Company to Rodrigues, etc., I am directed by the Officer Administering the Government to transmit, for your information, a copy of a despatch from the Secretary of State for the Colonies, and its enclosures on the subject.

I have the honour to be,
Sir,
Your most obedient servant,
F. A. GIBSON,
Acting Assistant Colonial Secretary.

The Honorable
Dr. W. A. Edwards.

Mauritius, No. 288

The Under Secretary of State for the Colonies presents his compliments to the Officer Administering the Government of Mauritius and is directed by the Secretary of State to transmit to him for his information, with reference to his dispatch No. 70 of the 10th. August, the papers described in the subjoined schedule respecting the free transmission of certain telegrams

by the new cable between Mauritius, Rodrigues and the Cocos Keeling Islands.

Downing Street,
2nd. October, 1900.

No. 29482/1900.

Downing Street,
18th. September, 1900.

Sir,

With reference to the letter from this Department of the 21st. April last, respecting the grant of landing rights at Mauritius, Rodrigues and the Cocos-Keeling Islands to the Eastern and Eastern Extension Australasia and China Telegraph Companies, I am directed by Mr. Secretary Chamberlain to transmit to you a copy of a despatch which he has received from the Officer Administering the Government of Mauritius, forwarding a letter from the Chairman of the Postal Enquiry Committee of that Colony on the subject.

2. Mr. Chamberlain concurs with Sir Graham Bower in regarding Dr. Edwards' suggestions as valuable and conducive to the interests of the Colony, and he trusts that the Directors of the Companies may see their way to giving them their favourable consideration.

I am, &c.,
(Sgd.) C. P. LUCAS.

J. Denison Pender, Esq.

Winchester House, Old Broad Street,
London, E.C.,
28th. September, 1900.

The Under Secretary of State,
Colonial office,
London, S. W.

Sir,

I have the honour to acknowledge the receipt of your letter No. 29482/1900 of the 18th. instant, with reference to the grant of landing rights at Mauritius, Rodrigues and the Cocos-Keeling

Islands to the Eastern and Eastern Extension Australasia and China Telegraph Companies.

The Directors of the Associated Companies regret that they are unable to entertain the suggestion as to sending a cablegram every week giving commercial information as to the state of the sugar market in Australia and South Africa. Any information of this kind would be interfering with the ordinary business of the Company and free messages of this description are not provided for under the Regulations of the International Telegraph Convention.

With regard to sending a meteorological report of the weather at Rodrigues and the Cocos-Keeling Islands, the Companies do not see any objection to this, provided the telegrams are limited to 4 words per day.

I have, &c.,
(Sgd.) J. DENSION PENDER,

No. 31614/1900

Downing Street,
2nd. October, 1901.

Sir,

I am directed by Mr. Secretary Chamberlain to acknowledge the receipt of your letter of the 28th. ultimo respecting the application of the Government of Mauritius for the free transmission by the Eastern Telegraph Company, Limited, and the Eastern Extension Australasia and China Company, Limited, of certain classes of telegrams affecting the Colony.

Mr. Chamberlain is glad to note that the Directors of the Associated Companies agree to transmit to Mauritius, without charge,weather telegrams from Rodrigues and the Cocos-Keeling Islands ; provided that the telegrams are limited to four words a day.

I am etc.,
(Sgd.) H. BERTRAM COX.

J. DENISON PENDER, Esq.

MEETING OF THE METEOROLOGICAL SOCIETY.

Wednesday, 1901, July 10.

THE HON. SIR VIRGILE NAZ, K.C.M.G., *President*, in the Chair.

Secretary : T. F. CLAXTON, F.R.A.S.

The Minutes of the last meeting were read and confirmed.

Dr. E. Laurent, B. Sc., M.B., M.R.C.S., and Mr. E. Haddon, F.C.S. were duly elected members of the Society.

Dr. F. J. R.Omplé, M.B., Ch. M., was proposed by the Secretary for election at the next meeting.

Mr. E. W. Maunder, Superintendent of the Solar Department, Royal Observatory Greenwich, who had come to Mauritius for the purpose of observing the Total Solar Eclipse in concert with the Director of the Observatory, was introduced by the Secretary.

The President. I am sure we are all very grateful to Mr. Maunder for coming here to-day, and that we shall listen with much pleasure to the paper on the recent Eclipse which Mr. Maunder has promised to read.

Mr. Maunder then read a paper on the recent Solar Eclipse, and showed photographs of the same.

A vote of thanks was accorded to Mr. Maunder and the Meeting adjourned.

ADDRESS TO H. R. H. THE DUKE OF CORNWALL AND YORK.

The following Address of Welcome was presented to the Duke and Duchess of Cornwall and York, on the occasion of their Royal Highnesses visit to Mauritius ; 1901, August 4-8.

To
Rear Admiral
His Royal Highness
Prince George Frederick Ernest Albert
Duke of Cornwall and York
K.G., K.T., K.P. &c. &c.

MAY IT PLEASE YOUR ROYAL HIGHNESS

We, the President and Council of the Meteorological Society of Mauritius beg leave to approach Your Royal Highness with the assurance of our loyalty to the Crown and of our devoted attachment to His Majesty the King and to the Royal Family.

We desire you to offer to Your Royal Highness and to Her Royal Highness the Duchess of Cornwall and York, a cordial welcome to these shores.

Mauritius being admirably situated for meteorological and magnetical observations, it had long been the ardent wish of the Society that a fully equipped observatory should be established for the purpose of making such observations, and through the wise policy of the late Governor Sir William Stevenson, and of his successor the late Sir Henry Barkly, that wish was realized in the year 1870.

Meteorological and magnetical observations and researches having for their main objects the safety and welfare of navigation, touch closely the commercial prosperity of the world, and link together men of different nations by their ties of common interest. We venture to hope, therefore, that Your Royal Highness, being not only heir to the Throne, but an Admiral in the Naval Service of a Sovereign whose ships traverse every sea,

and whose dominions extend to the remotest shores, will be pleased to take an interest in the Mauritius Observatory. The more so as His Royal Highness, the late lamented Duke of Saxe Cobourg Gotha, during his visit to Mauritius in the year 1870, was good enough to lay its foundation stone, and to consent that the Observatory should have the honor of bearing his name. He also consented to be the Patron of our Society.

We respectfully pray that Your Royal Highness may be pleased to confer the same great honor upon the Meteorological Society of Mauritius by consenting to be its Patron. The Society has been in existence for fifty years, and we hail with joy the auspicious occasion which permits us to associate the visit of Your Royal Highness with the celebration of its Jubilee.

With our earnest wishes for the Welfare and Happiness of Your Royal Highnesses, we have the honor to be, with the highest respect, Your Royal Highnesses' most dutiful and most obedient servants.

GEO. Mc IRVINE,
(for) *President.*

HAMILTON STEIN,
Treasurer.

W. T. A. EDWARDS,
Vice-President.

T. F. CLAXTON,
Secretary.

REPLY.*

YOUR EXCELLENCY
AND GENTLEMEN.

I sincerely thank you and the members of those Public Bodies which you represent, for the kindly expressions of welcome and good wishes to the Duchess and myself which are contained in the Addresses that I have had the pleasure to receive.

It will be a great satisfaction to me to convey to my dear Father, the King, your assurances of loyalty to His Throne and Person, and to make known to Him that spirit of affectionate

* to Addresses in general.

devotion to the memory of our late beloved Queen, so strongly evinced in these communications.

I note with especial satisfaction, from the Addresses of those non-european communities who have made their home among you, that they are living in contentment under the rule of their King Emperor in Mauritius.

We have looked forward with keen interest to visiting your beautiful Island, rich in its honorable traditions in the history of literature and statesmanship ; proud of its association with naval achievements that shed equal glory on England and France.

We deeply sympathise with you in that combination of adversities, altogether beyond your control, under which you have suffered during the past ten years.

Meanwhile the whole Empire has watched with sympathetic admiration, the constancy and courage by which you overcame your difficulties, and the spirit which prompted you to contribute generously — in spite of your own imperilled fortunes — to the relief of your suffering fellow subjects in India, the West Indies, and in South Africa.

I rejoice to know that a day of bright promise has dawned upon you ; that the great staple of the Island continues to enjoy its long established reputation, and that it is your earnest endeavour to keep pace with the rest of the empire in maintaining its commercial and mercantile pre-eminence.

I fervently trust that under Divine Providence the people of Mauritius may ever remain a united, loyal, and prosperous community.

(Sgd) GEORGE.

Government House,
Mauritius
1901 August 5.

SPECIAL MEETING OF THE METEOROLOGICAL SOCIETY.

Tuesday, 1901, September 10.

REV. G. MC IRVINE, M.A., *Vice-President*, in the Chair.

Secretary : T. F. CLAXTON, F.R.A.S.

The Chairman. Gentlemen, we have to-day a painful duty to perform. The month of August, 1901, will long be remembered in the annals of Mauritius owing to the auspicious visit of the Duke and Duchess of Cornwall and York to this Colony. When we were joyously preparing, together with other constituted bodies, to bid the Royal guests a hearty welcome, we little realized what the near future had in store for this Society. The last volume of our Proceedings and Transactions records a list of 60 members and honorary members on our roll for the present year, alas : three of our senior members ceased to be on that roll within the short space of one month. The hon. Sir Virgile Naz, who died on the 3rd of August ; the hon. A. P. Ambrose, who died on the 26th of August, and Dr. C. Meldrum who died at the close of the same month. These three distinguished members of the Meteorological Society were senior to all of us. Indeed each of them was little short of the honored rank of octogenarian. Yet we all feel keenly this thinning of our ranks, and we mourn their loss as the seniors of a united and attached family are mourned.

Sir Virgile Naz was President of the Society for nearly fifteen years, from 1886 to 1901, a longer period of office than any of his predecessors except the hon. Robert Stein who was president from 1862-1878. How conscientiously and thoroughly he discharged the duties of that office we can all testify. He was called away at a time when we greatly needed his valuable help and guidance. It is needless for me to dwell upon the the various proofs of remarkable geni us, generosity, and patriotism, which marked the whole life of Sir Virgile Naz in

this Colony. All the papers have lately enlarged upon his distinguished life and character.

The prevailing epidemic which deprived us of our esteemed President took from us also the hon. A. P. Ambrose, who was a staunch member of this Society for many years, and one of the worthiest and most charitable of our leading colonists. We all knew and honored Mr. Ambrose and feel that we are the poorer now that he is no more amongst us.

The telegram which told us on the 1st instant that Dr. Meldrum was no more, brought home to the whole Colony that one who had long been justly honored in the scientific world, and who had laboured for many years in no ordinary way for the welfare of Mauritius, had at length been called away. Dr. Meldrum was the life and soul of the Meteorological Society for well nigh half a century. The minutes of proceedings at our Meetings, all entered in his own handwriting testify to the diligence, tact, and success with which he fostered the great work that was dear to him. His name can never be forgotten by this Society, and his remarkable career will live long in the hearts of Mauritians. Sir Virgile Naz, Povah Ambrose, and Charles Meldrum all sat for many years in our Legislative Council ; Senators who deserved well of this colony.

I propose that a record of our sense of their great worth, and of our regret at their demise be entered in the minutes of the Society and that our Honorary Secretary be requested to forward an extract of the same, together with letters of condolence, to Lady Naz, Mrs. Meldrum, and the members of the Ambrose family.

The Secretary seconded the motion, and proposed that steps should be taken to obtain portraits of Dr. Meldrum and Sir Virgile Naz, and of as many past presidents as possible. The Society already possessed painted portraits of three of its past presidents, Dr. Thom, Colonel Johnson, 5th. Fusiliers, and the hon. Robert Stein ; it was highly desirable that similar portraits of other presidents should be obtained.

After some discussion the Secretary was requested to take the necessary steps to ascertain the cost of such portraits.

The President, I have now a very pleasant duty to perform, I beg to move that the Society should record in the minutes their gratification and pride which they feel at the honor conferred upon their Vice President, the hon. Dr. Edwards M.D., by His Majesty the King Emperor, in appointing him a Companion of the Most Distinguished Order of St. Michael and St. George. The motion was seconded by the hon. G. Ritter and carried with applause.

After some discussion as to when the celebration of the Society's Jubilee (which had been postponed from September 4, on account of the sad news of the death of Dr. Meldrum) should take place, it was decided that the President and Secretary should enquire whether September 6 would be convenient for His Excellency the Governor, and also to request His Excellency to preside at the meeting which it was proposed should be held at the Observatory on that day.

The Meeting then adjourned.

CELEBRATION OF THE METEOROLOGICAL SOCIETY'S JUBILEE.

The President and Council of the Meteorological Society held a reception at the Observatory on Monday, September 16, 1901, in celebration of the 50th anniversary of the foundation of the Society. Among the guests were His Excellency the Governor, His Honor the Officer Commanding the Troops, &c.

His Excellency opened the proceedings by referring to the object of the assemblage, and called upon the Honorary Secretary to read the remarks he had prepared on the history of the Society, and the establishment of the Royal Alfred Observatory.

The Secretary :—In celebrating the 50th anniversary of the Meteorological Society of Mauritius we are reminded of its principal founder and organiser, the late Dr. Charles Meldrum,

who, in the month of July, 1851, addressed a memorial to Governor Higginson, showing the desirability of forming a Meteorological Society at Mauritius; and as a result of this memorial, at a Public Meeting held in the Town Hall, Port Louis, on the first day of August, 1851, this Society was established, under the patronage of His Excellency the Governor. The Hon. C.J. Bayley was its first president, and Messrs Meldrum and Bousquet, joint secretaries.

The objects of the Society were to promote Meteorological Science in general, and especially that branch of it called cyclonology. To provide for meteorological, magnetical, and tidal observations being made in Mauritius and its Dependencies, and to aim at the establishment of a permanent Magnetical and Meteorological Observatory. With the above objects in view to collect a mass of data from ships' logs, and to make hourly observations with the instruments ordered from England by the Society.

For various reasons, however, very little progress was made in carrying out the above programme.

The local Government placed certain rooms attached to the so-called Government Observatory at the disposal of the Society, and voted an annual allowance of £ 200 for furthering its objects. They also appointed a Government Meteorological Observer at a salary of £ 100 a year, payable out of the Society's grant. But the Society was soon called upon to pay rent for the rooms occupied in the Observatory, at the rate of £ 60 per annum, and it was further necessary to provide the Government Observer with an assistant at a yearly stipend of £ 36, which left the Society a balance of £ 4 per annum out of the £ 200 voted by Government.

Though one room would have sufficed for their immediate needs; in view of the expected arrival of the Standard instruments which had been ordered from England, and for which suitable accommodation would have to be provided, the Society agreed to pay the rent demanded; but after the receipt of the

instruments, the Local Government declined to allow the Society to occupy the whole of the building for which they paid rent. The Society thereupon decided to vacate the Observatory and refer the whole matter to the Secretary of State. For eighteen months the Society was without a fixed place of meeting, had no accommodation for its books, instruments, and other property, and was subjected to various interruptions from causes over which it had no control. But in the month of April 1855 " it was announced that a despatch had been received from the Secretary of State which removed every obstacle, and placed the Society in a far more advantageous position than it had ever yet enjoyed ", the Home Government having been pleased to place the Observatory buildings at the entire disposal of the society, rent free ; and the Admiralty having further voted an annual subsidy of £50 for the purpose of enabling it to publish from time to time the results of its labours.

The Society, thus encouraged and assisted by the Home Government was now in a position to commence work in earnest. " It was generally expected that the instruments would at length be turned to account and the building made subservient to the purposes for which it was granted." But apparently the only observations made were those taken under the superintendence of Lieut. Fyers R. E. and Capt. Stokes R. E. at the Royal Engineers Observatory, which building was also utilised for copying log books.

The first Government Meteorological Observer, who lived in the Government Observatory, made no regular observations except during the passage of a cyclone. His own methods of investigation differing considerably from the plan adopted by the Council of the Meteorological Society, which was to collect and plot on an outline chart, as many syncronous observations as possible, spread over the whole of the South Indian Ocean, and from them to study the circulation of the atmosphere, and the distribution of pressure, temperature &c.

Moreover, being a Government servant, the observer ack-

nowledged no responsibility to the Society whose books, papers, and other property were in his possession, and out of whose funds his salary and that of his assistant were paid.

This unsatisfactory state of affairs continued until his resignation in the year 1854.

It was not until Mr. Meldrum, who had had no official connection with the Society for 5 years, was re-elected its Secretary in September 1859, that the Society's instruments were properly installed in the Observatory buildings and systematic observations commenced. He infused new life into the Society and under his superintendence the copying of ships' logs was prosecuted with renewed vigour. As a result of his labours Mr. Meldrum was enabled, subsequently, to publish Daily Synoptic Weather Charts of the South Indian Ocean for January, February, and March, 1861, and a Storm Atlas showing the tracks of all known Cyclones in the South Indian Ocean since 1848.

Though up to now the observations had been taken in Port Louis, which is encircled from W.S.W. through South to S. E. and East by a range of mountains, so that the true direction of the wind could seldom or never be known, the want of an Observatory in a more suitable locality, free from the traffic and dust of a busy town, had never been lost sight of. The subject was first brought to the notice of Government by Dr. Thom, the President of the Society at that time, and later by some of his successors, but apparently without result. At length in April 1860, the President, Colonel Sir Henry Johnson, again brought the matter to the notice of the Government, recommending that the Old Observatory should be sold and the proceeds devoted to the purchase of a more suitable building. In reply, Sir William Stevenson stated that the matter was under consideration, and requested the Society to select a convenient site.

A Committee was appointed for this purpose, and after much diversity of opinion and various recommendations, the present site was decided upon, as most nearly fulfilling the

necessary conditions of an Observatory site, being situated on a plain at a considerable distance from any mountain range (and so presumably free from local magnetic attraction), and having a tolerably good horizon to Northward, and a view to within 3°or 4° of the horizon to Southward. The North Line Railway brought it within a moderate distance of Port Louis, and until the Fever Epidemic of 1866, it was a favorite country resort.

Before the report of the Committee was ready, however, His Excellency Sir William Stevenson died, and much anxiety was felt as to what attitude the new Governor might assume, but fortunately Sir Henry Barkly succeeded him and at once took the matter in hand. The old Observatory was sold and part of the proceeds (£ 5,200) voted for a new building and instruments. The Government Observer, Dr. Meldrum, was authorized to proceed to England to procure the latter, and obtain plans for a new Observatory.

In the meantime the daily meteorological observations were taken in a small building in Little Mountain Street, Port Louis, under the Superintendence of the Rev. George Mc Irvine M.A., our present President.

In October 1869 Dr. Meldrum returned, and the set of Kew self-recording magnetometers and barograph, now at work in the underground Magnetic Observatory, arrived in July of the following year.

On Monday the 30th. of May, 1870, the foundation stone of this building was laid by His Royal Highness the Duke of Edinburgh, in the presence of His Excellency Sir Henry Barkly, the President and Council of the Meteorological Society, and a numerous company of the surrounding inhabitants.

The building was completed in 1874, and by the end of the year most of the self-recording instruments were set up and at work.

Thus one of the principal objects of the Society was accomplished: the establishment of a permanent magnetical and meteorological Observatory.

Little did the members of that Committee think when they decided upon the Powder Mill Reserves as the site of the long promised Observatory, that in a few years it would be a fever stricken district, deserted by all who had the means and opportunity of living elsewhere. One by one the houses and public buildings of Pamplemousses have disappeared, even the hospital, so necessary in such an unhealthy locality, has at last been removed to the higher and healthier district of Montagne Longue.

The Royal Alfred Observatory alone remains, and within its walls the immediate objects for which it was established are still being carried out, but its operations are impeded, its efficiency impaired, and its sphere of usefulness narrowed, by the unhealthiness of the district in which it is situated. Over thirty years ago the members of this Society, strong in the knowledge that their cause was good and for the benefit not only of science but of the commercial prosperity of the world, by extraordinary patience and perseverance surmounted all obstacles in their path and secured for this Colony a permanent Observatory, equipped with the best self-recording instruments, both magnetical and meteorological; and it is for this Society to show whether they are content to allow the Royal Alfred Observatory, which owes its origin entirely to their efforts, to remain in the unhealthy district of Pamplemousses.

Dr. Meldrum complained bitterly of the unhealthiness of the neighbourhood and its effect on the work of the Observatory. His first English assistant, Mr. Durnford, died of fever after about 18 months' residence at Pamplemousses. His successor, the nephew of Captain Toynbee, R.N., arrived in the Colony on September 1, 1874, and died of fever on November 26, 1877. The third Chief Assistant, though Mauritian born and therefore more or less acclimatised, suffered from repeated attacks of fever and finally died in the year 1895. The present Chief Assistant has suffered so much from fever, from continued residence at Pamplemousses, and his constitution is so undermined that even now that he is permitted to live away from the Observatory in

a healthier locality, over fatigue or slight indisposition results in a bad attack of fever.

It is true that the cost of removal, or rebuilding, would be great, but perhaps not incommensurate with the benefits which might reasonably be expected from having the Observatory in a healthy locality, where the Director and his Staff might live in comfort and freedom from the ever recurring sickness of Pamplemousses. Then indeed might the objects for which the Observatory was established be carried out in their fullest meaning, more time devoted to original research, and useful observations made with the astronomical instruments now at Pamplemousses.

I have no doubt that during the first few years, when the Society was struggling for its very existence, nothing seemed more improbable than the establishment of a first class Observatory such as we now possess. Yet they succeeded, why should not we ? What has once been accomplished can be accomplished again, and I trust that ere long we shall see the Royal Alfred Observatory in a more suitable locality where it may gain an honorable place among the Astronomical as well as Magnetical and Meteorological Observatories of the World.

His Excellency the Governor :—Ladies and Gentlemen, I am sure we have all listened with interest to the remarks Mr. Claxton has just read.

In the early stages of its existence the Meteorological Society of Mauritius met with several reverses, but by the devotion, ability, and indomitable perseverance of Dr. Meldrum, it has gained an assured position among similar societies in different parts of the world (*applause*). I am specially glad to be able to take part to-day in the celebration of the Society's Jubilee, as I happened to be a member of its Council when the foundation stone of the building in which we are now assembled was laid by H.R.H. the Duke of Edinburgh in the year 1870.

The history of the Meteorological Society is in reality the history of Dr. Meldrum's labours as scientist and organiser.

Whatever the Society may have accomplished has been almost entirely due to Dr. Meldrum, whose researches in different branches of Meteorology have been recognized and appreciated by the leading scientists of the day. In the year 1878, without any solicitation on his part, he was elected a Fellow of the Royal Society, and in 1886 was appointed a Companion of the Most Distinguished Order of St. Michael and St. George; he also received the honorary degree of L.L.D. from the University of Aberdeen and was offered a German decoration for his researches on the law of storms.

Dr. Meldrum's work may be classified under three heads. He commenced, fifty years ago, by collecting log books from vessels touching at Mauritius, and extracting all possible information concerning cyclones; afterwards plotting the observations from each ship on a map and constructing what are known as synoptic charts, to show at a glance the weather over the Indian Ocean at noon on each day, and hence the circulation of the atmosphere, distribution of pressure, &c., &c.

The chief difficulty in those days was for one man in his spare time to collect and tabulate the observations; but at the present time the difficulty is that the number of ships, that is the number of observations, has decreased to about one-third of the number available formerly; on the other hand the logs now received contain, as a rule, fuller information, and the observations are made with better instruments.

By the aid of the charts on which he had expended so much time and labour Dr. Meldrum was soon able to demonstrate his *incurving* theory of cyclones, in contradistinction to the *circular* theory of Piddington, Reid, and others. He showed that the wind did not blow in circles around the centre of a cyclone, but in the form of a spiral, blowing nearly directly towards the centre in the rear of a storm; and what Dr. Meldrum showed by patient and prolonged observation has since been demonstrated theoretically as the only possible solution of the problem.

With a knowledge of Dr. Meldrum's "law of storms" the

captain of a vessel can now, by carefully watching the barometer and the direction of the wind, estimate within much smaller limits than by the old circular theory, the distance and bearing of the storm centre, and shape his course so as to avoid the most violent winds.

Dr. Meldrum next turned his attention to the subject of rainfall periodicity. It having been shown that the magnetic activity of the earth varied with the solar activity, he subjected a large mass of rainfall observations from all parts of the world to a critical examination, and came to the conclusion that in spite of occasional contradictions, the amount of rainfall varied in the same manner, being greatest near the epoch of maximum sunspots, and least near the epoch of minimum sunspots.

His researches on this subject have been used as a basis for other investigators; and recently Sir Norman Lockyer and his son, Dr. W. J. S. Lockyer, have treated the subject in a somewhat different and more detailed manner by using, instead of the variation in the number of sunspots, the variation in the relative quantities of different gases present in the sun, which shows a very striking agreement with the variation of rainfal[1] from year to year.

Yet another branch of Dr. Meldrum's studies was the relation of malarial fever to rainfall; in the year 1879 he first showed that there was an annual inequality in the number of deaths from malarial fever, the highest death rates occurring about two months after the season of greatest rainfall, whereas no such inequality occurred in the death rates from other causes. His theory that malarial fever is increased by excessive rainfall still holds good in spite of the mosquito theory, seeing that with excessive rain the quantity of stagnant water increases and hence the number of mosquitoes.

I should like to say a few words on an important question alluded to by Mr. Claxton, viz:—the unhealthiness of the Observatory. The present site was chosen for the reasons given by Mr. Claxton. Many other places were suggested but none, at the

time, appeared to be so suitable as Pamplemousses. Government has been most unfortunate in this direction. Many years ago when money was plentiful it was decided to build some model dwellings at Pamplemousses, but the district soon became so unhealthy that they had to be abandoned, and quite recently I have had brought to my notice the unhealthiness of the Prisons at Beau Bassin, which were removed some time ago to what was then supposed to be a spot particularly healthy, and likely to remain so. In fact it has always been found that when a Government building is changed from one place to another on account of unhealthiness, its new site soon becomes as unhealthy as the previous one.

The cost of removing the Observatory would be very great, but should it by any possibility be moved to a different locality it must be to one which is not only healthy at the present time, but one which is likely to remain healthy. During the short time which I have to remain in the Colony I shall be happy to give the question my best consideration.

It is sad to think that the death of its principal founder and Secretary, Dr. Meldrum, should coincide so nearly with the date of the Society's Jubilee, and as you are aware, this function was postponed on account of the sad news of Dr. Meldrum's death, which was received on September 2. But on the other hand we are glad to be able to associate our Jubilee with two other important events occurring at about the same time. The visit of H. R. H. the Duchess of Cornwall and York on Tuesday, August 6th. 1901 will long be remembered as an episode in the history of the Observatory ; and it is to be hoped that with the new cable between Mauritius, Rodrigues and the Koko Keeling Islands, important information may be received which will enable the Director of the Observatory to give timely warning of the approach of Cyclones to these shores.

In conclusion I will ask you to give your best wishes for the welfare of the Meteorological Society of Mauritius, and I trust that while Mr. Claxton remains at the head of affairs the Society

may enjoy the same measure of success as it has done during the past fifty years. (*applause*).

Revd. G. Mc Irvine:—Ladies and Gentlemen,I will ask you to show your appreciation of Sir Charles Bruce's kindness in presiding at our Meeting to-day, and of the remarks he has just made, by according His Excellency a very cordial vote of thanks. (*applause.*)

After an inspection of the instruments in different parts of the grounds and buildings, and discussion of some light refreshment, the celebration of the Meteorological Society's Jubilee terminated 'mid the strains of the National Anthem.

The musical programme was admirably rendered by the band of the 27th Madras Infantry, by kind permission of Lieut.-Colonel Clothier and officers of the regiment.

ANNIVERSARY MEETING OF THE METEOROLOGICAL SOCIETY.

Thursday, 1901, October 10.

The Rev. G. Mc Irvine M. A., *Vice-President,* in the Chair.

Secretary : T. F. Claxton, F. R. A. S.

The Minutes of the last Meeting were read and confirmed.

The Secretary read the Report of the Council for the year ending 1901, August 31, and laid on the table a statement of the Society's accounts.

The following Office bearers for the ensuing year were elected :

President:

The Rev. George Mc Irvine, M.A.

Vice-Presidents :

THE HON. DR. EDWARDS, M.D., C.M.G.,
THE HON. H. LECLÉZIO, C.M.G.

Treasurer :

THE HON. HAMILTON STEIN.

Secretary :

T. F. CLAXTON, F. R. A. S.

Council:

C. F. H. ADAM, Esq.
THE HON. F. W. L. NASH,
OWEN L. O'CONNOR, Esq. F. R. MET : SOC :
THE HON. GEORGE ROBINSON,
C. F. SHAND, Esq.
THE HON. L. SOUCHON,
A. WALTER, Esquire.

REPORT OF THE COUNCIL OF THE METEOROLOGICAL SOCIETY OF MAURITIUS FOR THE YEAR ENDING 1901, AUGUST 31.

During the past year 22 new members have been elected, and 5 new honorary members have been admitted; while on the other hand we have to deplore the death of 3 of our oldest members : Sir Virgile Naz, who was President of the Society for nearly 15 years; the Hon. A. P. Ambrose, who had taken a warm interest in the labours of the Society for many years, and Dr. Charles Meldrum who had been its Honorary Secretary for over 40 years.

The total number of ordinary members on August 31 was 52, and of honorary members 10.

Our expenditure during the year was Rs 2,169.21 and receipts Rs 2,316.00, from which must be deducted Rs 1,000, the government grant which was not paid in the previous year.

This gives an excess of Rs 853.21 of expenditure over our normal annual income, but as the balance on hand at the commencement of the session was Rs 1,425.87 (+Rs 1,000 due from Government) there remained a balance, on 1901 August 31, of Rs 1,602.66.

The excess of expenditure over revenue was on account of the employment of two clerks for tabulating into 5° squares the sea observations collected by the Society during the past 50 years.

The first volume of a new series of the Society's Proceedings and Transactions was issued in July, after having been in the printer's hands for twelve months. It contains two papers on the Drought of 1896; papers on 15 different cyclones experienced in the South Indian Ocean during the years 1896-1900; on the Results of Actinometer observations made at the Royal Alfred Observatory from 1887-1897; on the Registration of Bright Sunshine at the Royal Alfred Observatory, 1887–1899; and on the Cape Gales of 1900. In addition to the above there are two papers by Mr. Walter, one on the Annual Variations of the Meteorological Elements at Mauritius, and the other on the cyclone of 1899 March 3-9.

Other papers to be printed are "The drought of 1899 November to 1900 December; On the cyclone of 1901 January 9-16; Mr. Claxton's and Mr. Maunder's preliminary accounts of the Total Solar Eclipse of 1901 May 18, and Mr. O'Connor's remarks on the weather in January 1901 in different parts of the world. To which must be added an account of the celebration of the Society's Jubilee, which took place at the Observatory on Monday September 16.

As usual, log books have been collected and copied at the Port Office, and the results forwarded to the Observatory.

In the following table the number of arrivals of vessels, the number of logs received, and the number of days' observations tabulated, for the 12 months ending 1901 August 31, are

compared with the corresponding numbers in the previous year.

Year	1899-1900			1900-1901		
Month	Number of arrivals.	Number of logs received	Number of days' observations tabulated	Number of arrivals	Number of logs received	Number of days' observations tabulated
September ...	19	14	293	25	19	434
October ...	25	14	421	21	17	527
November ...	27	19	342	20	13	281
December ...	22	15	446	20	15	300
January ...	28	15	239	23	15	375
February ...	17	15	610	24	14	317
March ...	25	16	413	23	16	446
April ...	18	16	436	25	17	442
May ...	30	21	608	26	15	382
June ...	26	19	401	31	20	500
July ...	28	21	557	31	22	588
August ...	25	18	402	27	18	425
Sums ...	290	203	5168	296	201	5017
Percentage of logs received.	70.0			68.0		

From which it will be seen that whereas the falling off in the number of arrivals, mentioned on page 176 of Volume I, has ceased for the present. The percentage of logs received decreased slightly, from 70.0 o/o in 1899–1900 to 68.0 o/o in 1900–1901 : The average length of a voyage continues to decrease. Whereas in 1896–7 it was 30 days ; in 1899–1900 it was 25.5 days, and in 1900–1901 it was 25.0 days.

In addition to the observations talulated in our *Daily Journal,* detailed accounts of gales and hurricanes were recorded in *Storm Books.*

Five tropical cyclones occurred in the South Indian Ocean during the year, and the tracks of three of them have been investigated and laid down on a chart ; but no information has come to hand concerning the cyclone which evidently passed to the North and North West of Mauritius in the month of March. We are led to suppose that such a cyclone did occur on account of the very heavy swell at Mauritius on March 20-24, in which the ill-fated *S. S. Taher* was washed on the reefs at Barkly Island The direction of this swell gradually changed from North on the 20th. to W. N. W. on the 24th.

Concerning the cyclone which passed to the North of Mauritius on January 25–26 we have only the observations of the *S. S. Corsair*, in addition to those made at the Royal Alfred Observatory, to guide us in laying down its track.

With regard to meteorological work in the Dependencies, usual observations of Atmospheric Pressure, Temperature of the Air, Rainfall, Wind, and Weather, have been received from Rodrigues, Seychelles, and Bourbon, but no observations have been received from Six Islands since August 1900.

For the past three years the Secretary has been in communication with the owners of the Cargados Islands respecting the establishment of a Meteorological Station at St. Brandon. In March 1898 a Standard Barometer, Thermometers, Thermometer Screen, and a Raingauge, were despatched under the charge of Mr. G. Darné, but up to now no observations have been received. The present owner, however, has promised to do all in his power to assist us, and I trust that a valuable series of observations will shortly be commenced at this Station.

It is very desirable that similar observations should be taken at St. Paul or Amsterdam, in latitude 38° S. and longitude 78° E. for the more complete study of " Cape Gales " and their accompanying anti-cyclonic systems which traverse the Southern Ocean from South Africa towards Australia.

These stations are dependencies of Bourbon, and the

Secretary has written to M. Bertho, the chief of the Port Department of that Island, respecting the possibility of obtaining such observations; but has not yet received a reply.

Though we are unable to congratulate ourselves on the acquisition of any new observing stations during the past year, we have the satisfaction of knowing that, thanks to the initiative taken by the hon. Dr. Edwards, C.M.G., and the courtesy of the Directors of the Eastern Telegraph Company, we shall soon be receiving daily weather telegrams from Rodrigues and Keeling Islands, by the new cable between Mauritius and Australia, provided the Mauritius Government will sanction the necessary instrumental equipment of the above stations.*

Should the application for instruments be granted, it is proposed that the Eastern Telegraph Company should be requested to further interest themselves in the matter, and to allow the instruments to be mounted in the Company's offices, and the observations made by members of their staff.

The old instruments at Rodrigues, whose errors are unknown, might then be returned to Mauritius for comparison with the observatory standards.

In addition to the laying of part of the submarine cable from Mauritius to Australia, other events have occurred during the past year, the 50th anniversary of the Society's foundation, which will long be remembered in the history of the Meteorological Society of Mauritius.

On April 20 an expedition arrived from Greenwich to observe the Total Eclipse of the Sun of 1901 May 18, and the first account of that Eclipse was read before the Society by Mr. E. W. Maunder, on July 10.

From August 4-8 Their Royal Highnesses the Duke and Duchess of Cornwall and York were the guests of this Colony, and on Tuesday, August 6, Her Royal Highness paid an informal visit to the Royal Alfred Observatory.

August 1 was the 50th. anniversary of the foundation of

* Sanctioned in November, 1901.

the Society, and the event was celebrated by an "At Home" at the Observatory on September 16, at which H. E. the Governor and many of the leading inhabitants were present.

In accordance with Rule No. XIII the Council filled up, provisionally, the vacancy caused by the lamented death of the President, Sir Virgile Naz, K.C.M.G., by appointing the senior Vice-President, the Rev. G. McIrvine, M.A., President, and the Honorable H. Leclézio, C.M.G., Vice-President in his stead.

These appointments you are now asked to confirm.

FURTHER REPLY TO THE ADDRESS OF WELCOME TO H.R.H. THE DUKE OF CORNWALL AND YORK.

Downing Street,
29th. November 1901.

Sir,

I have the honor to acknowledge the receipt of your despatch No. 386 of the 16th. ultimo, enclosing a copy of the Address of Welcome to His Royal Highness the Prince of Wales and asking whether His Royal Highness is willing to become a Patron of the Society.

I have laid this despatch before His Royal Highness, who desires me to inform you that he is pleased to accede to the the Society's request.

I have, &c.,

J. CHAMBERLAIN.

Governor Sir C. Bruce, K.C.M.G.
&c., &c., &c.

STATEMENT OF EXPENDITURE AND RECEIPTS OF THE METEOROLOGICAL SOCIETY OF MAURITIUS FOR THE TWELVE MONTHS ENDING 1901 AUGUST 31.

Dr.	Rs.	c.	Cr.	Rs.	c.
Salary of Clerk for copying logs ...	420	...	Balance on August 31, 1900 ...	1,455	87
Salary of Clerks for extra work ...	680	65	Government Grant for 1899 (not paid in that year)	1,000	...
Boat hire	188	...	Subscriptions 1899	140	...
Printing Vol. I, of Proceedings and Transactions	355	30	Government Grant for 1900 ...	1,000	...
Miscellaneous Printing: Circulars &c.	67	...	Subscriptions 19 0	140	...
Advertisements...	1	50	Subscriptions 1901	30	...
Office Contingencies	52	75	Sale of graduated measure for rain.	6	...
Stationery	35	49			
Purchase of Raingauges	210	07			
Addresses to King Edward VII, and The Duke of Cornwall and York	56	50			
Cablegram to Kiel	26	95			
Contribution to Symons' Memorial Fund	75	...			
Balance	1,602	66			
Rs.	3,771	87	Rs.	3,771	87

PAPERS

READ BEFORE THE

METEOROLOGICAL SOCIETY

OF

MAURITIUS

DURING THE YEAR

1901

THE MAURITIUS DROUGHT OF 1899 NOVEMBER–1900 DECEMBER.

Read on Thursday, 1901, March 21.

The Cyclone of 1901, January 12–13, brought to a close a drought which may be said to have commenced as far back as 1899 November, and the object of the present paper is to compare the rainfall of Mauritius during this period with the falls during former droughts.

Rainfall observations were made at Port Louis in the years 1789-91, 1821, 1827, 1828, 1831-34 by M. Lislet Geoffroy, and in 1833-34, 1839, 1841-42 by Colonel Lloyd. Similar observations were made at Flacq during parts of 1836-39 by M. Desjardins. From these records it would appear that a severe drought occurred at Port Louis in 1789, and at Flacq in 1837; but there are no available statistics showing to what extent the Island in general was affected.

I shall therefore confine my attention to the droughts which have occurred since 1862, the year in which systematic rainfall observations were commenced in different parts of the Island.

Commencing with 12 in the year 1862, the number of stations sending in monthly rainfall returns has now increased to 72, and from these I have been able to form tables of rainfall at 10 stations in Mauritius for each month of the years 1862-1900, filling up the few blanks which have occurred by utilizing returns from neighbouring stations, after multiplying by the observed factor. For instance, in the year 1862 the rainfall at the Botanical Gardens has been derived from Labourdonnais and Lucia, and Trianon from Beau Séjour. In later years the same method has been adopted when for one or two months the returns were not received.

There are objections to this principle, but it is certain that greater accuracy may be thus preserved than by using the means of different stations in different years. The rainfall varies to such an extent in different parts of Mauritius that no com-

parison can be made from year to year except from the returns from the same stations. It is useless to compare the mean rainfall in, say, 1864 as derived from 13 stations with the fall in, say, 1899 as derived from 72 stations. The actual figures are 57ins.14 and 76ins.80, while from the accompanying tables it will be seen that when the same 10 stations are used in 1864 and 1899, the figures become 64ins.68 and 71ins.17.

At only 3 of the stations selected were observations commenced in the year 1862, and as it was impossible to infer the rainfall at all the other stations, the means for the years 1862-70 have been derived by dividing the sums, not by the number of stations employed, but by the factors given in the following table; these having been obtained from the observations made in 1871-1900, during which period the returns from each of the 10 stations were available with, however, occasional blanks which were filled up in the manner mentioned above.

FACTORS BY WHICH THE TOTAL RAINFALL AT CERTAIN STATIONS MUST BE DIVIDED TO OBTAIN APPROXIMATELY THE MEAN RAINFALL AT TEN STATIONS.

Years.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Stations employed.
1862–3	5.21	5.74	5.42	4.97	4.93	4.89	4.97	5.18	4.97	5.23	4.96	5.18	1,3,4,5,6.
1864	6.38	6.75	6.59	6.37	6.24	6.41	6.29	6.43	6.33	6.56	6.38	6.41	1,3,4,5,6.8.
1865–8	8.29	8.38	8.35	8.34	8.40	8.44	8.24	8.28	8.26	8.38	8.40	8.31	1,3,4,5,6,7,8,9.
1869–0	9.35	9.26	9.27	9.36	9.38	9.54	9.31	9.43	9.48	9.38	9.42	9.31	1,3,4,5,6,7,8,9,10.

The 10 stations are :—

(1) Labourdonnais
(2) Observatory
(3) Botanical Gardens
(4) Beau Séjour*
(5) Trianon
(6) Cluny
(7) Beau Vallon
(8) Gros Bois
(9) St. Aubin
(10) L'Union.

* In 1897 the raingauge at Beau Séjour was transferred to Salency on the opposite side of the road, and the returns now received from M. A. Boulé.

It may be urged that the above are not representative stations, the first three being close together, the fourth and fifth and the last two. This is true, but they are the most suitable that can be found, and I doubt whether the addition of other stations situated in unrepresented districts, but commencing their records from 10 to 20 years ago, would add to the accuracy of the results. On the contrary, I believe the results would be vitiated. As it is there is slight uncertainty respecting the mean rainfall from 1862-1870, as given in the last column of tables I—XV, and every station introduced in later years would tend to increase the uncertainty in the years preceding.

The proximity of some of the stations practically reduces our data to observations from 6 small areas, but this disadvantage is counterbalanced by the increased accuracy of the information actually received, the effect of local peculiarities being thereby eliminated to a certain extent, and I think there is no doubt that for the purpose of comparing the amount of rainfall from year to year, the returns from a certain number of small areas with two observing stations in each, are more valuable than similar returns from twice that number of isolated stations, though the latter may give a better idea of its distribution.

I will now proceed to examine the rainfall at Mauritius, as derived from the records of ten stations, during the several periods of drought which have occurred since 1862; dividing the Island into the six districts given below, and using the mean rainfall when two stations are available.

District.	Stations employed.
1. Northern	*Labourdonnais & Botanical Gardens*
2. West Central	*Beau Séjour and Trianon*
3. South Central	*Cluny*
4. South-Eastern (Inland)	*Gros Bois*
5. South-Eastern (Coast)	*Beau Vallon*
6. Southern	*St. Aubin and L'Union.*

No. XVI of the accompanying Tables gives the percentage (+) above, and (−) below, the mean rainfall at ten stations, for each month of the years 1862-1900, and shows at a glance the occurrence of floods and droughts.

From it will be seen that severe droughts occurred as follows :

(1) 1866, January–1867, March ; (2) 1869, July–1870, March ; (3) 1871, February–September ; (4) 1880, March–1881, March ; (5) 1885, November–1886, December ; (6) 1896, June–1897, May ; (7) 1899, November–1900, December.

There have been also five minor droughts, namely :

(1) 1863, October–1864, June ; (broken by rains slightly above the average in 1864 February) ; (2) 1874, July–1875, March ; (broken by heavy rain in December) ; (3) 1876, March-December ; (broken by rain in October considerably above the average) ; (4) 1889, April–1890, January ; (broken by rains slightly above the average in each of the months July, August, and December, 1889) ; (5) 1893, August–1894, April; (broken by heavy rains in January, 1894).

In the accompanying Tables (pp. 5–11) we have the data in a convenient form. The figures in the last column but one show the relative severity of each drought from a purely meteorological point of view, so that we may enumerate them in the following order, for each district.

ORDER OF SEVERITY FROM A METEOROLOGICAL POINT OF VIEW.

Order of Severity.	District.						
	Northern.	West. Central.	South Central.	South-Eastern.		Southern.	Whole Island.
				Inland.	Coast.		
Worst.	1896–7	1866–7	1880–1	1885–6	1880–1	1880–1	1880–1
2	1880–1	1885–6	1885–6	1880–1	1885–6	1885–6	1885–6
3	1866–7	1880–1	1866–7	1866–7	1899–0	1896–7	1896–7
4	1899–0	1899–0	1896–7	1899–0	1896–7	1869–0	1866–7
5	1886	1896–7	1899–0	1896–7	1866–7	1871	1899–0
6	1869–0	1869–0	1869–0	1869–0	1869–0	1900	1869–0
7	1871	1871	1871	1871	1871	1866–7	1871

Table (a)— RAINFALL IN THE *NORTHERN* DISTRICT OF MAURITIUS DURING SEVEN SEVERE DROUGHTS.

No. of Drought.	Year.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total rainfall during Drought.	Average.	Defect.	
																Actual.	Per cent.
1	1866		5.04	9.15	7.08	2.47	0.76	2.36	2.41	1.43	1.43	0.51	3.04	50.09	81.93	31.84	39
	1867	5.83	5.52	3.06													
2	1869							1.78	1.18	0.14	0.87	2.93	0.98	24.96	47.02	22.06	47
	1870	5.65	4.69	6.74													
3	1871		5.52	4.44	5.05	1.87	2.31	1.68	1.76	0.76				23.39	13.61	20.22	46
4	1880			5.24	3.05	1.86	3.55	2.71	2.39	1.23	1.39	0.36	5.55	39.51	72.91	33.40	46
	1881	5.63	4.50	2.05													
5	1886	3.37	5.33	5.47	7.30	2.57	1.29	3.90	1.09	0.71	3.07	1.86	3.72	39.68	62.05	22.37	36
6	1896						1.72	2 67	2.63	1.35	0.77	1.31	0.80	27.76	62.05	34.29	55
	1897	7.32	4.42	0.77	3.33	0.67											
7	1899											1.68	1.54	39.36	69.13	29.77	43
	190.	3.80	5.23	8.45	4.90	1.87	0.85	3.50	3.10	0.60	1.75	1.49	0.60				
Average..		9.20	9.02	10.86	6.61	5.28	3.14	3.44	3.30	1.96	2.16	2.03	5.05	62.05			

Table (b)—Rainfall in the *West Central* District of Mauritius during seven severe Droughts.

No. of Drought.	Year.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total rainfall during Drought.	Average.	Defect.	
																Actual.	Per cent.
1	1866	7.07	5.37	7.95	4.30	2.48	2.89	2.37	2.93	1.70	1.61	0.70	4.51	61.59	98.62	37.03	38
	1867	3.90	6.80	7.01													
2	1869							1.46	1.84	0.44	0.61	3.19	5.13	24.81	51.64	26.83	52
	1870	2.94	4.26	4.94													
3	1871		3.00	4.58	4.63	1.20	2.17	1.40	3.17	1.45				21.60	43.63	22.03	50
4	1880			3.24	3.17	3.36	2.51	2.54	2.97	1.25	1.09	1.41	6.65	48.03	76.74	28.71	27
	1881	10.80	5.97	3.07													
5	1885											1.95	5.86	38.65	73.53	34.88	48
	1886	2.12	6.19	4.22	5.38	2.76	1.13	2.27	0.83	0.52	1.59	1.33	2.50				
6	1896						2.26	2.11	3.18	1.54	1.66	1.63	2.12	37.37	64.83	27.46	42
	1897	9·99	6.65	2.82	2.39	1.02											
7	1899												1.04	42.82	71.10	28.28	40
	1900	5.32	8.00	7.47	7.65	2.85	1.07	2.23	0.80	0.35	1.40	0.75	3.89				
Average..		10.67	11.21	11.91	6.24	4.17	2.78	2.67	2.96	1.69	1.83	2.43	6.27	64.83			

Table (c)—RAINFALL IN THE *SOUTH CENTRAL* DISTRICT OF MAURITIUS DURING SEVEN SEVERE DROUGHTS.

No. of Drought.	Year.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total rainfall during Drought.	Average.	Defect.	
																Actual.	Per cent.
1	1866	16.41	11.67	11.76	17.59	9.15	8.51	9.13	10.86	6.17	6.12	4.11	10.49	152.15	200.83	48.68	24
	1867	9.25	14.71	6.22													
2	1869							7.89	10.31	2.12	4.22	5.83	5.40	76.39	104.98	28.59	27
	1870	11.42	13.22	15.98													
3	1871		12.04	6.20	18.36	7.07	7.47	8.60	11.10	5.67				76.51	100.38	23.87	24
4	1880			9.68	6.38	6.57	17.33	6.43	4.91	2.90	1.58	1.29	7.96	89.04	164.84	75.80	46
	1881	7.64	6.47	9.90													
5	1885											3.30	11.67	110.13	161.54	51.41	32
	1886	6.34	8.91	8.61	16.94	7.87	8.54	9.53	5.76	2.89	6.68	5.94	7.15				
6	1896						8.35	4.49	5.34	3.97	1.42	4.04	5.39	98.51	143.28	44.77	31
	1897	17.63	20.76	15.08	6.40	5.64											
7	1899											3.09	5.48	118.23	161.54	43.31	27
	1900	11.47	14.58	20.23	15.32	15.49	5.33	11.71	4.53	2.31	3.89	1.53	3.27				
Average.		19.13	16.86	21.56	16.17	12.24	9.89	8.65	9.07	5.94	5.51	5.75	12.51	143.28			

Table (d)—RAINFALL IN THE *SOUTH EASTERN* (INLAND) DISTRICT OF MAURITIUS DURING SEVEN SEVERE DROUGHTS.

No. of Drought.	Year.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total rainfall during Drought.	Average.	Defect.	
																Actual	Per cent.
1	1866	5.85	6.82	7.70	11.24	3.76	4.09	5.51	4.95	4.21	3.80	2.81	9.50	93.68	132.84	39.16	29
	1867	5.37	13.27	4.80													
2	1869							3.33	4.41	1.39	2.16	4.25	3.27	42.54	68.15	25.61	38
	1870	6.60	5.69	11.44													
3	1871		5.35	4.95	20.81	8.94	5.14	3.51	5.65	1.52				55.87	65.77	9.90	15
4	1880			6.70	4.70	2.92	11.82	6.30	6.10	2.49	1.85	2.36	5.29	69.48	109.51	40.03	37
	1881	11.66	4.09	3.20													
5	1885											2.97	6.70	64.07	107.65	43.58	40
	1886	7.75	4.81	4.79	11.93	5.80	3.35	4.69	2.60	1.46	2.45	1.71	3.06				
6	1896						6.53	3.99	4.01	1.76	2.05	4.94	2.86	68.05	95.08	27.03	28
	1897	17.37	11.74	7.79	2.03	2.98											
7	1899											2.85	1.58	79.05	107.65	28.60	27
	1900	6.90	9.10	17.68	6.99	10.68	3.69	5.71	2.61	1.22	3.43	2.00	4.61				
Average.		13.29	10.04	14.43	11.84	8.33	6.76	5.53	5.24	3.60	3.45	4.18	8.39	95.08			

Table (e)—Rainfall in the *South Eastern* (Coast) District of Mauritius during seven severe Droughts.

No. of Drought.	Year.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total rainfall during Drought.	Average.	Defect.	
																Actual	Per cent.
1	1866	3.38	6.85	5.63	9.77	3.63	3.36	4.19	2.24	2.04	1.95	0.34	7.67	68.50	89.30	20.80	23
	1867	5.65	8.86	2.94													
2	1869							2.35	1.91	0.76	0.97	3.29	3.66	24.84	45.08	20.24	45
	1870	3.39	2.89	5.62													
3	1871		3.51	2.22	11.10	4.30	2.92	1.54	2.37	1.10				29.06	43.49	14.43	33
4	1880			2.85	1.53	5.26	4.53	3.36	2.73	0.82	0.73	1.20	1.55	34.04	72.57	38.53	53
	1881	4.30	2.27	2.91													
5	1885											0.77	2.80	35.06	70.79	35.73	50
	1886	4.24	4.39	3.18	5.82	2.60	1.45	2.92	0.69	0.57	1.77	1.42	2.44				
6	1896						2.80	3.72	2.11	1.55	0.47	2.35	1.30	38.80	62.79	23.99	38
	1897	10.52	7.54	4.07	1.07	1.30											
7	1899												0.82	40.25	68.20	27.95	39
	1900	4.84	4.83	9.68	3.54	6 04	1.33	4.19	1.08	0.58	1.35	0.59	1.38				
Average.		9.44	7.29	9.78	7.29	6.53	3.89	3.37	3.25	2.09	1.86	2.59	5.41	62.79			

Table (f)—RAINFALL IN THE *SOUTHERN* DISTRICT OF MAURITIUS DURING SEVEN SEVERE DROUGHTS.

No. of Drought.	Year.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total rainfall during Drought.	Average.	Defect.	
																Actual.	Per cent.
1	1866			5.99	10.16	7.10	3.45	5.72	3.30	3.79	2.58	1.55	6.67	75.87	90.48	14.61	16
	1867	8.23	14.98	2.35													
2	1869							4.02	2.44	0.58	0.80	2.29	1.98	27.13	58.12	30.99	53
	1870	2.84	4 64	7.54													
3	1871		3.99	2.95	14.67	4.57	3.51	2.63	3.05	1.65				37.02	53.70	16.68	31
4	1880			4.30	3.04	4.65	7.65	5.31	3.61	1.62	1.23	2.12	5.11	55.02	90.48	35.46	39
	1881	8.54	2.86	4.98													
5	1885											2.24	4.45	56.14	89.15	33.01	37
	1886	7.56	7.18	4.06	6.73	4.39	3.91	4.50	2.43	1.73	2.19	2.14	2.63				
6	1896						2.54	4.86	2.38	1.87	2.74	1.79	2.63	46.93	78.79	31.86	40
	1897	12.05	7.90	4.04	1.85	2.28											
7	1900						1.64	3.95	2.03	1.46	1.60	0.96	3.16	14.80	30.51	15.71	51
Average.		12.02	8.92	11.69	8.98	6.67	5.02	4.65	4.62	3.15	2.71	3.21	7.15	78.79			

Table (g)—Mean Rainfall at Ten Stations in different parts of Mauritius during seven severe Droughts.

No. of Drought.	Year.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total rainfall during Drought.	Average.	Defect.	
																Actual.	Per cent.
1	1866	9.05	6.63	7.82	8.58	3.99	3.17	4.13	3.87	2.72	2.45	1.34	5.95	78.97	109.83	30.86	28
	1867	5.79	9.12	4.36													
2	1869							3.02	2.92	0.70	1.27	3.21	3.06	31.92	56.97	25.05	44
	1870	4.74	5.29	7.71													
3	1871		5.02	4.01	10.10	3.67	3.34	2.65	3.69	1.70				34.18	52.51	18.33	35
4	1880			5.02	3.49	3.50	6.27	3.93	3.35	1.59	1.31	1.33	5.49	51.26	88·53	37.27	42
	1881	7.81	4.33	3.84													
5	1885											2.12	6.22				
	1886	4.66	5.98	4.79	7.66	3.76	2.67	4.07	1.65	1.17	2.72	2.09	3.67	53.23	85.93	32.70	38
6	1896						3.19	3.33	2.99	1.77	1.48	2.17	2.18	45.08	76.17	31.09	40
	1897	11.06	8.11	4.31	2.64	1.85											
7	1899											2.26	1.89				
	1900	5.88	8.16	11.38	6.98	5.62	1.88	1.33	2.19	0.94	1.98	1.18	2.52	57.19	85.93	28.74	33
Average..		11.31	9.98	2.37	8.43	6.32	4.45	4.13	4.17	2.66	2.59	2.96	6.80	76.17			

From the above it will be seen that the recent drought ranks fourth in the Northern, West Central, and South-Eastern (Inland) districts, fifth in the South Central, third in the South-Eastern (Coast) district, sixth in the Southern district, and fifth in the Island as a whole.

But before we can classify these droughts from an agricultural point of view, it is further necessary to subject each of them to an analysis which shall take into consideration.

1. (a) *The time during which the rainfall was below the average.*
   (b) *The month in which the drought commenced.*
2. *The total deficit of rainfall.*
3. (a) *Any specially severe portion of the drought.*
   (b) *The months in which it occurred.*
4. (a) *Whether the drought was broken by normal or abnormal rains.*
   (b) *The month, or months, in which such rain occurred.*
5. *The daily distribution of the rainfall.*

I shall therefore attempt to frame a rough scale of marks for each of these items, except No. 5.

Item No. 1.—In assigning marks for item No. 1 we must be guided by the experience of the agriculturist. As far as can be ascertained*, the worst month for the commencement of a drought appears to be December; then January, February, March &c.; a severe drought from December to April, or even March, being sufficient to ruin the crops. Subsequent rains from May to August do little or no good, except to canes in the high lands which have another year to run. If the drought continues till the following March, or April, a second crop will be ruined; so that the worst possible drought is one commencing in December and lasting for 17 months.†

* From information received from sugar planters, in different parts of the island. To these gentlemen I again tender my thanks for their courteous replies to my letters of enquiry.

† Excluding the possibility of a 29 months drought.

It is necessary therefore to weight each month, and this I have done as follows; going over a period of 24 months.

	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1st. year	4	4	4	4	4	1	1	1	1	0	0	1
2nd. year	9	5	6	7	8	6	4	2	0	0	0	1

On this basis the following table has been prepared, showing what marks to assign to droughts of varying length, and commencing in different months.

SCALE OF MARKS FOR DROUGHTS COMMENCING IN DIFFERENT MONTHS AND OF DIFFERENT DURATION.

Commencing in	Duration of drought, in months.														
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jan.	8	12	16	17	18	19	20	20	20	21	25	29	33	37	41
Feb.	8	12	13	14	15	16	16	16	17	21	25	29	33	37	38
Mar.	8	9	10	11	12	12	12	13	17	21	25	29	33	34	35
April	5	6	7	8	8	8	9	13	17	21	25	29	30	31	32
May	2	3	4	4	4	5	9	13	17	21	25	26	27	28	29
June	2	3	3	3	4	8	12	16	20	24	25	26	27	28	28
July	2	2	2	3	7	11	15	19	23	24	25	26	27	27	27
Aug.	1	1	2	6	10	14	18	22	23	24	25	26	26	26	27
Sept.	0	1	5	9	13	17	21	22	23	24	25	25	25	26	35
Oct.	1	5	9	13	17	21	22	23	24	25	25	25	26	35	40
Nov.	5	9	13	17	21	22	23	24	25	25	25	26	35	40	46
Dec.	8	12	16	20	21	22	23	24	25	25	25	34	39	45	52

The reason of the increased weight in the summer months of the 2nd year is obvious; for two successive dry summers naturally constitute a much more severe drought than if a wet summer had intervened. It may perhaps be thought that the second December is too heavily weighted, but I am given to understand that the effects of a dry December following upon a prolonged drought are very serious.

Item No. 2.—This item should have about the same weight as item No. 1, and requires a different scale for each district. This can be arranged, however, by giving, say, 40 marks to the drought in which the greatest deficit occurred, and 15 in which the least deficit occurred, interpolating for the remainder.

Item No. 3.—Sufficient allowance may be made for this item by using again the numbers given for item 1 and selecting as specially severe portions of a drought those periods of 2 months, or more, in which the rainfall is 60 % below the average; periods of 3 months, or more, in which the fall is 50 % below the average; and any two adjacent months in which the rainfall is at least 70 % below the average in one, and 40 % below the average in the other.

These limits have been fixed after careful examination of tables (a) to (g). It should be mentioned, however, that in certain cases the limit has been very slightly extended in order to include periods for which it is obvious that allowance should be made but which just fail to come within the prescribed definition of a specially severe portion of the drought. For instance, the drought of 1866-7 was specially severe in January, February, and March, 1867; in March the rainfall was more than 70 % below the average, but in February it was only 39% below, or 1 % below the limit; in January it was 37 % below the average; this obviously constitutes a specially severe portion of the drought, and, had but one-tenth of the January rain fallen in February, would have come within the meaning of item 3, which has therefore been applied.

Item No. 4.—This item presents certain difficulties, as instanced in the drought of 1874 July–1875 March. During this period the rainfall for the whole island was 39 % below the average, while from January to March, 1875, it was 60 % below. What would have been a very disastrous drought was however broken by heavy rains in December, and for this reason was not included in the list of severe droughts. Similar instances have occurred on other occasions and there must be considerable

diversity of opinion as to how such breaks should be considered. My own views are as follows :

(a) That rainfall above the average in any two consecutive summer months *i.e.* from December to May, should constitute a total breaking up of the drought.

(b) That if the rainfall reaches or exceeds, say, 90 °/₀ of the average in any summer month, then the number we have derived to express the severity of the drought should be divided by some factor which becomes 2 when the percentage in any one of the above months reaches, say, 180, decreasing to 1 when the percentage is 90 : and this factor is obviously

$\frac{a}{90}$, where a is the total percentage.

Should more than one instance occur in any drought, the operation must be repeated for each.

Subjecting now each drought to the above analysis. We obtain the following results :

NORTHERN DISTRICT.

Item.	Number of Marks.						
	1866–7	1869–0	1871	1880–1	1886	1896–7	1899–0
(1)	33	19	16	29	25	25	35
(2)	37	19	16	39	15	40	32
(3)	10	10	3	17	13	13	15
(4)	1.19	...	...	1.22	1.23	...	...
$\frac{(1)+(2)+(2)}{(4)}$	67	48	35	70	43	78	82

West Central District.

Item.	Number of Marks.						
	1866–7	1869–0	1871	1880–1	1885–6	1896–7	1899–0
(1)	37	19	16	29	35	25	34
(2)	40	23	15	26	36	24	25
(3)	...	12	8	16	8	13	8
(4)	...	...	...	1.32	1.04	1.04	...
$\frac{(1)+(2)+(3)}{(4)}$	77	54	39	54	76	60	67

South Central District.

(1)	37	19	16	29	35	25	35
(2)	34	19	15	40	37	31	30
(3)	...	...	...	22	12	...	5
(4)	...	...	...	...	1.21	1.40	...
$\frac{(1)+(2)+(3)}{(4)}$	71	38	31	91	69	40	70

South-Eastern (Inland) District.

(1)	37	19	16	29	35	25	35
(2)	37	27	15	37	40	28	29
(3)	...	...	...	17	5	9	8
(4)	1.94	...	2.33	...	...	1.88	1.94
$\frac{(1)+(2)+(3)}{(4)}$	38	46	13	83	80	33	37

South-Eastern (Coast) District.

Item.	Number of Marks.						
	1866–7	1869–0	1871	1880–1	1886	1896–7	1899–0
(1)	37	19	16	29	35	25	34
(2)	22	31	15	40	37	25	29
(3)	...	...	8	24	8	9	14
(4)	3.31	...	1.69	...	...	1.42	1.13
$\frac{(1)+(2)+(3)}{(4)}$	18	50	23	93	80	42	68

Southern District.

(1)	29	19	16	29	35	25	8
(2)	15	35	17	40	37	36	1
(3)	...	12	8	16	...	9	5
(4)	2.29	...	1.82	...	...	1.11	...
$\frac{(1)+(2)+(3)}{(4)}$	19	66	23	85	72	63	14*

Whole Island.

(1)	37	19	16	29	35	25	35
(2)	32	24	15	40	34	32	29
(3)	...	12	...	17	12	9	13
(4)	1.07	...	1.26	...	...	1.11	1.06
$\frac{(1)+(2)+(3)}{(4)}$	64	55	25	86	81	59	73

* In two consecutive months, January, and February, 1900, the rainfall was slightly above the average, and only a little below in April and May; the drought therefore is considered to be completely broken; it commenced again, however, in June and lasted for 7 months.

According to the above tables it would appear that, from an agricultural point of view, the seven droughts under consideration should be classified as follows:

Order of Severity.	District.						
	Northern.	West Central.	South Central.	South-Eastern.		Southern.	Whole Island.
				Inland.	Coast.		
Worst.	1899–0	1866–7	1880–1	1880–1	1880–1	1880–1	1880–1
2	1896–7	1885–6	1866–7	1885–6	1885–6	1885–6	1885-6
3	1880–1	1899–0	1899–0	1869–0	1899–0	1869–0	1899–0
4	1866–7	1896–7	1885–6	1866–7	1869–0	1896–7	1866–7
5	1869–0	1869–0	1896–7	1899–0	1896–7	1871	1896–7
6	1886	1880–1	1869–0	1896–7	1871	1866–7	1869–0
7	1871	1871	1871	1871	1866–7	1900	1871

Comparing this with our previous table, it will be seen that the order is slightly changed in every district. There appears to be no satisfactory method of dealing with Item V. I am therefore unable to say to what extent the present order would have been affected by taking into account the daily distribution of rainfall; but the results as they now stand show that, for the whole Island, the drought of 1899 November to 1900 December ranks third in the list of severe droughts experienced since 1862. In the North of the Island it has been the severest on record. In the West Central, South Central, and South-Eastern (Coast) district it ranks third. In the South-Eastern (Inland) district it ranks fifth, owing to rains nearly normal in 1900 February, and above the average in March and May. In the Southern district it ranks last, for the reason already given*. From 1900 June to December, however, the rainfall in this district was the least on record, namely:—14ins.80 or 51 % below the average; other droughts from June to December occurred as follows: 1869, 18ins.39; 1886, 18ins.55; 1896, 18ins.83; 1893, 18ins.94; 1884, 19ins.63.

* See footnote on page 17.

In what precedes, the word drought has been used to express prolonged deficiency of rain, that is to say, rainfall below the average during several consecutive months, and not necessarily an actual scarcity of water; so that what is termed a drought in the centre of the island would be considered excessive rainfall at some coast stations, and the same may be said of summer and winter rainfalls. From the accompanying tables it will be seen that in the centre of the island a drought, in the sense of actual scarcity of water, has never occurred, and that even the relative defects are less than at low-land stations, as shown in the following table of mean defects in the seven severe droughts, for each district.

District.	Northern.	West Central.	South Central.	South-Eastern.		Southern.	Whole Island.
				Inland.	Coast.		
Mean Defect.	% 44	% 43	% 29	% 31	% 40	% 36	% 37

This is to be expected, seeing that during a drought the rain-bearing clouds will be more readily condensed at the high-land stations, thus leaving a smaller proportion for the low-lands, to leeward.

The method of analysing drought statistics in the manner indicated above, appears to supply a long felt want in comparing the severity of different droughts, but is at present far from perfect; the scale of marks should have been framed by a person well acquainted with the exact effect of floods or droughts at different seasons of the year, and it is probable that this effect is different, not only in different districts, but at different altitudes in the same district. What is wanted is a record over several well defined areas, for a considerable number of years, of the dates of planting the cane, the resulting crop, and the rainfall from month to month during its growth. With this information a reliable scale of marks could be constructed for each area, and any changes in the sugar producing qualities of the climate detected.

Table I.—Rainfall at Ten Stations in Mauritius, 1862–1900 :—January.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	11.64		11.40	12.95	12.95	16.09					12.48
63	20.31		17.20	20.14	15.73	25.42					18.96
64	4.25		3.30	3.84	5.04	11.18		5.05			5.12
65	4.95		4.84	6.71	5.64	7.15	4.48	7.55	6.67		5.79
66	15.33		9.08	6.16	7.98	16.41	3.38	5.85	10.81		9.05
67	6.31		5.35	4.33	3.47	9.25	5 65	5.37	8.23		5.79
68	13.64		15.83	14.18	13.92	19.36	8.18	13.32	16.88		13.91
69	9.25		13.51	18.57	18.57	15.32	16.97	18.13	19.60	10.96	15.07
70	5.77		5.54	2.94	2.94	11.42	3.39	6.60	3.29	2.39	4.74
71	16.91	14.72	21.32	18.00	18.00	31.06	14.54	19.54	19.66	28.56	20.23
72	8.99	11.60	11.71	10.81	10.54	24.14	9.47	17.30	9.54	8.32	12.24
73	8.04	10.79	14.50	20.65	17.23	27.56	8.13	13.46	11.86	16.39	14.86
74	6.67	5.23	5.85	12.90	11.84	14.78	5.76	10.07	5.45	7.02	8.56
75	3.53	3.13	3.41	3.25	4.47	16.04	4.05	9.74	6.07	4.68	5.84
76	17.99	10.81	12.05	14.90	16.75	25.97	11.78	17.93	21.13	25.17	17.45
77	17.20	11.17	19.15	16.05	15.30	30.59	15.13	17.77	19.79	20.78	18.29
78	7.64	5.15	6.44	10.98	8.72	14.56	6.59	10.60	7.73	7.34	8.57
79	2.11	3.20	3.58	3.32	2.99	10.29	2.36	4.55	4.08	0.78	3.73
80	5.04	3.88	5.77	4.77	4.29	13.04	5.14	9.64	6.06	6.95	6.46

81	5.61	4.55	5.65	12.20	9.40	7.64	4.30	11.66	10.64	6.45	7.81
82	16.53	11.71	12.61	12.77	12.55	44.88	23.67	32.47	28.75	30.63	22.66
83	7.64	7.44	10.28	15.37	12.27	13.52	10.91	15.09	12.70	8.34	11.36
84	9.21	5.68	11.74	11.10	10.22	13.02	4.45	9.20	9.51	6.87	9.10
85	5.59	6.70	10.61	8.82	8.39	9.63	10.36	5.98	2.18	2.07	7.03
86	3.54	2.13	3.20	2.45	1.80	6.34	4.24	7.75	6.67	8.46	4.66
87	10.94	9.84	18.69	12.34	13.64	23.76	13.60	20.18	23.16	17.04	16.32
88	9.56	8.86	11.55	10.99	11.56	27.24	14.94	15.66	23.42	18.62	15.24
89	16.13	12.74	9.83	20.70	19.13	33.15	30.45	26.45	26.17	20.10	21.48
90	5.84	5.01	6.37	6.49	7.15	11.51	5.73	5.94	6.20	7.44	6.77
91	4.08	4.13	5.75	9.93	8.57	14.63	5.42	9.45	6.19	8.17	7.63
92	13.17	6.96	9.36	7.98	6.13	18.53	9.56	13.34	13.09	13.70	11.18
93	13.25	12.55	14.07	23.58	20.22	27.90	12.96	19.04	19.07	19.13	18.18
94	15.43	14.58	18.06	17.88	15.99	33.94	14.18	18.44	12.52	12.25	17.33
95	1.91	2.14	2.29	5.87	6.47	6.41	3.00	3.26	6.31	6.04	4.37
96	11.78	8.92	9.40	8.33	10.17	18.55	7.57	11.38	11.00	10.73	10.78
97	7.28	6.35	7.36	9.40	10.58	17.63	10.52	17.38	13.13	10.97	11.06
98	10.17	6.48	4.71	4.94	6.41	18.62	7.28	13.41	13.61	9.64	9.53
99	3.35	2.18	3.91	5.71	6.57	7.47	2.42	5.06	3.51	5.46	4.56
1900	3.53	3.35	4.08	5.22	5.43	11.47	4.84	6.90	5.21	8.80	5.88
Means 1871–1900	8.96	7.40	9.44	10.92	10.43	19.13	9.44	13.29	12.15	11.90	11.31

Mean 1862–1900 ... ... 11.03

TABLE II.—RAINFALL AT TEN STATIONS IN MAURITIUS, 1862–1900 :—FEBRUARY.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	7.56		8.36	10.77	10.77	19.08					9.85
63	12.93		15.54	23.89	22.32	24.33					17.25
64	11.93		9.44	10.42	7.33	21.94		14.36			11.17
65	25.89		23.35	29.40	27.79	29.84	15.35	17.86	18.27		22.40
66	3.24		6.84	6.39	4.35	11.67	6.85	6.82	9.36		6.63
67	4.23		6.81	7.62	5.97	14.71	8.86	13.27	14.98		9.12
68	5.13		4.84	6.93	8.31	12.93	4.36	6.84	6.19		6.63
69	11.19		11.05	11.46	11.46	18.47	8.02	12.21	9.89	8.77	11.07
70	3.54		5.84	4.26	4.26	13.22	2.89	5.69	5.37	3.92	5.29
71	3.67	4.29	7.38	3.00	3.00	12.04	3.51	5.35	5.04	2.94	5.02
72	9.15	9.27	10.35	13.38	13.67	16.25	6.09	9.47	11.50	13.16	11.23
73	21.12	26.04	26.31	25.54	26.55	28.70	13.27	17.37	17.93	15.62	21.84
74	5.37	4.48	4.58	4.50	4.82	8.95	4.72	8.38	3.94	1.30	5.10
75	5.19	2.78	3.20	2.28	2.32	5.59	2.83	3.25	2.79	3.74	3.40
76	12.33	7.88	10.46	14.76	16.56	17.17	7.07	7.59	6.53	8.45	10.88
77	21.24	15.66	20.28	28.58	23.63	30.04	12.21	17.16	16.69	13.71	19.92
78	3.83	3.94	4.94	6.53	7.50	10.58	3.00	5.52	6.04	12.32	6.42
79	8.22	7.77	9.93	7.68	7.58	14.83	5.05	8.40	8.98	5.61	8.40
80	9.24	5.78	9.41	9.01	5.84	29.37	11.40	22.42	16.70	6.99	12.62

81	3.34	3.86	5.66	6.69	5.25	6.47	2.27	4.09	3.70	2.02	4.33
82	11.05	8.28	11.96	8.55	8.65	22.73	10.75	11.64	10.84	9.90	11.43
83	7.89	4.38	4.82	10.63	10.05	12.71	6.14	8.95	6.32	4.81	7.67
84	4.49	3.78	5.40	6.22	5.84	7.23	3.75	7.91	6.54	4.70	5.59
85	3.84	2.16	4.54	6.87	4.88	10.95	4.50	4.75	4.86	2.87	5.02
86	5.23	4.26	5.44	6.42	5.96	8.91	4.39	4.81	5.69	8.67	5.98
87	5.77	3.37	7.28	8.63	6.83	24.08	11.64	18.59	12.69	9.38	10.83
88	14.37	8.76	16.41	22.47	17.55	27.31	19.38	17.74	17.21	16.56	17.78
89	6.88	5.51	7.25	5.58	5.08	14.28	10.88	7.18	7.24	6.41	7.63
90	11.77	11.02	12.76	15.80	12.21	9.23	5.51	8.09	9.21	7.46	10.31
91	6.65	4.32	6.30	9.00	6.87	14.63	3.26	5.80	3.94	3.39	6.42
92	12.54	13.86	15.42	31.85	22.08	34.37	13.50	15.36	13.29	17.22	18.95
93	3.23	2.42	2.02	11.38	10.50	7.74	1.62	2.22	4.54	8.73	5.44
94	4.18	4.48	5.19	17.71	16.26	17.80	6.20	9.94	7.93	7.23	9.69
95	2.35	2.97	3.79	5.33	3.23	6.12	12.21	2.82	3.27	2.57	3.47
96	36.07	30.06	30.00	35.63	27.80	39.90	17.21	27.70	27.19	26.49	29.80
97	6.05	3.14	2.79	8.08	5.23	20.76	7.54	11.74	6.70	9.10	8.11
98	3.83	3 70	3.99	6.49	5.94	9.74	7.15	5.58	4.24	3.97	5.46
99	11.11	7.24	12.72	12.94	13.26	22.66	6.68	12.43	9.10	17.47	12.56
1900	3.94	4.79	6.52	7.76	8.23	14.58	4.83	9.10	10.64	11.17	8.16
Means 1871–1900	8.80	7.34	9.24	11.98	10.44	16.86	7.29	10.04	9.04	8.80	9.98

Mean 1862–1900 ... ... 10.23

Table III.—Rainfall at Ten Stations in Mauritius, 1862–1900 :—March.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	5.05		6.02	7.74	7.74	19.54					8.50
63	6.93		14.35	7.91	10.03	25.94					12.02
64	3.27		4.68	8.14	8.90	7.04		4.64			5.56
65	9.83		7.43	10.34	9.35	28.57	6.72	14.96	9.64		11.60
66	11.27		7.03	9.67	6.24	11.76	5.63	7.70	5.99		7.82
67	4.00		2.13	8.08	5.94	6.22	2.94	4.80	2.32		4.36
68	12.12		21.18	30.79	27.77	27.34	21.62	30.92	22.30		23.24
69	16.17		20.04	10.88	10.88	22.42	10.65	14.79	12.24	8.44	13.65
70	6.78		6.70	4.94	4.94	15.98	5.62	11.44	8.05	7.03	7.71
71	5.44	2.75	3.45	4.58	4.58	6.20	2.22	4.95	3.94	1.97	4.01
72	4.30	7.52	9.55	8.00	8.06	10.45	4.79	8.70	5.80	9.34	7.65
73	8.04	7.74	8.57	6.30	8.03	24.23	9.14	13.71	12.36	10.91	10.90
74	25.30	36.66	40.25	59.01	52.65	61.79	27.87	46.09	40.75	49.73	44.01
75	5.13	2.18	2.49	6.92	3.11	7.28	3.05	4.37	2.73	1.52	3.88
76	4.92	4.80	4.98	5.98	7.49	13.78	6.67	9.02	6.14	5.27	6.90
77	17.54	8.12	7.71	8.45	6.93	18.08	8.75	13.15	16.30	11.18	11.62
78	4.76	3.45	4.66	9.92	7.75	25.08	6.26	11.28	9.99	7.25	9.04
79	16.90	11.87	13.12	22.99	17.51	30.76	14.84	19.44	16.93	13.28	17.76
80	5.38	5.39	5.10	2.31	4.18	9.68	2.85	6.70	5.22	3.39	5.02

81	1.05	2.18	3.05	3.74	2.40	9.90	2.91	3.20	6.35	3.62	3.84
82	21.73	17.53	24.88	19.35	17.80	44.97	22.49	27.02	19.34	24.60	23.97
83	9.00	4.99	8.68	9.42	8.55	18.41	6.49	16.31	11.91	13.36	10.71
84	11.13	6.75	9.89	11.12	10.04	13.64	7.61	12.31	8.66	9.47	10.06
85	7.43	5.73	8.10	9.25	7.56	15.96	2.87	9.70	5.71	6.52	7.88
86	4.77	3.81	6.17	4.21	4.24	8.61	3.18	4.79	4.57	3.55	4.79
87	14.44	12.76	21.64	6.67	7.46	16.34	8.74	11.22	5.70	3.33	10.83
88	15.22	9.83	11.57	12.16	13.20	34.27	13.10	20.32	16.24	14.63	16.05
89	24.86	17.09	18.79	24.75	22.55	48.61	21.46	32.11	29.37	29.28	26.89
90	12.35	11.36	12.62	22.27	17.63	26.01	8.61	17.20	14.65	16.46	15.92
91	15.44	11.74	14.07	15.29	14.30	27.35	19.52	22.72	21.10	16.08	17.76
92	9.59	9.57	9.79	7.30	5.47	18.76	10.59	9.21	9.04	10.04	9.94
93	8.34	6.08	7.40	9.64	6.27	14.44	4.02	9.27	4.47	4.33	7.43
94	6.32	3.99	4.61	5.38	4.25	9.50	3.84	5.66	4.43	4.07	5.20
95	29.08	24.11	25.79	29.54	27.29	40.77	29.81	28.55	17.68	17.32	26.99
96	7.61	3.51	5.57	7.18	7.48	9.79	3.75	8.20	7.64	7.28	6.80
97	1.02	0.88	0.53	3.38	2.26	15.08	4.07	7.79	4.69	3.39	4.31
98	11.70	6.53	6.78	11.83	11.38	22.61	12.30	15.64	15.84	12.29	12.69
99	14.65	12.13	11.89	20.13	22.11	24.34	12.04	16.62	16.06	19.00	16.90
1900	8.45	9.15	8.44	6.87	8.06	20.23	9.68	17.68	13.50	11.79	11.38
Means 1871–1900	11.06	9.01	10.67	12.46	11.35	21.56	9.78	14.43	11.90	11.47	12.37

Mean 1862-1900 ... ... 11.94

Table IV.— Rainfall at Ten Stations in Mauritius, 1862-1900 :—April.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	1.12		1.45	7.43	7.43	11.43					5.81
63	5.78		6.81	5.76	3.83	13.50					7.18
64	4.88		3.66	5.46	5.25	13.86		10.56			6.86
65	1.65		2.95	1.71	1.44	7.81	4.27	6.86	4.92		3.79
66	6.61		7.55	4.49	4.12	17.59	9.77	11.24	10.16		8.58
67	9.40		7.00	6.61	7.97	16.37	8.95	12.91	13.20		9.88
68	12.31		17.66	13.17	15.89	32.80	12.95	23.86	18.90		17.69
69	8.42		6.19	5.52	5.52	13.75	8.81	15.09	10.18	9.47	8.86
70	13.44		17.23	12.55	12.55	59.58	21.00	34.42	31.67	35.73	25.45
71	6.71	3.05	3.40	4.76	3.50	18.36	11.10	20.81	15.58	13.76	10.10
72	3.06	1.66	1.44	4.10	3.28	9.26	3.12	5.74	7.49	3.71	4.29
73	10.16	14.48	12.57	10.51	11.16	28.23	13.34	19.08	15.44	14.24	14.92
74	1.97	2.45	2.40	6.75	5.03	8.69	0.89	4.87	3.21	3.55	3.98
75	6.29	5.27	6.48	6.77	9.39	13.98	9.67	11.08	8.69	4.50	8.21
76	9.27	5.48	5.96	2.54	2.45	10.96	3.72	5.37	4.19	2.21	5.21
77	18.46	12.48	13.36	12.15	13.69	39.20	12.85	17.68	22.94	31.83	19.46
78	10.71	8.47	8.81	9.37	9.52	25.40	16.03	38.74	28.17	18.31	17.35
79	3.25	2.31	3.09	1.90	1.37	8.89	1.63	5.58	3.80	2.24	3.41
80	2.47	3.81	3.63	3.85	2.49	6.38	1.53	4.70	3.39	2.70	3.49

81	11.77	8.36	13.28	9.41	7.16	22.25	11.66	20.90	15.96	7.78	12.85
82	2.93	1.46	2.73	3.84	2.14	8.03	4.95	8.14	5.62	5.72	4.56
83	18.64	12.22	14.19	14.05	11.10	14.80	7.13	11.46	9.52	5.97	11.91
84	6.88	6.02	9.27	5.06	4.61	19.00	11.24	15.88	5.77	11.01	9.47
85	2.91	1.41	3.90	6.33	6.04	12.41	6.01	12.79	6.24	4.16	6.22
86	6.05	3.12	8.55	5.15	5.62	16.94	5.82	11.93	7.86	5.60	7.66
87	2.76	2.91	4.40	2.85	3.02	7.90	3.37	6.73	6.03	4.85	4.48
88	2.70	1.84	2.27	3.78	3.60	20.99	8.18	15.24	11.48	13.68	8.38
89	6.20	4.65	3.94	2.27	2.34	18.07	3.83	7.19	4.63	5.91	5.90
90	10.53	10.24	10.23	9.39	7.29	29.22	14.86	23.19	11.96	9.95	13.69
91	7.90	7.23	8.30	5.00	6.01	17.36	11.94	17.99	13.54	10.82	10.61
92	8.62	5.68	6.66	18.71	11.49	16.45	9.23	5.33	4.05	9.14	9.54
93	13.59	10.06	11.00	16.52	9.83	17.47	12.68	16.20	8.82	8.58	12.47
94	5.61	6.11	3.81	5.41	4.35	19.24	6.48	7.23	12.86	11.69	8.28
95	2.78	2.62	3.33	6.97	3.42	7.51	2.78	3.77	7.51	6.83	4.75
96	5.79	3.36	4.41	8.02	6.64	20.68	7.67	7.43	12.97	11.79	8.88
97	4.72	1.75	1.93	2.47	2.31	6.40	1.07	2.03	1.59	2.12	2.64
98	5.09	4.82	4.63	2.92	3.42	14.50	6.80	14.02	7.56	12.78	7.65
99	5.30	4.61	5.74	2.60	3.41	11.17	5.51	7.17	5.08	5.26	5.58
1900	5.71	3.16	4.09	7.05	8.25	15.32	3.54	6.99	6.71	9.02	6.98
Means 1871–1900.	6.96	5.37	6.26	6.68	5.80	16.17	7.29	11.84	9.29	8.66	8.43

Mean 1862-1900 ... ... 8.90

Table V.—Rainfall at Ten Stations in Mauritius, 1862–1900 :—May.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	13.93		12.90	6.69	6.69	14.03					11.00
63	4.05		4.05	2.91	2.47	5.18					3.79
64	2.55		3.89	1.28	0.42	3.28		4.70			2.58
65	3.85		2.36	3.26	2.78	9.55	5.20	7.64	7.07		4.97
66	3.28		1.65	2.28	2.68	9.15	3.63	3.76	7.10		3.99
67	1.87		2.87	2.20	2.08	11.81	2.70	5.19	4.25		3.92
68	9.02		9.41	10.08	10.08	15.96	8.66	11.85	13.58		10.55
69	2.74		2.50	2.48	2.48	11.22	6.47	7.00	3.75	4.87	4.64
70	0.77		0.99	0.75	0.75	2.97	1.12	1.92	1.12	1.00	1.21
71	2.23	1.11	1.51	1.24	1.17	7.07	4.30	8.94	4.74	4.40	3.67
72	1.70	1.37	2.70	3.16	1.75	8.20	5.17	8.82	6.66	5.45	4.50
73	2.36	2.23	2.55	0.71	0.91	5.76	2.80	2.88	3.66	2.45	2.63
74	4.74	2.44	2.92	3.60	3.16	8.53	5.48	6.06	4.35	3.63	4.49
75	20.48	13.78	14.30	8.08	9.79	20.17	12.42	13.30	6.33	7.52	12.62
76	5.44	2.43	3.00	1.99	2.63	9.74	5.63	6.18	6.62	5.17	4.88
77	2.62	1.34	1.56	1.11	1.51	6.41	2.75	3.37	3.97	2.40	2.70
78	4.50	2.97	3.44	6.86	4.00	7.35	4.56	9.46	8.14	4.75	5.60
79	6.73	6.44	7.13	7.06	6.56	8.41	9.58	9.73	9.31	6.84	7.78
80	2.12	0.49	1.60	5.00	1.73	6.57	5.26	2.92	4.66	4.65	3.50

81	6.89	4.78	6.88	6.25	4.41	13.64	5.40	16.96	9.36	10.17	8.47
82	0.55	0.87	1.73	1.23	0.96	5.38	3.07	5.70	2.34	2.26	2.41
83	7.58	6.25	7.51	7.72	6.79	11.93	15.49	11.95	10.68	8.64	9.45
84	11.90	12.81	11.82	11.68	9.78	16.94	11.40	11.35	5.05	7.41	11.01
85	10.51	7.40	16.65	2.93	3.15	21.17	7.30	12.39	9.87	10.43	10.18
86	2.60	1.88	2.55	2.69	2.84	7.87	2.60	5.80	4.48	4.31	3.76
87	5.50	4.68	9.19	4.56	5.19	16.61	8.13	9.94	7.62	5.90	7.73
88	4.38	0.99	1.02	1.39	0.84	3.44	2.89	3.07	3.68	3.90	2.56
89	1.40	1.51	1.98	1.27	1.29	6.82	2.36	3.51	3.49	2.69	2.63
90	1.75	0.82	1.27	1.90	1.61	6.08	3.35	3.54	3.43	3.09	2.68
91	5.21	1.76	2.74	1.75	1.53	8.06	3.20	6.11	6.40	4.67	4.14
92	1.99	1.25	1.59	1.19	1.88	11.51	6.31	3.93	6.02	3.81	3.95
93	7.03	4.13	5.00	5.55	5.67	22.19	6.18	7.05	10.00	8.65	8.14
94	4.13	4.41	5.01	5.23	4.60	10.41	9.94	8.21	10.30	6.06	6.83
95	4.15	3.09	3.65	4.25	5.15	16.90	7.91	9.65	7.00	6.71	6,85
96	21.57	13.55	13.84	14.27	11.98	41.42	18.54	22.86	26.50	23.24	20.78
97	0.63	0.66	0.71	1.07	0.97	5.64	1.30	2.98	1.81	2.75	1.85
98	13.00	8.32	9.59	8.82	9.22	26.33	12.84	16.92	15.43	12.39	13.29
99	3.54	1.73	2.48	5.20	5.74	11.05	3.63	5.55	4.68	6.12	4.97
1900	2.26	1.36	1.49	2.77	2.93	15.49	6.04	10.68	7.09	6.09	5.62
Means 1871–1900	5.65	3.89	4.91	4.35	3.99	12.24	6.53	8.33	7.12	6.22	6.32

Mean 1862-1900 ... ... 6.32

Table VI.—Rainfall at Ten Stations in Mauritius, 1862–1900:—June.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	0.33		0.74	1.04	1.04	1.92					1.04
63	6.86		7.43	8.91	7.09	13.09					8.87
64	3.09		4.33	3.18	2.94	7.62		5.05			4.09
65	2.37		1.97	2.10	1.92	9.20	3.87	4.94	3.49		3.54
66	0.73		0.80	2.70	3.08	8.51	3.36	4.09	3.45		3.17
67	2.32		2.20	2.19	1.53	7.24	2.51	3.72	2.82		2.91
68	1.00		1.34	2.61	2.61	9.53	2.50	5.36	3.47		3.37
69	6.26		5.57	6.00	6.00	12.42	6.38	8.55	7.05	5.50	6.68
70	1.91		2.14	2.08	2.08	7.47	2.87	5.62	4.67	3.79	3.42
71	2.22	1.94	2.40	2.08	2.26	7.47	2.92	5.14	3.67	3.34	3.34
72	5.66	4.66	5.95	7.73	7.62	25.18	6.66	11.48	8.03	10.35	9.33
73	1.61	0.99	1.90	1.85	2.07	2.75	0.79	1.70	1.95	0.55	1.62
74	4.89	2.90	5.05	4.73	6.83	21.27	7.18	14.69	10.00	8.39	8.59
75	2.49	2.07	2.76	3.13	3.42	5.56	3.06	5.80	3.49	2.84	3.46
76	3.50	1.31	2.09	2.20	2.39	10.78	3.31	6.40	3.65	2.95	3.86
77	3.86	1.90	3.39	3.36	3.27	9.58	3.33	7.50	7.30	6.91	5.04
78	1.90	1.64	2.71	1.72	1.66	4.78	1.65	4.12	2.84	2.80	2.58
79	3.11	1.78	2.39	1.51	1.25	9.45	4.49	7.95	5.02	3.50	4.04
80	4.68	1.58	2.42	2.26	2.77	17.33	4.53	11.82	8.76	6.55	6.27

81	2.35	2.53	2.55	2.58	2.09	7.30	1.64	5.41	4.53	4.32	3.53
82	5.05	2.86	5.44	2.40	2.68	8.98	3.43	5.29	3.47	3.02	4.26
83	4.26	1.97	3.64	2.72	3.31	7.45	6.48	5.85	7.68	3.11	4.65
84	1.26	1.06	2.49	1.14	1.14	8.01	3.85	6.85	4.06	2.18	3.20
85	5.55	4.36	9.72	4.86	5.25	9.87	6.97	10.89	9.51	10.88	7.79
86	1.23	0.65	1.36	1.04	1.22	8.54	1.45	3.35	3.42	4.41	2.67
87	2.15	1.68	2.82	2.94	2.70	7.74	2.47	4.94	3.81	4.85	3.61
88	3.15	1.64	1.65	3.89	2.58	10.33	3.85	5.11	3.82	5.40	4.14
89	2.02	1.53	1.84	1.28	1.41	4.24	3.30	5.45	5.02	3.52	2.96
90	2.95	1.52	2.25	2.76	2.49	10.71	4.21	6.59	6.18	7.45	4.71
91	6.90	2.55	3.86	3.65	2.91	11.87	5.88	7.71	6.63	7.45	5.94
92	5.87	4.02	5.64	4.98	4.61	12.56	3.86	6.79	4.82	6.00	5.91
93	2.59	2.53	3.78	2.42	2.48	8.78	4.88	5.03	4.56	4.22	4.13
94	0.92	0.76	0.88	1.74	1.51	1.24	1.06	1.67	1.69	1.72	1.32
95	3.44	2.85	3.33	5.10	5.10	17.29	4.17	7.45	6.50	6.15	6.14
96	1.76	1.12	1.69	2.76	1.76	8.35	2.80	6.53	2.63	2.46	3.19
97	5.84	2.51	2.96	2.32	2.45	13.61	6.68	11.37	9.22	8.14	6.51
98	2.15	1.11	1.33	1.29	1.70	9.25	4.17	3.72	1.41	2.79	2.89
99	3.41	1.63	1.67	1.45	2.17	11.18	6.19	12.60	9.00	9.25	5.85
1900	0.58	1.33	1.12	1.15	0.99	5.33	1.33	3.69	1.86	1.43	1.88
Means 1871–1900	3.24	2.03	3.04	2.77	2.80	9.89	3.89	6.76	5.15	4.90	4.45

Mean 1862–1900 ... . 4.37

TABLE VII.—RAINFALL AT TEN STATIONS IN MAURITIUS, 1862–1900 :—JULY.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	3.43		4.45	4.28	4.28	8.41					5.00
63	2.73		3.30	4.61	3.29	8.96					4.60
64	5.88		4.56	4.82	4.74	8.97		6.24			5.60
65	3.78		3.50	1.68	2.09	7.95	2.05	4.29	3.10		3.45
66	2.38		2.35	2.46	2.29	9.13	4.19	5.51	5.72		4.13
67	4.79		5.90	4.48	3.99	10.27	4.31	6.50	6.28		5.65
68	1.95		1.57	4.75	4.75	14.47	6.33	11.56	6.29		6.27
69	2.30		1.27	1.46	1.46	7.89	2.35	3.33	5.06	2.98	3.02
70	2.61		2.69	1.74	1.74	8.07	3.33	5.73	4.69	3.59	3.67
71	1.61	1.40	1.75	1.17	1.64	8.60	1.54	3.51	2.92	2.34	2.65
72	2.47	2.48	2.46	2.02	2.37	7.16	2.81	4.42	5.82	6.05	3.81
73	2.71	2.23	2.22	2.95	3.23	8.73	2.37	4.73	4.56	1.95	3.57
74	3.04	2.18	2.78	3.44	3.87	7.35	2.62	4.65	3.81	4.15	3.79
75	1.78	1.04	1.68	1.40	1.98	4.10	1.22	2.75	2.46	0.67	1.91
76	2.80	1.49	2.46	2.88	3.14	10.05	2.12	3.29	2.45	5.23	3.59
77	2.99	1.59	2.29	2.98	2.87	14.87	3.59	6.22	4.38	6.44	4.82
78	8.67	5.71	6.83	6.04	5.86	11.21	8.74	11.88	10.92	9.80	8.57
79	2.23	1.11	1.73	1.80	1.64	5.41	1.42	3.01	4.17	1.88	2.44
80	2.56	2.05	2.86	2.82	2.28	6.43	3.36	6.30	5.91	4.72	3.93

81	8.63	4.43	8.38	4.74	3.77	12.05	5.35	8.83	7.38	6.97	7.05
82	5.06	2.76	3.82	4.36	3.46	17.00	6.48	12.30	8.68	10.88	7.48
83	1.20	0.72	1.12	1.31	1.32	3.91	1.22	1.24	2.81	1.98	1.68
84	0.89	1.55	4.10	2.97	3.05	9.22	3.36	4.26	4.78	4.63	3.88
85	4.46	2.18	4.54	2.34	2.59	5.92	4.36	5.73	4.96	3.19	4.03
86	3.13	2.22	4.68	2.23	2.31	9.53	2.92	4.69	4.48	4.52	4.07
87	3.47	1.96	4.13	2.37	2.39	8.03	4.19	7.27	4.48	4.94	4.32
88	2.24	1.50	1.87	1.59	2.33	6.23	1.87	4.37	2.13	1.82	2.59
89	4.02	2.21	2.44	2.01	1.91	8.19	7.00	5.56	8.54	5.89	4.78
90	5.52	4.30	4.82	2.31	2.23	8.58	3.36	6.38	5.08	4.82	4.74
91	5.45	2.06	3.18	3.63	3.60	12.50	3.96	8.60	3.77	4.37	5.11
92	5.72	3.10	3.66	3.37	3.09	13.08	3.46	6.66	5.61	4.63	5.24
93	4.48	3.35	4.45	3.38	3.25	8.36	3.82	6.47	4.51	3.22	4.53
94	5.69	2.29	3.24	3.52	4.02	11.64	3.13	7.08	8.09	6.22	5.49
95	1.90	1.12	2.22	1.14	1.48	4.92	1.53	3.41	2.50	2.48	2.27
96	3.62	1.82	1.72	2.11	2.11	4.49	3.72	3.99	5.07	4.66	3.33
97	1.42	1.50	2.78	1.11	1.15	3.78	1.42	2.13	2.29	1.95	1.95
98	3.04	1 72	2.24	1.59	1.82	5.47	2.14	4.84	2.73	3.85	2.94
99	4.35	2.93	3.58	3.47	3.75	10.90	3.95	5.60	4.95	6.34	4.98
1900	3.68	2.29	3.33	2.77	1.70	11.71	4.19	5.71	4.21	3.70	4.33
Means 1871–1900	3.63	2.24	3.25	2.66	2.67	8.65	3.37	5.53	4.81	4.48	4.13

Mean 1862–1900 ... ... 4.24

Table VIII.—Rainfall at Ten Stations in Mauritius, 1862–1900 :—August.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	1.92		2.15	3.33	3.33	7.14					3.45
63	1.56		3.73	3.32	2.80	12.33					4.58
64	7.88		3.74	6.65	4.62	15.07		12.04			7.78
65	8.89		8.53	5.97	5.29	22.16	11.87	15.84	15.89		11.41
66	2.18		2.65	2.62	3.24	10.86	2.24	4.95	3.30		3.87
67	3.31		4.56	3.09	4.32	8.25	1.64	5.13	4.80		4.24
68	1.51		2.68	2.01	2.01	7.65	2.86	4.89	4 67		3.42
69	1.19		1.18	1.84	1.84	10.31	1.91	4.41	2.48	2.41	2.92
70	2.00		1.81	2.03	2.03	5.75	1.61	3.30	2.25	1.59	2.37
71	1.44	1.87	2 07	2.78	3.57	11.10	2.37	5.65	4.14	1.96	3.69
72	2.19	2.29	3.07	3.96	5.24	15.42	4.86	7.24	5.19	8.53	5.80
73	2.71	2.57	1.78	2.89	3.36	7.09	2.36	4.29	3.47	6.35	3.69
74	1.10	0.70	1.53	1.80	2.17	8.36	1.91	3.87	3.32	2.33	2.71
75	5.93	2.54	2.64	3.40	3.98	15.14	9.00	13.49	11.36	15.24	8.27
76	2.42	1.67	2.26	1.78	2.21	8.64	1.49	4.17	2.29	4.04	3.10
77	4.93	2.90	4.25	3.42	3.96	16.46	5.39	7.15	6.95	8.08	6.35
78	1.40	2.06	2.64	2.21	1.58	3.74	0.94	2.26	1.35	0.70	1.89
79	4.69	3.01	4.00	3.74	2.89	17.11	4.03	7.72	6.98	7.07	6.12
80	2.48	1.85	2.30	3.02	2.92	4.91	2.73	6.10	5.63	3.60	3.35

81	2.26	1.72	3.25	2.17	2.51	4.36	1.11	2.81	2.28	2.68	2.51
82	1.73	1.53	1.48	1.71	1.47	5.38	2.40	3.53	3.82	4.54	2.76
83	1.89	1.33	2.58	2.10	2.14	7.29	1.85	6.52	4.93	3.35	3.40
84	0.90	0.34	0.56	0.60	0.62	3.87	2.89	1.60	1.76	1.05	1.42
85	3.12	2.76	6.18	3.47	3.98	8.62	4.07	3.20	5.67	6.62	4.77
86	0.59	0.74	1.60	0.85	0.82	5.76	0.69	2.60	0.90	1.97	1.65
87	3.38	2.11	2.29	2.66	2.52	8.19	1.64	3.73	3.19	3.35	3.30
88	4.79	2.87	4.06	3.19	3.03	10.54	8.79	9.44	8.51	7.37	6.26
89	3.78	3.68	4.66	3.97	2.98	10.71	2.26	4.56	4.59	4.05	4.52
90	3.52	2.22	3.04	3.45	3.04	4.83	1.74	3.63	3.38	3.40	3.22
91	2.40	1.85	2.50	2.41	2.37	8.30	3.46	4.44	4.44	4.04	3.62
92	5.84	3.80	5.23	2.27	1.80	10.66	2.89	5.54	5.35	5.17	4.85
93	2.37	2.06	2.65	2.56	2.71	4.39	1.99	2.71	1.81	1.86	2.51
94	2.65	2.09	2.67	4.44	3.28	10.62	3.09	5.36	4.82	5.48	4.45
95	8.94	4.66	6.01	7.24	6.47	16.99	7.33	8.87	7.05	7.56	8.11
96	2.54	2.08	2.73	3.18	3.18	5.34	2.11	4.01	1.96	2.81	2.99
97	4.01	1.72	3.68	2.54	2.66	8.19	1.42	3.23	3.19	3.43	3.31
98	8.81	6.61	9.26	6.06	6.50	15.06	6.75	10.87	9.95	9.87	8.97
99	5.02	3.40	3.54	3.81	4.34	10.57	4.89	6.12	4.84	5.70	5.22
1900	3.73	1.79	2.47	1.18	0.41	4.53	1.08	2.61	2.13	1.93	2.19
Means 1871-1900	3.39	2 36	3.20	2.96	2.96	9.07	3.25	5.24	4.44	4.80	4.17

Mean 1862-1900 ... ... 4.33

Table IX.—Rainfall at Ten Stations in Mauritius, 1862-1900 :—September.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Anbin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	1.07		0.86	2.23	2.23	2.83					1.86
63	1.94		2.36	4.06	4.77	4.83					3.61
64	2.19		2.16	1.75	1.33	4.63		3.01			2.38
65	2.06		2.33	1.85	3.04	7.28	3.69	5.06	3.13		3.44
66	1.31		1.55	1.53	1.87	6.17	2.04	4.21	3.79		2.72
67	1.95		2.15	1.03	1.28	7.86	2.03	3.17	2.65		2.68
68	3.32		2.09	1.22	1.22	10.60	3.25	11.83	7.19		4.93
69	0.16		0.12	0.44	0.44	2.12	0.76	1.39	0.62	0.55	0.70
70	0.39		0.75	0.75	0.75	2.63	0.86	2.38	1.10	0.66	1.08
71	0.56	1.00	0.96	1.20	1.70	5.67	1.10	1.52	1.22	2.09	1.70
72	0.96	1.19	1.14	1.66	2.75	5.19	1.46	2.96	3.13	4.34	2.48
73	2.10	1.28	2.91	1.81	2.55	11.21	2.70	4.49	2.00	2.32	3.34
74	2.22	1.79	2.09	1.84	2.55	7.06	1.59	2.06	1.28	0.52	2.30
75	3.48	2.23	2.29	1.95	2.38	7.83	3.85	6.37	7.78	9.57	4.77
76	2.08	0.51	1.01	0.77	0.88	7.02	0.94	2.61	2.77	3.14	2.17
77	1.83	0.61	1.01	3.04	1.52	3.35	1.43	2.40	1.51	3.40	2.01
78	1.22	0.76	1.26	1.28	1.56	7.15	2.65	5.42	4.53	4.52	3.03
79	3.82	2.79	4.42	2.26	2.64	9.45	4.20	9.84	5.97	8.29	5.37
80	0.88	1.50	1.58	1.23	1.27	2.90	0.82	2.49	1.89	1.35	1.59

81	1.55	1.01	1.70	1.12	1.09	4.06	1.82	2.86	3.23	2.38	2.08
82	4.53	2.58	3.09	2.95	2.36	7.45	5.61	7.40	7.35	6.47	4.98
83	1.77	1.07	1.61	1.39	1.40	4.61	1.96	5.21	3.70	3.39	2.61
84	1.73	1.19	1.82	1.54	1.23	3.44	0.77	1.80	1.81	2.06	1.74
85	3.65	3.59	6.41	0.81	1.40	7.23	1.67	3.50	1.66	2.45	3.24
86	0.54	0.85	0.89	0.44	0.61	2.89	0.57	1.46	1.79	1.68	1.17
87	1.77	0.86	2.29	1.79	1.00	4.72	1.50	1.97	1.71	1.82	1.94
88	1.45	1.03	0.97	1.33	1.57	4.91	1.68	2.72	5.37	3.05	2.41
89	1.65	1.53	0.70	1.44	1.58	3.97	1.26	1.71	1.42	2.61	1.79
90	0.73	0.45	0.30	0.70	0.97	4.34	1.48	3.67	2.90	2.78	1.83
91	4.81	2.50	3.70	3.31	3.24	11.64	4.97	6.95	5.37	5.80	5.23
92	3.16	1.41	1.83	1.91	2.19	5.29	1.79	2.63	2.26	2.43	2.49
93	1.19	0.91	1.30	0.49	0.83	3.81	1.93	1.51	1.62	1.28	1.49
94	3.05	1.88	2.38	1.90	2.64	6.74	1.87	4.78	4.18	3.62	3.30
95	0.97	0.83	0.91	2.02	1.67	7.46	1.76	3.63	2.51	2.26	2.40
96	1.25	1.15	1.45	1.33	1.54	3.97	1.55	1.76	2.00	1.74	1.77
97	2.70	1.77	2.30	1.38	2.04	5.64	3.29	3.61	2.40	3.10	2.82
98	2.08	1.34	1.59	2.08	2.37	7.84	2.36	3.71	3.62	4.01	3.10
99	3.12	1.68	1.73	2.91	3.35	9.08	3.42	5.80	3.39	3.43	3.79
1900	0.37	0.48	0.83	0.49	0.22	2.31	0.58	1.22	1.57	1.35	0·94
Means 1871-1900	2.04	1.39	1.88	1.61	1.77	5.94	2.09	3.60	3.06	3.24	2.66

Mean 1862-1900 ... ... 2.65

Table X.—Rainfall at Ten Stations in Mauritius, 1862-1900 :—October.

Years.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Sejour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	1.66		1.84	1.58	1.14	3.55					1.87
63	1.11		0.82	3.68	2.02	4.37					2.29
64	3.90		0.90	1.30	1.34	5.47		3.40			2.49
65	2.49		3.26	2.65	2.91	10.19	3.27	4.48	4.46		4.02
66	1.26		1.60	1.55	1.67	6.12	1.95	3.80	2.58		2.45
67	1.24		1.69	0.61	0.61	2.32	1.11	2.66	4.22		1.73
68	0.70		1.10	1.64	1.64	10.26	3.69	5.96	2.87		3.32
69	0.83		0.92	0.61	0.61	4.22	0.97	2.16	1.44	0.15	1.27
70	5.18		5.09	5.72	5.72	8.06	5.31	5.51	3.06	3.66	5.04
71	2.83	1.67	1.75	0.73	0.85	5.25	3.30	7.43	3.85	3.75	3.14
72	1.85	1.87	1.64	0.75	1.15	5.37	1.98	2.80	2.53	3.12	2.31
73	3.82	2.69	2.70	2.52	2.69	11.06	4.45	8.00	4.93	6.86	4.97
74	0.12	0.51	0.58	0.48	0.33	1.75	0.39	1.71	0.65	0.00	0.65
75	4.63	2.55	3.11	3.34	5.38	7.29	3.88	6.64	4.22	6.61	4.76
76	3.32	2.65	2.53	5.51	4.56	11.93	1.67	3.70	2.77	3.15	4.18
77	3.88	2.10	4.73	1.14	1.15	5.59	2.97	3.39	5.09	4.55	3.46
78	0.61	0.46	0.92	0.18	0.30	0.77	0.64	0.79	0.73	0.75	0.61
79	1.57	1.35	1.62	1.34	1.02	4.55	2.09	0.79	3.11	1.71	2.30
80	1.50	1.51	1.28	1.19	0.99	1.58	0.73	1.85	1.24	1.22	1.31

81	1.62	1.83	1.42	1.42	1.34	2.58	1.19	2.29	2.12	1.72	1.75
82	2.46	0.91	0.58	2.02	2.56	3.89	4.47	1.67	2,67	1.59	2.28
83	2.33	1.89	3.42	1.37	1.40	7.65	1.67	3.83	3.63	2.55	2.97
84	4.56	2.85	6.93	6 00	5.32	9.34	1.58	2.32	3.56	3.17	4.56
85	2.93	1.57	3.11	1,58	1.80	5.92	2.50	3.89	2.53	2.27	2.81
86	2.15	2.58	3.99	1.43	1.75	6.68	1.77	2.45	2.36	2.02	2.72
87	4.36	3.46	6.61	3.24	4.14	11.62	2.53	4.60	3.32	3.16	4.70
88	1.41	1.60	1.02	1.20	1.24	4.23	1.59	2.96	1.98	3.78	2.10
89	1.47	1.20	1.15	1.26	1.65	4.91	1.08	3.30	1.55	1.90	1.95
90	2.95	1.25	1.32	2.47	1.83	9 71	2.78	4.48	4.48	2.49	3.38
91	1.43	1.34	1.55	1.24	1.15	6.06	1.39	5.22	6.24	5.03	3.06
92	3.48	1.39	2.78	2.11	1.73	3.40	1·48	3.70	3.97	0.87	2.49
93	1.11	1.06	1.33	1.68	1.35	7.83	0.59	1.49	1.58	1.28	1.93
94	1.10	1.11	0.92	0.81	1.25	2.73	0.56	1.10	1.14	1.29	1.20
95	0.61	0.64	1.19	1.90	1.86	8.38	0.59	3.77	2.69	2.43	2.41
96	0.60	0.54	0.95	1.63	1.70	1.42	0.47	2.05	2.98	2.51	1.48
97	1.77	1.40	1.79	1.49	1.71	3 84	1.60	2.71	4.57	3.18	2.41
98	0.72	0.53	0.72	0.57	0.76	2.34	1.31	1,08	1.56	1.20	1.08
99	1.50	2.25	2.07	1.18	2.42	3.95	3.24	5.92	1.66	1.67	2.59
1900	1.41	1.59	2.09	1.55	1.26	3.89	1.35	3.43	1.92	1.27	1.98
Means 1871-1900	2.14	1.61	2.19	1.78	1.89	5.51	1,86	3.45	2.85	2.57	2.59

Mean 1862-1900 ... ... 2.62

Table XI.— Rainfall at Ten Stations in Mauritius, 1862-1900 :—November.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	1.59		3.38	4.12	1.83	9.32					4.08
63	1.45		0.39	1.72	0.55	1.09					1.05
64	3.46		4.82	4.05	2.97	8.10		5.23			4.49
65	3.50		3.50	3.49	2.40	9.15	8.38	7.85	4.80		5.13
66	0.47		0.55	0.56	0.84	4.11	0.34	2.81	1.55		1.34
67	3.16		2.68	7.12	5.30	16.96	9.16	6.58	6.59		6.85
68	1.69		1.97	1.81	1.81	6.58	1.66	3.25	1.23		2.38
69	3.87		2.00	3.19	3.19	5.83	3.29	4.25	2.63	1.95	3.21
70	4.98		5.45	4.78	4.78	6.92	8.57	6.64	5.47	5.36	5.62
71	3.27	2.11	1.98	2.16	2.85	8.62	6.82	9.02	9.01	4.33	5.02
72	0.94	0.94	1.12	0.85	1.55	3.71	2.15	1.77	1.94	1.88	1.68
73	1.26	0.82	0.81	2.32	1.94	2.72	1.75	2.41	2.34	1.58	1.79
74	2.13	0.79	1.36	2.27	2.15	8.55	2.43	5.73	1.28	2.35	2.90
75	2.24	2.82	3.75	3.27	2.29	12.14	5.47	19.94	15.16	9.93	7.70
76	0.76	0.66	0.60	2.00	1.58	3.50	0.25	1.70	2.96	3.83	1.78
77	5.94	9.22	6.53	6.09	6.17	10.53	4.79	5.39	3.37	3.70	6.17
78	2.05	1.06	1.38	1.30	0.70	6.24	1.84	3.02	2.15	1.14	2.09
79	0.95	0.45	0.58	1.13	0.66	1.32	0.95	1.55	0.71	0.64	0.89
80	0.22	0.69	0.51	1.44	1.37	1.29	1.20	2.36	1.70	2.54	1.33

81	4.50	3.19	4.40	3.52	2.86	7.63	7.73	6.33	3.95	4.05	4.82
82	0.76	0.74	0.68	2.30	2.68	2.00	0.84	1.66	1.98	2.03	1.57
83	1.69	1.41	2.03	1.78	1.54	3.33	1.43	3.53	3.00	1.05	2.08
84	1.98	2.21	4.98	1.92	1.82	11.14	3.27	5.60	4.02	4.67	4.16
85	1.17	1.59	2.99	2.33	1.57	3.30	0.77	2.97	2.54	1.95	2.12
86	1.98	1.19	1.75	1.61	1.06	5.94	1.42	1.71	2.35	1.93	2.09
87	1.93	0.60	1.30	2.02	1.88	3.85	2.16	2.54	2.83	2.79	2.19
88	0.86	1 25	2.52	6.41	3.12	14.72	3.27	9.66	18.63	15.25	7.57
89	0.97	1.78	1.89	0.57	1.58	2.64	1.10	2.14	1.77	2.11	1.65
90	2.72	2.80	1.62	1.01	1.12	9.22	3.01	3.25	2.27	4.96	3.20
91	3.03	1.47	1.92	3.61	3.94	6.63	2.53	2.99	2.89	2.52	3.15
92	2.14	1.84	2.49	3.79	2.70	3.66	4.66	1.34	1.49	2.36	2.65
93	2.59	1.78	2.17	1.13	1.07	5.56	3.47	3.44	2.13	1.93	2.53
94	1.96	1 31	1.31	2.43	1.63	5.77	5.32	6.94	1.41	0.46	2.85
95	3.92	2.58	3.68	6.95	8.84	14.45	1.36	4.28	3.03	2.01	5.11
96	1.45	0.91	1.18	1.71	1.56	4.04	2.35	4.94	1.84	1.74	2.17
97	2.30	1.05	1.65	4.82	4.56	2.43	1.09	3.19	1.49	1.74	2.43
98	0.96	0.90	1.35	1.89	1.47	3.06	0.81	1.13	1.18	2.49	1.52
99	0.85	1.73	2.52	2.53	3.00	3.09	2.90	2.85	1.39	1.75	2.26
1900	1.25	1.31	1.73	0.80	0.71	1.53	0.59	2.00	1.35	0.57	1.18
Means 1871–1900	1.96	1.71	2.09	2.53	2.33	5.75	2.59	4.18	3.41	3.01	2.96

Mean 1862-1900 ... ... 3.15

Table XII.—Rainfall at Ten Stations in Mauritius, 1862-1900 :—December.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	2.92		2.90	7.01	5.30	9.10					5.26
63	5.07		2.50	12.85	5.76	8.05					6.63
64	3.97		6.06	3.71	3 70	15.32		9.08			6.53
65	18.37		25.60	17.95	16.54	43.60	31.65	37.88	34.14		27.16
	2.23										
66			3.84	4.14	4 83	10.49	7.67	9.50	6.67		5.95
67	14.88		22.08	17.19	17.50	29.79	11.37	15.01	11.25		16.74
68	8.07		11.61	6.46	6.46	16.26	5.64	7.65	8.53		8.51
69	1.35		0.62	5.13	5.13	5.40	3.66	3.27	1.68	2.28	3.06
70	12.01		12.66	11.87	11.87	18.36	12.67	13.01	11.64	7.50	11.99
71	4.03	6.71	7.60	4.26	4.32	12.27	4.66	7.39	8.23	1.82	6.13
72	2.93	2.90	2.86	6.26	4.72	16.49	5.43	9.38	8.47	4.34	6.38
73	6.11	3.68	4.57	4.84	4.77	13.28	4.17	5.97	8.58	11.33	6.73
74	6.93	4.69	4.38	9.04	7.01	20.51	11.02	12.08	10.64	11.34	9.76
75	14.83	9.59	9.94	17.13	18.12	18.24	9.14	14.05	13.86	19.21	14.41
76	5.77	2.18	2.83	2.98	3.45	16.88	6.25	6.49	6.42	2.74	5.60
77	2.85	4.27	3.43	6.54	6.13	18.80	4.20	9.42	9.68	7.45	7.28
78	5.57	7.58	8.41	7.26	6.64	16.24	6.10	8.97	9.99	6.32	8.31
79	9.22	7.08	7.64	8.16	7.59	11.99	10.61	9.42	6.20	5.30	8.32
80	4.22	5.50	6.87	6.53	6.77	7.96	1.55	5.29	5.37	4.85	5.49

81	6.05	6.88	6.13	6.60	5.50	11.57	5.45	16.34	7.01	6.11	7.76
82	3.60	4.83	6.87	10.12	5.87	10.49	7.08	9.58	9.31	8.22	7.60
83	6.19	4.02	10.02	9.98	11.17	13.48	7.01	12.20	16.61	10.65	10.13
84	1.43	1.56	1.59	1.34	1.08	2.55	1.17	1.88	0.72	0.80	1.41
85	6.28	5.16	8.93	6.05	5.68	11.67	2.80	6.70	3.52	5.38	6.22
86	1.37	6.31	6.08	2.54	2.45	7.15	2.44	3.06	2.71	2.56	3.67
87	2.56	2.41	4.48	1.84	2.15	6.80	3.65	2.85	3.76	2.46	3.30
88	15.40	12.64	11.32	11.21	11.07	30.15	13.70	22·68	18.19	21.42	16.78
89	5.70	2.76	3.99	6.20	6.23	18.37	7.84	13.03	11.05	8.03	8.32
80	4.16	2.18	3.95	4.74	6.48	4.31	3.14	4.81	5.24	5.96	4.50
91	3.71	3.68	4.21	9.07	5.10	13.22	6.12	10.62	5.03	8.62	6.94
92	5.06	6.24	5.54	7.63	8.37	17.66	3.22	10.61	11.88	10.28	8.70
93	1.86	1.40	1.60	1.69	1.54	2.77	1.35	1.75	5.31	2.58	2.18
94	4.33	5.90	5.62	9.83	9.39	17.96	11.98	11.84	10.22	7.61	9.47
95	7.31	6.55	6.10	5.46	5.44	20.09	8.79	12.28	12.30	8.91	9.32
96	0.90	1.15	0.69	1.97	2.27	5.39	1.30	2.86	1.61	3.65	2.18
97	4.75	4.53	5.45	14.76	14.21	15.42	7.26	7.81	4.30	9.07	8.76
98	1.50	5.70	3.53	4.05	4.28	4.91	2.73	6.15	2.50	2.81	3.82
99	1.44	1.31	1.64	1.14	0.94	5.48	0.82	1.58	2.45	2.13	1.39
1900	0.43	0.68	0.77	4.28	3.50	3.27	1.38	4.61	3.37	2.95	2.52
Means 1871–1900	4,88	4.67	5.23	6.45	6.09	12.51	5.41	8.39	7.48	6.83	6.80

Mean 1862-1900 7,58

Table XIII.—Rainfall at Ten Stations in Mauritius, 1862-1900 :—Year.

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Séjour.	Trianon.	Cluny.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	52.22		56.45	69.17	64.73	122.44					70.06
63	70.72		78.57	99.76	80.66	147.09					91.52
64	57.25		51.54	54.60	48.58	122.48		83.36			64.68
65	87.63		89.62	87.11	81.19	192.45	100.80	135.21	115.58		106.54
66	50.29		45.49	44.55	43.24	121.97	51.05	70.24	70.48		59.56
67	57.46		65.42	64.55	59.96	141.05	61.23	84.31	81.59		73.72
68	70.46		91.28	95.65	96.47	183.74	81.70	137.29	112.10		104.03
69	63.73		64.97	67.58	67.58	129.37	70.24	94.58	76.62	58.33	74.04
70	59.38		66.89	54.41	54.41	160.43	69.24	102.26	82.38	76.22	77.52
71	50.92	42.62	55.57	45.96	47.44	133.71	58.38	99.25	82.00	71.26	68.71
72	44.20	47.75	53.99	62.68	62.70	146.82	53.99	90.08	76.10	78.59	71.69
73	70.04	75.54	81.39	82.89	84.49	171.32	65.27	98.09	89.08	90.55	90.87
74	64.48	64.82	73.77	110.36	102.41	177.59	71.86	120.26	88.68	94.31	96.85
75	76.00	49.98	56.05	60.92	66.63	133.36	67.64	110.78	84.94	86.03	79.23
76	70.60	41.87	50.23	58.29	64.09	146.42	50.90	74.45	67.92	71.35	69.61
77	103.34	71.36	87.69	92.91	86.13	203.50	77.39	110.60	117.97	120.43	107.13
78	52.86	43.25	52.44	63.65	55.79	133.10	59.00	112.06	92.58	76.00	74.07
79	62.80	49.16	59.23	62.89	53.70	132.36	61.25	91.98	75.26	57.14	70.58
80	40.79	34.03	43.33	43.43	36.90	107.44	41.10	82.59	64.53	49.51	54.36

81	55.62	45.32	62.35	60.44	47.78	109.45	50.83	101.68	76.51	58.27	66.82
82	75.98	56.06	75.87	71.60	63.18	181.18	95.24	126.40	104.17	109.86	95.95
83	70.08	47.69	69.90	77.84	71.04	119.09	67.78	102.14	93.54	67.20	78.63
84	56.36	45.80	70.59	60.69	54.75	117.40	55.34	80.96	56.24	58.02	65.61
85	57.44	44.61	85.68	55.64	52.29	122.65	54.18	82.49	59.25	58.79	67.30
86	33.18	29.74	46.26	31.06	30.68	95.16	31.49	54.40	47.28	49.68	44.89
87	59.03	40.64	85.12	51.91	52.92	139.64	63.62	94.56	78.30	63.87	73.56
88	75.53	52.81	65.23	79.61	71.69	194.36	93.24	128.97	130.66	125.48	101.86
89	75.08	56.19	58.46	71.30	67.73	173.96	92.82	112.19	104.84	92.50	90.51
90	64.79	53.17	60.55	73.29	64.05	133.75	57.78	90.77	74.98	76.26	74.94
91	67.01	44.63	58.08	67.89	59.59	152.25	71.65	108.60	85.54	80.96	79.62
92	77.18	59.12	69.99	93.09	72.04	165.93	70.55	84.44	80.87	85.65	85.89
93	61.63	48.33	56.77	80.02	65.72	131.24	55.49	76.18	68.42	65.79	70.96
94	55.37	48.91	53.70	76.28	69.17	147.59	67.65	88.25	79.59	67.70	75.42
95	67.36	54.16	62.29	81.77	76.42	167.29	71.24	91.74	78.35	71.27	82.19
96	94.94	68.17	73.63	88.12	78.19	163.34	69.04	103.71	103.39	99.10	94.16
97	42.49	27.26	32.93	52.82	50.13	118.42	47.26	75.96	55.38	58.94	56.16
98	63.05	47.76	49.72	52.53	55.27	139.73	66.64	97.07	79.63	78.09	72.95
99	57.64	42.82	53.49	63.07	71.06	130.94	55.69	87.30	66.11	83.58	71.17
1900	35.34	31.28	36.96	41.89	41.69	109.66	39.43	74.62	59.56	60.07	53.05
Means 1871-1900	62.70	49.03	61.41	67.16	62.52	143.29	62.79	95.09	80.72	76.87	76.16

Mean 1862-1900 ... ... 77.09

Table XIV.—Rainfall at Ten Stations in Mauritius, 1862-1900 :—December-April (Summer).

Years.	Labourdonnais.	Observatory.	Botanical Gardens.	Beau Sejour.	Trianon.	Olany.	Beau Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.'
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862–63	48.87		56.80	64.71	57.21	98.29					61.26
1863–64	29.40		23.67	40.71	32.28	62.07		42.59			35.44
1864–65	46.29		44.63	51.87	47.92	88.69		56.31	46.41		50.75
1865–66	54.82		56.10	44.66	39.23	101.03	57.28	69.49	70.46		59.19
1866–67	26.17		25.13	30.78	28.23	57.04	34.07	45.85	45.40		35.13
1867–68	58.08		81.59	82.26	83.39	122.22	58.48	89.95	75.52		78.21
1868–69	53.10		62.40	52.89	52.89	86.22	50.09	67.87	60.44		58.33
1869–70	30.88		35.93	29.82	29.82	105.60	36.56	61.42	50.06	51.35	46.34
1870–71	44.74	37.47	48.21	42.21	40.95	86.02	44.04	63.66	55.86	54.73	51.79
1871–72	29.53	36.76	40.65	40.55	39.87	72.37	28.13	48.60	42 56	36.35	41.54
1872–73	50.29	61.95	64.81	69.26	67.69	125.21	49.31	73.00	66.06	61.50	68.91
1873–74	45.42	52.50	57.65	88.00	79.11	107.49	43.41	75.38	61.93	72.93	63.38
1874–75	27.07	18.05	19.96	28.26	26.30	63.40	30.62	40.52	30.92	25.78	31.09
1875–76	59.34	38.56	43.39	55.31	61.37	86.12	38.38	53.96	51.85	60.31	54.86
1876–77	80.21	49.61	63.33	68.21	63.00	134.79	55.19	72.25	82.14	80.24	74.90
1877–78	29.79	25.28	28.28	43.34	39.62	94.42	36.08	75.56	61.61	52.67	48.66
1878–79	36.05	32.73	38.13	43.15	36.09	81.01	29.98	46.94	43.78	28.23	41.61
1879–80	31.35	25.94	31.55	28.10	24.39	70.46	31.53	52.88	37.57	25.33	35.91

1880–81	25.99	24.45	34.51	38.57	30.98	54.22	22.69	45 14	42.02	24.72	34.33
1881–82	58.29	45.86	58.31	51.11	46.64	132.18	67.31	95.61	71.56	76.96	70.38
1882–83	46.77	33.86	44.84	59.59	47.84	69.93	37.75	61.39	49.76	40.70	49.24
1883–84	37.90	26.25	46.32	43.48	41.88	66.37	34.06	57 50	47.09	42.70	44.35
1884–85	21.20	17.56	28.74	32.61	27.95	51.50	24.91	35.10	19.71	16.42	27.57
1885–86	25.87	18.48	32.29	24.28	23.30	52.47	20.43	35.98	28.31	31.66	29.31
1886–87	35.28	35.19	58.09	33.03	33.40	79.23	39.79	59.98	50.29	37.16	46.12
1887–88	44 41	31.70	46.28	51.24	48.06	116.61	59.25	71.81	72.11	65.95	60.74
1888–89	69.47	52.63	51.13	64.51	60.17	144.26	80.32	95.61	85.60	83.12	78.68
1889–90	46.19	40.39	45.97	60.15	50.51	94.34	42.55	67.45	53.07	49.34	55.00
1890–91	38.23	29.60	38.37	43.96	42.23	78.28	43.28	60.77	50.01	44.42	46.91
1891–92	47.63	39.75	45.44	74.91	50.27	101.33	49.00	53.86	44.50	58.72	56.54
1892–93	43.47	37.35	40.03	68.75	55.69	85.21	34.50	57.34	48.78	51.05	52.22
1893–94	33.40	30.56	33.27	48.07	42.39	83.25	32.05	43.02	43.05	37.82	42.69
1894–95	40.45	37.74	40.82	57.54	49.80	78.77	49.78	50.24	44.99	40.37	49.05
1895–96	68.56	52.40	55.48	64.62	57.53	109.01	44.97	66.99	71.10	65.20	65.59
1896–97	19.97	13.27	13.30	25.30	22.65	65.26	24.50	41.79	27.72	29.23	28.30
1897–98	35.54	26.06	25.56	38.79	41.36	80.89	40.79	56.46	45.55	47.75	43.87
1898–99	35.91	31.86	37.79	47.58	49.63	70.55	29.38	47.43	36.25	50.00	43.64
1899–00	23.07	21.76	24.77	28.04	30.91	67.08	23.71	42.25	38.51	41.86	34.20
Means 1871–1900	41.05	34.19	41.24	48.75	44.39	86.73	39.59	58.28	50.14	47.77	49.21

Mean 1862–1900... ... 50.03

Table XV.—Rainfall at Ten Stations in Mauritius, 1862-1900 :—May-November (Winter).

Year.	Labourdonnais.	Observatory.	Botanical Gardens.	Bean Séjour.	Trianon.	Cluny.	Bean Vallon.	Gros Bois.	St. Aubin.	L'Union.	Means.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1862	23.93		26.32	23.27	20.54	47.20					28.20
63	19.70		22.08	29.21	22.99	49.85					27.71
64	28.95		24.40	23.03	18.36	53.14		39.67			29.44
65	26.94		25.45	21.00	20.43	75.48	38.33	50.10	41.94		35.80
66	11.61		11.15	13.70	15.67	54.05	17.75	29.13	27.49		21.57
67	18.64		22.05	20.72	19.11	64.71	23.46	32.95	31.61		27.87
68	19.19		20.16	24.12	24.12	75.05	28.95	54.70	39.30		34.12
69	17.35		13.56	16.02	16.02	54.01	22.13	31.09	23.03	18.41	22.42
70	17.84		18.92	17.85	17.85	41.87	23.67	31.10	22.36	19.65	22.36
71	14.16	11.10	12.42	11.36	14.04	53.78	22.35	41.21	29.55	22.21	23.22
72	15.77	14.80	18.08	20.13	22.43	70.23	25.09	39.49	33.30	39.72	29.90
73	16.57	12.81	14.87	15.05	16.75	49.32	17.22	28.50	22.91	22.06	21.61
74	18.24	11.31	16.31	18.16	21.06	62.87	21.60	38.77	24.69	21.37	25.44
75	41.03	27.03	30.53	24.57	29.22	72.23	38.90	68.29	50.80	52.38	43.50
76	20.32	10.72	13.95	17.13	17.39	61.66	15.41	28.05	23.51	27.51	23.56
77	26.05	19.66	23.76	21.14	20.45	66.79	24.25	35.42	32.57	35.48	30.56
78	20.35	14.66	19.18	19.59	15.66	41.24	21.02	36.95	30.60	24.46	24.38
79	23.10	16.93	21.87	18.84	16 66	55.60	26.76	44.59	35.27	29.93	28.95
80	14.44	9.67	12.55	16.96	13.33	41.01	18.63	33.84	27.79	24.63	31.28

81	27.80	19.49	28.58	21.80	18.07	51.62	24.24	45.49	32.85	32.29	30.22
82	20.14	12.25	16.82	16.97	16.17	50.08	26.30	37.55	30.31	30.79	25.74
83	20.72	14.64	21.91	18.39	17.90	46.17	30.10	38.13	36.48	24.07	26.85
84	23.22	22.01	32.70	25.85	22.96	61.96	27.12	33.78	25.04	25.17	29.98
85	31.39	23.45	49.60	18.32	19.74	62.03	27.64	42.57	36.74	37.79	34.93
86	12.22	10.11	16.82	10.29	10.61	47.21	11.42	22.06	19.78	20.84	18.14
87	22.56	15.35	28.68	19.58	19.82	60.76	22.62	34.99	26.96	26.81	27.81
88	18.28	10.88	13.11	19.00	14.71	54.40	23.94	37.33	44.12	40.57	27.63
89	15.31	13.44	14.66	11.80	12.40	41.48	18.36	26.23	26.38	22.77	20.28
90	20.14	13.36	14.62	14.60	13.29	53.47	19.93	31.54	27.72	28.99	23.77
91	29.23	13.53	19.45	19.60	18.74	65.06	25.39	42.02	35.74	33.88	30.26
92	28.20	16.81	23.22	19.62	18.00	60.16	24.45	30.59	29.52	25.27	27.58
93	21.36	15.82	20.68	17.21	17.36	60.92	22.86	27.70	26.21	22.24	25.26
94	19.50	13.85	16.41	20.07	18.93	49.15	24.97	35.14	31.63	24.85	25.45
95	23.93	15.77	20.99	28.60	30.57	86.39	24.65	41.06	31.28	29.60	33.28
96	32.79	21.17	23.56	26.99	23.83	69.03	31.54	46.14	42.98	39.16	35.72
97	18.67	10.61	14.87	14.73	15.54	43.13	16.80	29.22	24.97	24.29	21.28
98	30.76	20 53	26.08	22.30	23.84	69.35	30.38	42.27	35.88	36.60	33.80
99	21.79	15.35	17.59	20.55	24.77	59.82	28.22	44.44	29.91	34.26	29.67
1900	13.28	10.15	13.06	10.71	8.22	44.79	15.16	29.34	20.13	16.34	18.12
Means 1871-1900	22.04	15.24	20.56	18.66	18.42	57.06	23.58	37.09	30.86	29.22	27.27

Mean 1862-1900 ... ... 27.66

Table XVI.—Percentage above or below the Mean Rainfall at Ten Stations, 1862-1900.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
1862	+ 13	− 4	− 29	− 35	+ 82	− 76	+ 18	− 20	− 29	− 28	+ 30	− 31	− 9
63	+ 72	+ 69	+ 1	− 19	− 37	+103	+ 8	+ 6	+ 36	− 12	− 67	− 13	+ 19
64	− 54	+ 9	− 53	− 23	− 57	− 6	+ 32	+ 79	− 10	− 5	+ 43	− 14	− 16
65	− 47	+119	− 3	− 57	− 18	− 19	− 19	+163	+ 30	+ 54	+ 63	+258	+ 38
66	− 18	− 35	− 35	− 4	− 34	− 27	− 3	− 11	+ 2	− 6	− 57	− 22	− 23
67	− 47	− 11	− 63	+ 11	− 35	− 33	+ 33	− 2	+ 1	− 34	+117	+121	− 4
68	+ 26	− 35	+ 95	+ 99	+ 74	− 23	+ 48	− 21	+ 86	+ 27	− 24	+ 12	+ 35
69	+ 37	+ 8	+ 14	0	− 23	+ 53	− 29	− 33	− 74	− 51	+ 2	− 60	− 4
70	− 57	− 48	− 35	+186	− 80	− 22	− 13	− 45	− 59	+ 93	+ 78	+ 58	+ 1
71	+ 84	− 51	− 66	+ 13	− 39	− 24	− 38	− 15	− 36	+ 20	+ 59	− 19	− 11
72	+ 11	+ 10	− 36	− 52	− 26	+114	− 10	+ 34	− 6	− 11	− 47	− 16	− 7
73	+ 35	+114	− 9	+ 68	− 57	− 63	− 16	− 15	+ 26	+ 90	− 43	− 11	+ 18
74	− 22	− 50	+269	− 55	− 26	+ 97	− 11	− 38	− 13	− 75	− 8	+ 29	+ 26
75	− 47	− 67	− 67	− 8	+108	− 21	− 55	+ 91	+ 80	+ 82	+144	+ 90	+ 3
76	+ 58	+ 6	− 42	− 41	− 19	− 12	− 15	− 29	− 18	+ 60	− 43	− 24	− 10
77	+ 66	+ 95	− 3	+119	− 55	+ 15	+ 14	+ 46	− 24	+ 33	+ 96	− 4	+ 39
78	− 22	− 37	− 24	+ 95	− 8	− 41	+102	− 56	+ 14	− 77	− 34	+ 10	− 4
79	− 66	− 18	+ 49	− 62	+ 28	− 8	− 42	+ 41	+103	− 12	− 72	+ 10	− 8
80	− 41	+ 23	− 58	− 61	− 42	+ 43	− 7	− 23	− 40	− 50	− 58	− 18	− 30

81	− 29	− 58	− 68	+ **44**	+ **40**	− 19	+ **66**	− 42	− 22	− 33	+ **53**	+ **2**	− 13
82	+**106**	+ **12**	+**101**	− 49	− 60	− 3	+ **76**	− 36	+ **88**	− 13	− 50	**0**	+ **24**
83	+ **3**	− 25	− 10	+ **34**	+ **56**	+ **6**	− 60	− 22	− 2	+ **14**	− 34	+ **34**	+ **2**
84	− 17	− 45	− 16	+ **6**	+ **82**	− 27	− 8	− 67	− 34	+ **75**	+ **32**	− 81	− 15
85	− 36	− 51	− 34	− 30	+ **68**	+ **78**	− 5	+ **10**	+ **22**	+ **8**	− 33	− 18	− 13
86	− 58	− 42	− 60	− 14	− 38	− 39	− 4	− 62	− 56	+ **4**	− 34	− 52	− 42
87	+ **48**	+ **6**	− 9	− 50	+ **28**	− 17	+ **2**	− 24	− 27	+ **80**	− 30	− 56	− 5
88	+ **38**	+ **74**	+ **34**	− 6	− 58	− 5	− 39	+ **44**	− 9	− 20	+**140**	+**121**	+ **32**
89	+ **95**	− 25	+**125**	− 34	− 57	− 32	+ **13**	+ **4**	− 32	− 25	− 48	+ **10**	+ **17**
90	− 39	+ **1**	+ **33**	+ **54**	− 56	+ **8**	+ **12**	− 26	− 31	+ **29**	+ **2**	− 41	− 3
91	− 31	− 37	+ **49**	+ **19**	− 32	+ **36**	+ **21**	− 17	+ **97**	+ **17**	**0**	− 8	+ **3**
92	+ **1**	+ **85**	− 17	+ **7**	− 35	+ **35**	+ **24**	+ **12**	− 6	− 5	− 16	+ **15**	+ **11**
93	+ **65**	− 47	− 38	+ **40**	+ **34**	− 5	+ **7**	− 42	− 44	− 26	− 20	− 71	− 8
94	+ **57**	− 5	− 56	− 7	+ **13**	− 70	+ **30**	+ **3**	+ **25**	− 54	− 9	+ **25**	− 2
95	− 60	− 66	+**126**	− 47	+ **13**	+ **41**	− 46	+ **87**	− 9	− 8	+ **62**	+ **23**	+ **7**
96	− 2	+**191**	− 43	**0**	+**243**	− 27	− 21	− 31	− 33	− 43	− 31	− 71	+ **22**
97	0	− 21	− 64	− 70	− 69	+ **49**	− 54	− 24	+ **7**	− 8	− 23	+ **16**	− 27
98	− 13	− 47	+ **6**	− 14	+ **19**	− 34	− 31	+**107**	+ **17**	− 59	− 52	− 50	− 5
99	− 59	+ **23**	+ **41**	− 37	− 18	+ **34**	+ **17**	+ **20**	+ **43**	− 1	− 28	− 75	− 8
1900	− 47	− 20	− 5	− 22	− 7	− 57	+ **2**	− 50	− 65	− 24	− 62	− 67	− 31

THE CYCLONE OF 1901, JANUARY 9-16.

Read on Thursday, 1901, March 21.

The circumstances under which this cyclone formed were unusual. From 9 a.m. on the 4th. to 3 p.m. on the 8th. the barometer at Mauritius fell from 30ins.050 to 29ins.835 with fine clear weather and easterly to east-north-easterly winds generally, and then rose to 29ins.956 by 9 a.m. on the 9th., after which it commenced to fall again with every appearance of bad weather.

From observations recently received, it would appear that the fall of the barometer on January 4 to 8 was caused by the passage of a small cyclone from the Chagos Archipelago southwards.

On January 4 the only information in this part of the ocean is from the *Grosvenor* and the *Wild Rose*. The former, in latitude 3½° S. and longitude 67½°E., had a strong breeze from W.S.W. all the day, with heavy rain, occasional squalls, and high sea : barometer 29ins.92 with a tendency to fall. The *Wild Rose*, in latitude 9° S. and longitude 71½° E., had the wind from S.S.W. in morning, gradually backing to S.S.E by noon, with hard squalls, and veering to S.W. during the evening, again increasing in force after a slight lull in the afternoon. The captain reports a high sea and torrential rain.

On the 5th the *Grosvenor*, in latitude 5½° S. and longitude 68° E., had the wind variable with frequent squalls during the morning, and from S. W. in afternoon ; weather gloomy with passing showers of rain. The *Wild Rose*, in latitude 9° S. and longitude 71° E., had a whole gale all day, the wind veering gradually from S. W. to N. W. ; very high sea washing over the deck, and vessel rolling heavily ; in the evening very heavy rain is reported, accompanied by lightning. During this gale her barometer only fell 0in. 05, namely :—from 29ins.69 at 9 a.m. to 29ins.64 at 9 p.m.

On the 6th the *Grosvenor*, in latitude 6½° S. and longitude 68½° E., had the wind variable from S. W. to W.b.N. with

occasional sudden shifts*; the weather was overcast, rainy, and squally throughout; barometer rising slightly. The *Wild Rose*, in latitude 9° S. and longitude 73° E, had a whole gale from N.W. in morning, the wind gradually decreasing after noon, and veering to North by 5 p.m.; the barometer rose from 29ins.66 at 9 p.m. on the 5th to 29ins.76 by 11 p.m. on the 6th.

On the 7th the *Grosvenor*, in latitude 7° S. and longitude 68° E, had the wind from S.W. with fresh squalls until 5 a.m.; it then shifted to W. S.W., and remained steady from that direction until midnight; the weather was overcast all day with a very high sea, and heavy rain in morning; the barometer was steady at 29ins.77. The *Wild Rose*, in latitude 8½° S. and longitude 72° E., had a moderate breeze from North all day, with squalls, occasional rain, and high sea, lightning from N.W. at midnight: barometer 29ins.85, and rising.

From the above information it would appear that a small cyclone formed on the morning of the 4th, with centre in latitude 8° S. and longitude 72° E., and proceeded on a southerly course, travelling very slowly at first. On this assumption the observed facts are explained.

The backing and subsequent veering of the wind reported by the *Wild Rose* on the 4th may be accounted for by the movements of the vessel herself. Commencing on a south south easterly course she moved from westward to south-south-westward of the storm centre, and then setting north-westerly, westerly, and south-westerly courses successively, she sailed west of the centre again, the storm having travelled a little to southward in the meantime. Had it made more southing than the *Wild Rose* on the morning of the 4th, the latter would have had no backing of the wind to South and S.S.E. but a continual veering and gradually increasing force. As it was the wind decreased until noon, and then increased again, after the vessel had changed her course. On the 5th she evidently attempted to avoid the centre by setting a west-south-westerly course, but as the storm

* probably in the squalls:—Ed.

was apparently travelling in nearly the same direction, she experienced no improvement in the weather. From 8 a.m. to noon the vessel was heading eastward and the weather got worse. At 1 p.m. she was hove to and the centre passed to southward and south-eastward by the evening of the 6th; the weather gradually improving after 3 p.m. The fall of the barometer during this storm was exceedingly small; this is usual at the commencement of a cyclone, but a greater fall might have been expected on the 5th. There is no reason to suppose that the barometer was working badly, as it gradually rose after the 6th; and on the 20th, after the vessel's arrival at Mauritius, it read 0in.08 higher than the Observatory Standard.

Had this cyclone remained in existence for any length of time, its presence must have been felt at Rodrigues, but there is nothing in the observations received from that Island to show that a cyclone passed within 500 miles, we must therefore assume either that the storm dispersed soon after the 6th of January, or else that it curved to S.E.; the latter alternative is negatived by the fine weather experienced by the *C.J.S.* on the 6th to 10th of January, between latitude 22°-23° S. and longitude 88°-82° E.

In the month of May I hope to receive observations from Six Islands which should furnish additional information as to the conditions under which this cyclone formed.

On the 8th the *Grosvenor*, in latitude 8° S and longitude 68° E., had winds veering from West in morning to W.N.W. after noon, with strong squalls from N.W.; the weather was overcast, but no rain is reported; heavy sea from S.W.; barometer steady at 29ins.76. At Mauritius the wind was light from E.b.N., and weather fine with passing clouds; barometer rising slightly after noon. At Rodrigues the wind was from East, weather fine, and sea smooth; barometer steady at 30ins.07.

On the 9th the *Grosvenor*, in latitude 9° S. and longitude 67½° E., had a gale from N.W. in morning veering to N.N.W. at noon, decreasing to a fresh breeze in afternoon, but again

increasing in force towards evening; the weather was overcast with thunder and lightning and heavy rain; sea very high; barometer 29ins.76 at noon with a tendency to rise. At Mauritius the wind veered to S. S. E.; the weather became squally in the afternoon, the barometer having commenced to fall at about 9 a.m. It is to be regretted that no definite information has been received from St Brandon; from the telegram received from the captain of the *S. S. Corsair,* it would appear that the centre of a cyclone passed over, or very near this group of Islands on the 9th or 10th of January. The *Wild Rose,* in latitude 10° S. and longitude 71° E, had winds veering from N.E. in morning to East in afternoon; the weather was cloudy up to noon and then fine and clear with a moderate sea. Barometer 29ins. 98 and rising.

On the 10th the *Grosvenor,* in latitude 10° S. and longitude 68° E., had winds further veering to North by noon, and N.N.E. by 6 p.m.; the squalls became less violent and the weather improved, though a very high sea from northward is reported; the barometer reading at noon was 30ins.04, with a tendency to rise. The *Wild Rose,* in latitude 11½° S. and longitude 70° E., had moderate winds veering from East in morning to S. E. in afternoon. The weather was cloudy during the morning and fine afterwards; a westerly swell is reported at 4 p.m. The barometer continued to rise, and at noon read 30ins.01. At Mauritius the barometer commenced to fall, and the weather became squally with occasional showers; the wind was from E.S.E. with a tendency to back to Eastward, increasing in force. At Rodrigues the weather was overcast and gloomy with squalls of wind and rain; at noon the barometer read 30ins.04 to which it had fallen from 30ins.17 at noon; on the 4th a very heavy north easterly swell is reported.

On the 11th. the *Grosvenor,* in latitude 12° S. and longitude 66° E., had N.N.E. winds all day with fine weather but a heavy sea; barometer 29ins.99, with a tendency to rise. About a hundred miles to the east of this, the *Wild Rose* had steady S.E.

winds with fine bright weather ; barometer 29ins.96. At Rodrigues the wind was moderate from E. b. N., the weather was overcast, and a northerly swell is reported ; the barometer read 29ins.98. The *Gabrielle,* in latitude 26° S. and longitude 49° E., had winds increasing in force and veering from N.E. at midnight to S.E. at 5 a.m., South at 10 a.m., and steady at S.S.W. after noon : weather threatening, sea rising rapidly, and dangerous in the afternoon. The barometer fell from 29ins.88 at 1 a.m. to 29ins.68 at noon, and to 29ins.21 by midnight. About a hundred miles to the west of this vessel the *S.S. Crescent* had moderate winds veering steadily from N.E. in morning to East in the afternoon. Barometer 29ins.90 with a tendency to fall. The *S.S. Woolwich,* in latitude 30° S. and longitude 63° E., had moderate East winds backing to E.N.E. with heavy clouds and threatening appearance to the northward. The wind increased to a strong breeze by midnight, with squalls; a heavy sea from N.E. is reported. Barometer 30ins.07 at noon, falling. Fifty miles to southward the *Inverclyde* had light winds backing from East in morning to North after noon, the weather was fine till 4 p.m., then cloudy with increasing sea ; barometer 30ins.18.

On the 12th. the *Grosvenor,* in latitude 14½ S. and longitude 65° E., had winds from N.E. and N.N.E. with fine weather throughout, and the *Wild Rose,* still about 100 miles to eastward, had steady S.E. winds all day with fine bright weather and a westerly swell. The *Samanco,* in latitude 20° S. and longitude 60½° E., had a steady N.N.E. wind with the barometer falling very slowly. By 8 a.m. it was blowing a moderate gale with overcast weather and high confused sea. The *Gabrielle,* in latitude 24° S. and longitude 51° E., had a S.W. gale moderating towards evening : the barometer fell to 29ins.05 at 9 a.m. and then commenced to rise ; the sea was very high and dangerous throughout. A hundred miles to the west-south-west of this the *S.S. Crescent* had light winds from E.S.E. in morning, increasing to a strong breeze from S.E. after 8 a.m., the weather was partially cloudy with passing showers and strong

squalls ; sea high, and confused ; barometer 29ins.83 and falling. The *S.S. Woolwich,* in latitude 30° S. and longitude 60° E., had winds from N.E. at 4 a.m. backing round by North to the westward ; at noon, weather moderating and barometer rising. Two hundred and fifty miles to the eastward the *Inverclyde* had winds backing from North in morning to west in the afternoon, and further to South and S.E. during the evening. The weather was overcast with continuous heavy rain ; barometer 30ins.18. On the 13th. the winds experienced by the *Grosvenor* still formed part of the cyclonic circulation. She had a fresh breeze from N.E. with fine weather and a moderate sea ; barometer steady at 29ins.99. The *Samanco,* in latitude 20½ S. and longitude 59° E., had a N.E. gale, moderating towards evening ; the weather was overcast with heavy rain squalls and the sea very high ; barometer 29ins.95 at noon, and rising. Similar weather was experienced at Rodrigues. The *Gabrielle,* in latitude 24° S. and longitude 51° E., had a steady breeze from W.S.W. all day with a moderate sea, cloudy weather, and occasional squalls : barometer 29ins.58 and rising. One hundred miles to the north-west of this, the *S.S. Crescent* had a fresh gale from S.E. till afternoon, veering then to South, the weather was cloudy and the sea very high, ship rolling heavily ; barometer 29ins.81 and falling slightly. The *S.S. Woolwich,* in latitude 30°S. and longitude 56½ E., had S.E. winds, weather overcast and high confused sea ; at sunset the wind was fresh from E.S.E., the sky overcast with heavy dark clouds and for about 18 minutes the whole of the sky had a yellowish and purple appearance, barometer at noon 30ins.10 and rising. The *Invercyde* in latitude 28° S. and longitude 63½°E , had moderate winds from S.E. till noon, and afterwards from N.E. The weather was cloudy with passing showers, and sea smooth : barometer 30ins.18.

On the 14th the *Grosvenor,* in latitude 18° S. and longitude 61° E., had winds from N.E. and N.N.E. The weather was fine

and the sea moderate. The *Samanco,* in latitude 20° S. and longitude 58½° E., had a strong breeze from N.E.b.N. during the day, gradually moderating towards evening ; the weather was cloudy with a rising barometer, and heavy sea. The *Chocolate Girl,* in latitude 20°S. and longitude 63½° E., had an E.N.E. breeze all day, with cloudy weather and a moderate sea. The *S.S. Crescent,* in latitude 22° S. and longitude 50½° E , had the wind from S.S.W. till evening then from S.E. The weather was cloudy and squally in morning becoming fine and clear after noon ; a heavy swell from E.S.E. is reported : barometer 29ins.83, rising. The *S.S. Clan Forbes,* in latitude 26° S. and longitude 44½°E., had winds backing from E. S.E. in morning to East and E.N.E. in evening, with a high sea and fine though cloudy weather, barometer 29ins.90 and rising. The *Gabrielle,* in latitude 23½° S. and longitude 52° E., had calms all day with fine weather but heavy sea ; barometer 29ins.72, rising. The *S. S. Woolwich,* in titude 30° S. and longitude, 53½° E., had winds veering from E. S. E. in morning to S.S.E. afternoon ; and increasing to hurricane force with fierce squalls and a heavy sea. (oil bags in use after 3 p. m.). The barometer fell from 29ins.90 at 4 a. m. to 29ins.42 by 4 p. m. and the weather remained overcast with occasional heavy rain. The *Inverclyde,* in latitude 26° S. and longitude 62° E. had steady N. E. winds all day with cloudy weather and high confused sea ; barometer 30ins.08 and falling.

On the 15th. the *Grosvenor,* in latitude 19° S. and longitude 60° E., had northerly winds all day with fine bright weather and moderate sea ; barometer steady at 29ins.99. The *Samanco* in latitude 20° S. and longitude 58° E., had also northerly winds with cloudy weather and a head (south-westerly) sea ; barometer 29ins.89 and steady. The *Chocolate Girl* at Rodrigues, had N.E. winds with fine bright weather. The *S. S. Crescent,* in latitude 21° S. and longitude 54° E., had variable winds, with fine bright weather and confused sea ; barometer 29ins.93. The *Gabrielle,* in latitude 23° S. and longitude 53° E., had calms and fine weather

throughout the day ; barometer 29ins.80. The *S.S. Clan Forbes* in latitude 25° S. and longitude 48° E., had winds from S. E. till afternoon and then from N. E.: the weather was fine and clear ; at 4 p. m. a moderate sea is reported, at 8 a.m. a swell from eastward, and from noon till 4 p.m. a south-easterly swell; barometer 29ins.98. The *S.S. Woolwich,* in latitude 30½° S. and longitude 53° E., had a gale from S. S. E. in morning veering to S. W. in afternoon ; the barometer rose from 29ins.48 at 5 a.m. to 29ins.96 by midnight. Weather gradually improving and gale moderating ; heavy sea from E.S.E. The *Inverclyde,* in latitude 25½° S. and longitude 61° E., had increasing winds backing from N. E. at 1 a.m. to N. b E. at noon. The weather was very threatening " with every appearance of a cyclone." The barometer fell from 30ins.08 at noon on the previous day to 29ins.68 at 4 a.m. At 5 a.m· the ship's course was changed from N.W.bN. to E.bS.

On the 16th. there were calms and variables in the region immediately to the north of the cyclonic area, as shown by the logs of the *S. S. Clan Forbes,* in latitude 23° S. and longitude 51° E., and the *Gabrielle* in latitude 23° S. and longitude 50° E. To the north-west of the centre on this day we have the *S. S. Woolwich,* in latitude 30° S. and longitude 48° E. She had S.W. winds all day, commencing with a gale and falling light towards evening. The weather was fine, and a south-westerly swell is reported. The barometer read 30ins.20. The *Inverclyde,* in latitude 25° S. and longitude 64° E., had northerly winds all day ; the weather was squally till noon, and then fine and clear, though the sea remained high ; barometer 30ins.08. The *Bolivia,* in latitude 35° S. and longitude 56½° E., had a strong gale from S.S.E., rapidly veering to S.S.W. by noon, and decreasing in force, by midnight the wind was light from S.W. The weather was overcast with heavy squalls and high cross sea in morning ; barometer at noon 29ins.76.

From the above information, combined with the observations taken at Mauritius and Bourbon, the accompanying track of the storm has been deduced. From an inspection of the diagram it will be seen that on the 12th of January the centre was approaching Mauritius, but after midnight curved towards the south-west and passed over Bourbon on the morning of the 13th. From observations received it is clear that the centre passed from north-eastward to southward of St Denis. A calm was experienced at this Station and also at Pointe des Galets ; the sky was perfectly clear from 2.30 until 6.30 a.m. when it suddenly became cloudy, with a strong N.N.W. wind and heavy rain. At St Pierre the observations appear to be so contradictory that it is impossible to judge from them whether the centre passed to the eastward or westward. For instance, at 4.15 p.m. on the 12th it is reported that the wind was blowing in squalls sometimes from N.E. and sometimes from S.E. while the clouds were drifting from S.W., the centre being at this time about 100 miles to the N.N.E. Considering, however, that at St Denis there was a calm for 4 hours it is very probable that the centre passed to north and west of St Pierre. Mr. Bertho, the head of the Port Department at Bourbon, concludes his report as follows.

" Before the advent of the calm I also thought that the cyclone had curved when due north of us and would pass between the two islands. My reason for this assumption was that the sea increased from west towards east, and that the direction of the swell, originally N.b.E., gradually changed to N.E. This is anomalous. (Il y a eu là des anomalies). The tide gauge registered 1.40 metres on the 13th whereas the normal height of the tide at syzygy is 0.80 metres."

The assumption of a S.S.E. track on the 12th changing to S.W. on the 13th explains not only the observed facts at Mauritius, but also the anomalies mentioned by Mr. Bertho.

The diameter of the central calm area is estimated by Mr. Bertho as 25 or 30 miles, but I am inclined to think that even

this estimate, large as it is, is not large enough. At 1 a.m. on the 13th the *S.S.Pandua,* when about 30 or 40 miles to the West of Cape Brabant (the Morne) had a violent gale from N.E.; barometer 29ins.06. At 2 a.m., *after a short lull,* the wind shifted to N.W., the barometer having risen to 29ins.17. The captain reports as follows.

" Wind blowing with terrific violence, nothing visible but spray ; ship labouring heavily and taking in much water fore and aft."

It is obvious that the vessel was at this time just on the eastern edge of the calm area. But from Pointe de Galets, about 70 or 89 miles to westward, we learn that there was a calm from 2.30 a.m. to 6.30 a.m. on the 13th, so that the diameter of the calm area must have been at least 50 miles.

From St Denis we learn that at 2.30 a.m. on the 13th the barometer read 29ins 39 ; the clouds were travelling slowly from southward, the sea was falling rapidly and the waves coming from north-west. By 6½ a.m. the barometer had risen from 29ins.07 to 29ins.43 and the wind commenced again from West and N.N.W., indicating that the centre passed a short distance to southward on a south-westerly course. Had the centre approached from northward the wind would have been more Easterly on the 12th and remained for sometime at West before veering so far as N.N.W. It will be noticed that the lowest barometer reading at St Denis was practically the same as that experienced by the *S.S. Pandua,* although the latter was only on the extreme edge of the calm area whereas St Denis had 4 hours calm ; it appears therefore that the lowest pressure was to the east of the actual centre of the calm area, at 1 a.m., and to the south of the centre after curving. The subsequent track of the cyclone has been deduced principally from the log of the *S.S. Woolwich* on the 14th, and the *Bolivia* on the 16th.

There are several points in connection with the hurricane of January 9–16 which are anomalous to an ideal theory of cyclones, upon which forecasts from observations at a single station must to a certain extent be based.

In an ideal cyclone, with circular isobars, every change of wind would indicate a change of bearing, and every fall and rise of the barometer an approach or recession of the centre; but such ideal conditions do not exist in nature, and the chief difficulty of the forecaster is to discriminate between the changes of wind and barometer which are caused by changes in the form of the isobars, and those which are due to the progressive motion of the whole system; there is the further complication that these two factors are to a certain extent dependent one upon the other.

Between 11 p.m. on the 10th and 1 a.m. on the 11th the backing of the wind, which had been very gradual during the previous 12 hours, now increased rapidly, the direction changing from E.S.E. to E. in two hours, ; this, combined with the fall of the barometer during the night, led me to expect a further increase of wind ; the velocity, however, decreased from this point and the barometer commenced to rise :—the effect of change in the form of the isobars.

Between 4 a.m. and 6.45 a.m. on the 12th, the rapid backing of the wind from E.N.E. to N.E. accompanied by a fall in the barometer, after a period of oscillatory movements but with no steady tendency up or down, was indicative of increased curvature ; but how account for the subsequent behaviour of the barometer ? It rose between 6 a.m. and 9 a.m. and then remained stationary until 11 a.m., before commencing on its steady downward trend. The only explanation is a re-arrangement of the isobars while curving, for whatever tentative track is laid down which will approximately satisfy previous and subsequent conditions, it will be seen that the centre was nearer to the island at noon on the 12th than at 6 a.m., but this is not shown by the barometer.

In the rapid backing from E.N.E. to N.E., between 8 p.m. and 10 p.m. on the 12th we see the change of track from south eastward to southward mentioned above, bearing in mind that at this time the centre was still to the north of West.

The veering between 10 a.m. and 11 a.m. on the 12th, from

N.E. to E.N.E. was yet another re-arrangement of the isobars, and was not the result of change of path but the flattening which evidently *preceded* it. That the change of wind *caused by* it should not have occurred till 9 hours after, is at once explained by the fact that some time must elapse before the effect of flattening can be communicated throughout the whole system, and in the same way time must elapse before the change of path can affect the wind at a distant station.

Referring to this cyclone Mr. Bertho, chief of the Port Department at Bourbon, writes as follows :

" Il est à remarquer, que les vents n'ont varié que sous l'influence des hautes terres, mais revenaient toujours au même point S.S.E. direction moyenne.

A St Pierre les vents ont commencé à souffler le 13 à minuit de l'Est en tempête, et vers 4 heures (les vents du N.O. venant par dessus les hautes montagnes) il y faisait calme.

Dans la partie du vent. (Nord de l'île) le calme plat subit s'est fait entre 2 et 3 heures du matin. J'ai en ce moment constaté une chasse des nuages sur la lune, de 5 ou 6 directions. S., S.E., E., N.E., N.O., S.O. Le moment précis de la plus grande baisse du baromètre a été $3^h\ 45^m$, et le baromètre est descendu à $737^{m/m}.9$.

En ce moment, nous n'avions plus un atome de nuage. Les étoiles brillaient d'une façon éclatante, et le ciel est resté pur jusqu'à $6^h\ 30^m$ du matin, où tout-à-coup s'est élevé du N.N.O, un bandeau de brume épaisse, accompagnée de pluie, et en même temps les vents se mirent à souffler du N.N.O. avec une vitesse de 17 mètres par seconde. Ce vent à duré jusqu'au 15 janvier avec pluie torrentielle $541^{m/m}$ à Cilaos et $227^{m/m}$ à la Pointe des Galets pendant la durée du cyclone.

Le centre a donc mis plus de quatre heures pour passer sur le même point. J'estime, d'après le calme observé dans les positions Est et Ouest de l'île, qu'il devait avoir entre 25 ou 30 milles de diamètre centrale. Le vent n'a pas été violente et n'a guère dépassé 40 milles à l'heure dans les rafales.

Avant que nous ne soyons touchés par le centre, j'avais comme vous, supposé un cyclone s'étant courbé dans le Nord, et devant passer entre les deux îles. Mon opinions, se basait sur ce fait que la mer avait grossi de l'Ouest à l'Est, et que la direction des lames primitivement N. ¼ N.E. étaient devenues N.E. Il y a eu là des anomalies.

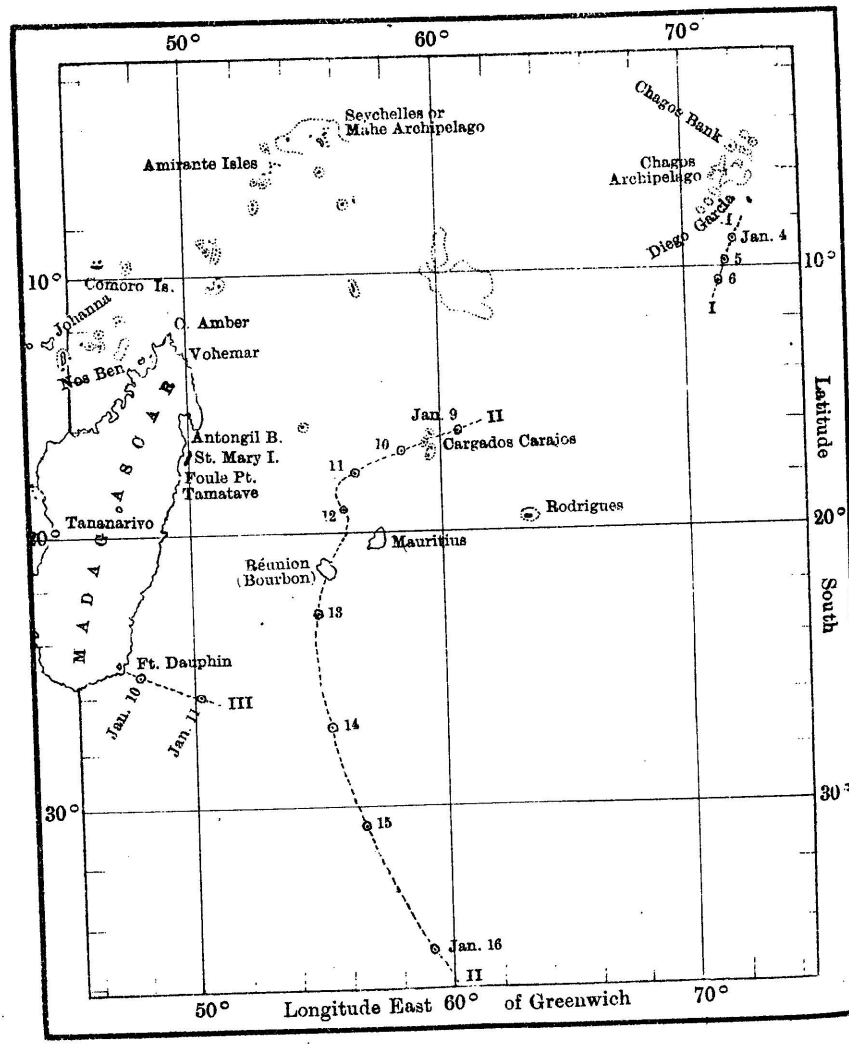
Le marégraphe nous a donné au Port, le 13, une marée de 1 mètre 40 au lieu de 80 cent. pour les marées des syzygies."

The only information concerning the small cyclone of January 11, which occurred in about latitude 26° S. and longitude 49° to 52° East, is from the log of the *Gabrielle*. Her barometer fell 0in.8 and the wind veered from N.E. to S.W., the force is not given, but special mention is made of the enormously high sea. There is no doubt that this was a cyclonic storm, but of very much smaller diameter than those which form to the N.E. of Mauritius. One hundred miles to the West of the storm centre the *Crescent* experienced nothing more on the 11th than a steady breeze, veering from N.E. to E. with a slight head sea, and it was not till 8 a.m. on the 12th that the wind reached S.E. and became part of the cyclonic circulation.

The approximate positions of the centre of the above cyclones on each day are given in the following table.

No. of cyclone.	Date 1901.	Latitude (South).	Longitude (East).	Distance travelled in 24 hours.
		°	°	
1	January 4	8.8	72.0	
	5	9.5	71.8	50
	6	10.5	71.6	60
2	January 9	16.1	60.8	
	10	17.0	58.5	132
	11	17.6	56.8	105
	12	20.3	56.0	115
	13	22.9	55.0	235
	14	26.9	55.6	240
	15	30.6	56.6	235
	16	34.8	59.2	290
3	January 10	25.3	47.8	
	11	26.0	50.2	144

CYCLONE TRACKS IN JANUARY, 1901.



WEATHER IN THE SOUTH INDIAN OCEAN.

Friday, January 4th., 1901.

No. on Chart.	Position at Noon. Lat. South.	Long. East.	Wind. Direction.	Force.	State of sea.	Barometer Reading.	Temp. of air.	Weather.
	° ′	° ′				ins.	°	
1	19.50	57.50	E.b.N.	2	calm	30.02		F.B.
4	20.44	55.53	E.b.N.	1	calm	30.06		F.B.
6	3.18	67.29	W.S.W.	6	high	29.92	82	rq.
7	25.06	67.31	Calm	0		29.95	82	c.
10	8.55	71.28	S.E.	6	high	29.68		hard q.
11	16.55	61.27	S.E.	4	moderate	29.94	81	F.c.
13	38.48	54.17	West	6	high	30.08		c.
14	23.09	90.16	East	5	moderate	30.11		c.
16	8.33	55.24	Variable	4	moderate	29.90		c.
17	26.15	45.04	E.S.E.	2	heavy	29.90		F.B.
19	32.15	86.00	N.b.W.	2		30.12		F.B.
Mauritius.			E.b.N.	2		29.98	81	bc ; fine
Rodrigues.			E.N.E.	2	smooth	30.17	85	B.
Seychelles.			N.W.	3	N.Wly swell	29.91	82	o.r.
Bourbon.			East	3	calm	29.94	83	c.

Saturday, January 5th., 1901.

4	20.52	55.30	S.E.b.E.	2	calm	30.06		F.B.
6	5.30	67.57	Variable	5	rough	29.86	83	q.
7	25.16	67.27	N.W.	1	calm	29.98	81	F.
10	8.52	71.15	W.N.W.	10	dangerous	29.70		heavy q.
11	20.13	57.28	S.E.b.E.	4	moderate	29.84	83	F.
13	38.11	57.46	W.S.W.	4	calm	30.18		B.
14	23.03	88.38	E.b.N.	5	calm	30.08		F.
16	7.03	55.45	W.N.W.	8	high			rq.
17	26.15	45.38	W.S.W.	1	heavy	29.86		F.
18	32.05	82.30	N.W.b.W.	5		29.95		c.
Mauritius.			East	2		29.99	82	bc ; fine
Rodrigues.			E.S.E.	2	smooth	30.14	84	B.F.
Seychelles.			N.W.	3	N.Wly swell	29.88	82	or.
Bourbon.			S.E.	3	calm	29.96	82	o.

SUNDAY, JANUARY 6TH., 1901.

No. on Chart.	Position at Noon. Lat. South.	Long. East.	Wind. Direction.	Force.	State of sea.	Barometer Reading.	Temp. of air.	Weather.
	° ′	° ′				ins.	°	
4	20.14	57.00	S.E.b.E.	2	calm	30.06		F.B.
5	30.13	33.45	E.N.E.	1	calm	29.79		F.B.
6	6.31	68.20	Variable	5	rough	29.85	81	o.
7	25.12	67.33	Calm	0	calm			B.
10	9.11	72.45	N.W.	9	high	29.70		hard q.
13	36.57	59.26	E.S.E.	2		30.18		F.B.
14	22.53	87.41	E.S.E.	2	calm	30.06		F.
16	4.50	56.13	W.N.W.	3	moderate	29.90		heavy q.
17	26.00	45.39	S.W.	1		29.88		F.
19	32.00	79.45	W.b.S.	4	moderate	29.94		p.
	Mauritius.		E.S.E.	3		29.96	81	bc; fine
	Rodrigues.		E.N.E.	1	smooth	30.13	85	B.
	Seychelles.		N.W.	3	moderate swell	29.87	83	c, r.
	Bourbon.		Variable		high	30.00	82	o.
	Diego Garcia		N.W.	9	high	29.71		q.

MONDAY, JANUARY 7TH.. 1901.

5	29.39	37.35	S.S.E.	5	smooth	29.86		c.
6	7.06	68.08	West	5	moderate	29.75	82	hard q.
7	25.08	68.10	N.b.W.	1	calm	29.94	80	F.
10	8.25	72.14	North	4	high	29.86		q.
13	37.17	61.38	N.N.E.	5	high head	29.88		p.
14	22.44	86.17	E.b.S.	2	calm	30.11		F.
16	5.30	55.46	W.N.W.	2		29.90		F.B.
17	25.46	47.02	S.S.E.	8	high	29.76		rq.
19	31.00	76.45	W.b.S.	2	S.W. swell	30.14		c.
	Mauritius.		E.b.N.½N.	3		29.90	81	bc; fine
	Rodrigues.		E.N.E.	2	smooth	30.11	84	bc.
	Seychelles.		West	3	calm	29.87	83	c, F.
	Bourbon.		North	3	calm	29.92	82	o.
	Diego Garcia.		N.	9	high	29.76		heavy q.

TUESDAY, JANUARY 8TH., 1901.

No. on Chart.	Position at Noon. Lat. South.	Long. East.	Wind. Direction.	Force.	State of sea.	Barometer Reading.	Temp. of air.	Weather.
	° ′	° ′				ins.		
5	28 28	40.47	S.S.E.	5	high beam	30.04		p.c.
6	8.07	67.45	West.	6	high	29.76	82	c.
7	24.30	67.08	N.E.b.N.	4	high cross	29.94	80	q.
10	8.57	72.03	N.E.	4	swell from West			F.B.W.
13	35.36	62.37	N.W.	4	moderate	29.78		F.
14	22.38	85.00	E.S.E.	2	smooth	30.14		F.
16	4.31	56.11	W.N.W.	4		29.91		F.B.W.
17	26.00	45.08	S.S.E.	4	moderate	29.76		F.
19	30.30	73.15	N.b.W.	4		30.00		r.
Mauritius.			E.b N.	2		29.89	80	bc ; fine
Rodrigues.			East.	1	smooth	30.07	84	B.
Seychelles.			W.N.W.	3	calm	29.90	83	c. F.
Bourbon.			West.	4	choppy	29.94	83	o.

WEDNESDAY, JANUARY 9TH., 1901..

5	26.59	43.06	E N.F.	5	head sea	30.04		c.
6	9.03	67.30	N.N.W.	8	high sea	29.76	81	qr.
7	24.09	66.36	S.W.b.W.	2		29.90	80	heavy r.
10	10.17	71.04	N.E.	4	moderate	29.98		B.
13	32.39	63.07	S.b.W.	4	moderate	30.28		B.
14	22.30	83.51	E N.E.	2	smooth	30.14		F.
19	30.00	69.45	N.b.W.	4		30.12		q.
Mauritius.			E.S.E.	1		29.90	82	bc ; fine
Rodrigues.			E.S.E.	2	smooth	30.06	87	B.
Seychelles.			N.W.	3	calm	29.84	83	F.
Bourbon.			E.S.E.	2	choppy	29.94	83	o.

THURSDAY, JANUARY 10TH., 1901.

No. on Chart.	Position at Noon. Lat. South.	Long. East.	Wind. Direction.	Force.	State of sea.	Barometer Reading.	Temp. of air.	Weather.
	° ′	° ′					°	
5	26.40	44.36	East.	5	moderate	29.92		B.
6	9.54	67.57	North.	5	moderate	29.93	79	q. r.
7	22.57	65.23	N.E.	5	heavy swell	29.94		p.
8	29.27	34.07	N.N.E.	2	smooth	30.15	84	F.B.
9	0.15	68.04	E.	4		29.94	83	F.B.
10	11.38	70.17	E.	4	swell from W.	30.02	83	c.
13	32.10	63.13	Variable.	2	smooth	30.28		F.B.
14	22.20	82.09	E.N.E.	2	smooth	30.20		c.
17	26.00	49.00	N.E.b.E.	4	moderate	29.88		cq.
19	30.00	66.30	E.b.N.	4		30.15		B.
Mauritius.			E.S.E.	4		29.89	84	bcq, fine
Rodrigues.			E.N.E.	5	very heavy swell from N.	30.04	85	odq.
Seychelles.			N.W.	2	calm	29.90	83	F.
Bourbon.			E.S.E.	3	high	29.85	84	o, r.

FRIDAY, JANUARY 11TH, 1901.

5	26.09	47.23	N.N.E.	4	slight head	29.90		F.B.
6	11.49	65.56	N.E.	5	heavy	29.99	82	F.B.
7	21.36	63.05	N.E.b.E.	6	confused	29.94		heavy p.
8	28.09	37.09	E.S.E.	4	calm	30.13	82	F.B.
9	1.19	65.11	East.	6	moderate	29.98	82	F.B.
10	12.29	68.42	S.E.	4		29.96	82	F.B.
12	21.06	63.36	East.	7	high	30.00		c.
13	30.46	63.03	East.	2		30.18		F.B.
14	21.46	80.36	E.N.E.	2	calm	30.13		F.B.
17	26.00	49.12	S.b.W.	9	very high	29.68		o. + g.
19	30.00	63.00	E.N.E.	4		30.07		threathening
Mauritius.			E.b.W.	6		29.75	81	cgq.
Rodrigues.			E.b.N.	4	swell from North	30.14	83	o.
Seychelles.			North.	2	calm	29.91	83	c.
Bourbon.			E.S.E.	6	high	29.74	88	o, r.

SATURDAY, JANUARY 12TH., 1901.

No. on Chart.	Position at Noon. Lat. South.	Long. East.	Wind. Direction.	Force.	State of sea.	Barometer Reading.	Temp. of air.	Weather.
	° ′	° ′					°	
5	24.41	49.36	E.S.E.	5	moderate	29.83		passing c
6	14.24	64.54	N.N.E.	4	moderate	29.99	83	F.B.
7	20.12	60.26	N.N.E.	7	heavy swell	29.84	80	c. sky
8	27.18	39.30	E.S.E.	6	high	30.07	84	q r.
9	2.36	61.45	East.	4	moderate	29.92	85	F.B.
10	13.41	66.58	S.E.	4	Westerly swell	30.02		F.B.
12	20.14	63.06	N.E.	8	heavy swell	29.96		q.
13	29.56	64.26	N.W.b N.	4		30.18		heavy r, q.
14	21.37	78.56	E.N.E.	2		30.14		F.
17	24.04	50.50	S.W.b.S.	9	very high	29.09		o, q.
19	30.00	59.51	N.W.	6	moderate	30.00		q.
Mauritius.			N.E.b.E.	6		29.65	77	ogqrm.
Rodrigues.			North.	3	swell from N.N.W.	30.09	83	cq.
Seychelles.			East.	2	calm	29.89	83	F.
Bourbon.			E.N.E.	7	very high	29.35	85	o.

SUNDAY, JANUARY 13TH., 1901.

5	23.29	50.09	E.S.E.	8	high	29.81		c.
6	15.54	63.03	N.E.	5	moderate	29.99	81	F.B.
7	20.23	58.39	N.E.b.N.	9	very heavy	29.83	79	heavy r, q.
8	26.51	42.00	E N.E.	6	very high	30.00	82	rq.
9	3.47	58.22	E.N.E.	4		29.95	85	F.B.
10	15.07	65.31	S.E.	4		30.05	86	F.B.
12	21.08	64.18	N.E.b.E.	6	very heavy			rq.
13	27.43	63.24	S.E.b.E	4	calm	30.18		p,
14	22.21	78.55	E.N.E.	2	calm	30.13		F.
17	24.12	51.10	S.W.b.W.	5	moderate	29.58		o.q.
19	30.00	56.56	S.E.b.E.	4	confused	30.10		c. o.
Mauritius.			N.E.b.N.	8		29.76	76	ogqrm.
Rodrigues.			N.E.	3	Northerly swell	30.16	84	cq.
Seychelles.			East.	2	calm	29.91	83	F.
Bourbon.			N.W.	6	high	29.53	88	o.r.

MONDAY, JANUARY 14TH., 1901.

No. on Chart.	Position at Noon. Lat. South.	Long. East.	Wind. Direction.	Force.	State of sea.	Barometer Reading.	Temp. of air.	Weather.
	° ′	° ′					°	
5	22.14	50.39	S.b.W.	4	E.S.Ely swell	29.83		B.
6	17.58	61.15	N.E.b.E.	5	moderate	30.03	80	F.B.
7	20.08	58.38	N.N.E.	5	high head sea	29.86	80	c. sky.
8	26.00	44.31	E.N.E.	6	high	29.90	84	c.
10	15.53	64.10	S.W.b.W.	2		30.04	82	F.B.
12	20.51	63.37	E.N.E.	5	moderate			c.
13	26.17	62.00	N.E.	4	high head sea	30.08		c.
14	21.45	76.36	E.N.E.	2	calm	30.15		F.
15	30.46	99.20	W.S.W.	2		30.18		F.B.
17	23.44	51.53	Calm		heavy	29.72		F.B.
19	30.00	53.30	S.E.b.S.	9	high	29.65		cq.
Mauritius.			N.N.E.	6		29.93	77	ogq.
Rodrigues.			N.E.	2	smooth	30.21	83	B.
Seychelles.			East	2	smooth	29.95	83	F.
Bourbon.			West	3	choppy	29.80	85	o.r.

TUESDAY, JANUARY 15TH., 1901.

5	21.19	53.43	Variable	2	heavy swell	29.93		F.B.
6	19.16	58.57	N.b.W.	4	moderate	29.99	81	F.B.
7	20.08	57.44	N.b.W.	4	moderate	29.89	80	c.
8	25.10	47.43	E.S.E.	1	heavy swell from S.E.	29.98	89	F.B.
13	25.20	61.19	N.N.E.	9	high	29.88		cq.
14	21.27	74.34	E.N.E.	2	calm	30.15		c.
15	29.53	98.09	E.b.S.	5		30.18		
17	23.15	52.44	Calm.		heavy swell	29.80		F.
19	30.30	53.00	S.E.b.E.	7	high	29.70		r.
Mauritius.			N.b.E.	4		29.97	79	cgq.
Rodrigues.			N.E.	1	smooth	30.20	83	B.F.
Seychelles.			S. E.	2	smooth	29.94	84	F.
Bourbon.			Calm.		high	29.93	85	o.r.

WEDNESDAY, JANUARY 16TH. 1901.

No. on Chart.	Position at Noon. Lat. South.	Position at Noon. Long. East.	Wind. Direction.	Wind. Force.	State of sea.	Barometer Reading.	Temp. of air.	Weather.
	° ′	° ′					°	
5	20.14	57.01	N.W.b.W.	4	moderate	30.00		B.
8	23.13	50.45	E.b.N.	2	calm	29.98		F. B.
10	17.53	61.27	S.E.	2	calm	30.06	85	F. B.
13	24.57	63.42	N,b.E.	4	moderate	30.08		q.
14	21.06	72.26	E.N.E.	2	calm	30.14		F.
15	29.10	95.59	E.S.E.	2		30.18		F. B.
17	23.19	52.50	S.W.b.S.	1	heavy	30.10		F.
19	30.06	48.16	S.W.b.S.	7		30.20		c.
Mauritius.			N.b.E.	3		29.98	78	o. g.
Rodrigues.			N.E.	1	smooth	30.16	83	c.
Seychelles.			N.E.	1	smooth	29.94	84	F.
Bourbon.			calm		calm	29.98	84	o.

THE RECENT SUNSETS AND SKY GLOWS.

Received on Tuesday, 1901, August 27.

The gorgeous sunsets and sky glows of the past 3 months recall those vivid displays of 1883 and 1884 which were associated with the disastrous volcanic eruptions at Krakatoa, in the Straits of Sunda, and it is not surprising to learn that towards the end of May of this year similar though less serious eruptions occurred in about the same locality, according to the following cablegrams which appeared in the "Daily Graphic."

Batavia, May 23.

"The volcano of Keloet is in eruption. It is reported that there has been great loss of life among the natives. District of Kediri enveloped in total darkness."

Friday, May 24.

"Three Europeans and 25 natives perished in the eruption of the volcano of Keloet. Several plantations chocked with mud and ashes."

Batavia, May 25.

"178 natives perished, and 9 injured by the eruption of the volcano of Keloet."

It has been suggested that the vivid sunset colors of the past 3 months have been produced by the volcano at Bourbon, but from the reports received it does not appear that the eruptions which have recently occurred in that island have been sufficiently violent to account for the observed phenomena, which are caused by the presence of foreign matter in the upper strata of the atmosphere.

There are three distinct features of the phenomena under consideration; the horizon colors, the first sky glow, and the secondary sky glow.

A few minutes before sunset the horizon becomes tinged with a yellowish red color; becoming more fiery and red as the sun sinks below the horizon, and spreading out to some 30° on either side of the sun. This is followed by a faint glow, bluish green near the Eastern horizon, blue up to the zenith, then purple-pink to rose-pink in the Western sky and finally a small circular arc of yellow, paling to white at the Western horizon. The clouds which first had a dull white appearance now assume lurid colors, and vegetation reflects the most pronounced colors of the Western sky. The effect of the reflection from a green surface is most impressive.

The first glow lasts for about 20 minutes; the most intense color is at first rose-pink, at an altitude of about 20° to 30°; and this, gradually sinking towards the West, gives way to a more purple-pink; finally the most intense color is a fiery orange red along the horizon which gives the clouds a yellow or red-tinge.

As the horizon red fades away the green in the eastern sky changes to a murky yellow, and the zenith clouds again assume

a cold dull whitish color; the secondary glow then commences by the appearance of a very pale purplish pink in the western sky, between altitudes 20° and 40°, extending upwards and downwards as it increases in brightness. In this glow, however, there is no yellow or white near the horizon nor any distinguishable gradation of color from purple-blue to rose-pink, as in the first glow, though as the darkness increases the coloring becomes more red and finally fades away, its altitude gradually decreasing.

The following notes made on the recent sky glows will supplement the above description:

1901—July 27.

5.52 p.m.—Blue-green in East: blue up to zenith, then purplish blue to purplish pink, followed by rose-pink, which is the most intense color, and brightest between altitudes 30° to 40°; boundary elliptical, not circular.

5.54—Green higher up in East: blue now extends west of zenith; most intense color is now more purple, and perhaps at a slightly lower altitude: clouds in zenith have lost their dull appearance.

5.59—Green still higher in East; brighest coloring now considerably lower down, altitude of about 5°. Venus now in purplish blue.

6.4 —Green in East becoming dirtier and greyish yellow brightest coloring now on horizon.

6.5 —Cirro-cumulus clouds now turning yellow, particularly towards western horizon.

6.7 —The green in the East has changed to a murky yellow.

6.9 —The zenith clouds have regained their dull white appearance.

6.10—A very faint suspicion of purplish pink now visible in the western sky between altitudes 20° and 40°.

6.11—Extending now to 60°.

6.12—Glow more intense.

6.13—There is a very slight tinge of red in the murky yellow of the eastern sky.

6.17—Glow still getting brighter.

6.27—Glow fading : redder.

6.37—Very faint reddish glow for about 30° along western horizon, remaining till 6.53.

1901—August 14.

5.58—Very pale coloring : slight purple tint in East : blue to zenith, then purple-blue to purple-pink and rose-pink : a slight tinge of yellowish green below this, and yellowish on western horizon.

6.1 —No purple in East : yellow on western horizon not so bright. Venus now in purplish rose-pink, which is brightening.

6.3 —Slight trace of yellow left on western horizon ; above this is a whitish yellow color, gradually merging into bright rose-pink—brightest between altitudes 30° and 40°—then purple-pink, purple, and purple-blue : zenith blue. Green tinge in the blue of Eastern horizon.

6.5 —Brightest color now slightly below Venus (about 25° altitude) which is now in a more purplish than rose-pink : Green tinge in East more pronounced.

6.7 —Brightest color (rose-pink) now 20° high : golden on western horizon : glow only extends as high as Venus, above which is blue : along horizon coloring extends from W.S.W. to North.

6.9 —Brightest color 10° high : more red than pink. Eastern sky greyish green up to 30° or 40°.

6.11—Coloring now extends along horizon to N. b. E. but is not so bright : terminates in murky greyish yellow.

6.13—Greyish yellow now more pronounced in Eastern sky : coloring in West only 5° high, and bright orange red.

6.16—Western coloring only about 3° high : fiery red.

6.18—Faint suspicion of a purplish pink glow from 15° to 60°

high in western sky : horizon red at westward, murky yellowish red at northward, and lurid greyish yellow in East up to about 40°.

6.20—Glow brightening : maximum brightness at an altitude of about 30° ; horizon still red, then from practically colorless to purplish pink extending up to about 60°.

6.25—Still faint red on Western horizon : northern horizon more the color of second glow.

6.27—Glow fading—at no time has it been as bright as the first glow—extending now to 40° only ; colors have disappeared from Eastern sky, but extend very faintly from W.S.W. to North.

6.29—Glow fading : now 30° high only.

6.31—Glow faint.

6.34—Glow now brightest along western horizon ; and red. Traces of red glow along western horizon until 6.58 p.m.

Referring to the sunset effects of 1883, Dr. Meldrum writes as follows :

" With regard to the phases of the optical phenomena which have been observed, they have generally presented the same features throughout, and they do so still. It is difficult to describe them. During the greater part of the day the sun is surrounded by a circular patch of whitish silvery light, on the outer borders of which there is a brownish fringe, the diameter of the whole varying from 12° to 30° between 9 a.m. and 4 p.m., according to the sun's altitude and the state of the atmosphere. As the sun approaches the horizon the silvery patch extends more and more above than below him, until at length it is entirely above him. It then becomes greyish watery looking, and beyond it, towards North and N.W., and South and S.W. the sky has a brownish smoky appearance down to the horizon.

At about four minutes after sunset the sky becomes slightly pinkish at 30° to 45° above the point of the horizon where the sun has set. The pink or purple soon becomes red ; below the red are orange and yellow ; below them there is a

bluish band, into which the greyish watery patch has been gradually converted. Along the horizon to the extent of 30° on either side of the point of sunset there is generally a low brownish yellow band, which seems to be partly due to smoke from the sugar-mills. Between 23 and 26 minutes after sunset the grass, trees, etc., assume a yellowish red colour.

The reddish band, which is the most prominent, commences about 16 minutes after sunset at an estimated altitude of 40°, and lasts 21 minutes, its width and altitude decreasing until it vanishes on the horizon. At first it extends as a broad arc from W.b.N. to S.W. When its upper edge has descended to 10° above the horizon it becomes fiery red, and when nearer to the horizon dark red. The blue, yellow, and orange disappear in succession, before the red.

At about ten minutes before the disappearance of the red band, when it is within 6° of the horizon, the sky above it up to 40° or 45° begins to assume a greyish green colour, and, after the red has disappeared, this large *new* patch of colour which is now inclining to greyish yellow, is the only remarkable feature.

The upper part of the new patch becomes red about 44 minutes after sunset, at about 35° above the horizon.

This *second* red band lasts 32 minutes, or till 1 h. 16m. after sunset. At first it forms an arc extending from W.N.W. to S.S.W. Below it there are narrow bands of orange, and yellow, and occasionally below them a bluish band, all of which disappear before the red. The latter is most intense when its upper edge has an altitude of about 20°. It then deepens into a dark red and ultimately dies out on the horizon."

It will be seen that though the main features are similar, yet certain of those observed in 1883 have not been noticed this year and *vice versa*.

The duration of the glows appears to be the same in both cases.

The " circular patch of whitish silvery light " around the

sun noticed in 1883 has been again observed, but not the brownish fringe, so far as I am aware.

In 1883 the secondary glow was described as commencing with greyish green, changing to greyish yellow, and then red; whereas it now (the end of August) commences with purplish pink and undergoes no perceptible change of color until it becomes merely an horizon band of about 10° altitude; it then changes to a red, becoming more and more fiery, and finally dies away at about 1h. 15m. after sunset. It is considerably fainter than the first glow.

In the month of June, however, the second glow was even more intense than the first, and gradually changed from a purple-pink to a lurid yellow-red before assuming the fiery red of the horizon band.

The explanation of the ordinary horizon colors observed at sunrise or sunset on almost any day of the year is to be found in the process of selective scattering. The sun's rays which in a perfectly pure atmosphere would pass unobstructed, are scattered in every direction by the very fine particles which are always present in our atmosphere in greater or less numbers, but the smaller the wave length of the ray the greater the deflection from its original direction, so that light which reaches us laterally has fine waved rays in excess and appears blue, while light which reaches us directly has lost some of its blue rays and appears reddish. The coarser the particles the greater the amplitude of the waves in the scattered rays, and hence the greater their intensity; but with coarse particles the difference in the deflection of rays of different wave lengths is less than with fine particles; that is to say, the light reflected laterally from coarse particles is less blue, but more intense than from fine particles. This explains also the blue color of the sky. The light that reaches us from the sky has been scattered by the fine particles suspended in the atmosphere and contains fine rays in excess; it therefore appears blue, and the finer the par-

ticles the more pronounced the blue, but coarse particles in the air, producing the appearance of haze, reflect a considerable amount of white light and this increases the illumination but decreases the blue of the sky. As we look towards the sun we receive the rays in nearly the same direction at which they entered our atmosphere, they should therefore appear reddish, having lost part of their blue rays by scattering ; but we know from observation that except near the horizon the direct rays of the sun appear white. The explanation of this is that the color of the sun is really blue and only appears white after the excess of blue has been scattered by passage through our atmosphere, As the sun nears the horizon, however, the depth of atmosphere that the light has to traverse increases rapidly, so that more and more blue is lost and the sun gradually assumes a yellow and then reddish tinge, as does also the sky along the horizon, becoming redder and redder as the thickness of air to be traversed increases.

The white glow observed round the sun during the day is a diffraction glow, and if the particles in the air were of a uniform size would appear sharply defined with distinct colors, but as they are not, the rings produced by particles of different sizes overlap, and by interference form a colorless, that is white glow, increasing in brightness towards the centre. As large particles produce small rings and small particles produce large rings ; with a preponderence of very fine particles the glow may be surrounded by a reddish fringe.

The above appears to be the explanation of sky glows. As the sun sinks below the horizon his rays fall on the upper strata of the atmosphere, its lower portion being within the earth's shadow ; and whereas in the day time the glow was caused by particles of different sizes, all that is now seen must come from the myriads of very fine particles of volcanic dust and other matter now present in the upper strata of the atmosphere, and these being of nearly an uniform size, produce the observed

colored glows; the secondary glow being a recurrence of the first at a greater angular distance from the sun.

A curious cloud effect was observed after sunset on August 18. A strip of cumulo-stratus cloud, about 1° in width, stretched for some 10° along the horizon at an altitude of 5° immediately above the point of sunset, and where the points of its irregular summit obstructed his light, blue rays from the sun shot up into the red of the first glow, getting fainter and fainter as the glow sank towards the horizon.

PRELIMINARY ACCOUNT OF THE TOTAL SOLAR ECLIPSE OF 1901, MAY 18, AS OBSERVED AT THE ROYAL ALFRED OBSERVATORY

By E. W. Maunder, F.R.A.S.

Read on Wednesday 1901, July 10.

It has been suggested to me, and the suggestion accords most completely with my own feeling in the matter, that it would be appropriate that I should give some account of the observations of the Total Eclipse of May last, before I leave Mauritius for England. The Eclipse was observed here under favorable circumstances—so far as we know under more favorable circumstances than anywhere else,—and it seems but right that the first account of the results of those observations should be communicated to a scientific Society in Mauritius. It is with very great pleasure, therefore, that I have responded to the invitation of your Secretary, Mr. Claxton, and that I now beg to submit to you a brief account of our recent work.

May I before doing this, however, preface a few words of personal explanation. I have received one or two very courteous invitations to give such an account in the form of a popular lecture, and it was my decided wish to be able to respond to those invitations in the affirmative. Unfortunately, I was

hindered in my work for some considerable time by ill-health, and the preparation of the needful lantern illustrations for such lectures demanded much more time, not to speak of necessary appliances, than I had at my disposal. I feel, however, that the opportunity which you have so kindly given to me to-day, enables me to offer a preliminary report upon the Eclipse more suitably than I could do to a general audience, and through the medium of this learned society to make my acknowledgements to this Island, where I have been so courteously and hospitably received, where so much interest has been felt in my undertaking, and so much assistance afforded me.

Two expeditions came out from England to Mauritius for the purpose of observing the Total Eclipse, and these two expeditions had technically not the least connection with each other. The one expedition was official ; it was sent out by the Royal Observatory, Greenwich, at the expense of the Admiralty, and was equipped with instruments which either belonged to Greenwich Observatory, or which were lent to that institution for this purpose. The other expedition was unofficial, wholly and entirely so, both as to personnelle and instruments. I have the honor to represent the Royal Observatory Greenwich, and therefore myself personally constitute the official expedition ; whilst as you all know, you have here in the Royal Alfred Observatory an institution mainly meteorological it is true, but possessing a fair astronomical equipment, and most ably directed and worked by your esteemed members Mr. Claxton and Mr. Walter. And may I be permitted as a Greenwich man to draw your attention to the fact that all my three colleagues in this Eclipse work, Mr. Claxton, Mr. Walter and my wife, were at one time, as well as myself, on the staff of the Royal Observatory Greenwich.

Two entirely different branches of Astronomy are concerned with total Solar Eclipses. The first is that branch which is often spoken of nowadays as the old astronomy, or the astronomy of position. This branch of astronomy deals with the distances, signs, and movements of heavenly bodies. The other branch

is often called the new astronomy or physical astronomy, and each special field embraces the Cosmical constitution and physical condition of the heavenly bodies. There can be no doubt that the latter field is the one which excites by far the greater amount of popular interest at the present time ; many striking discoveries have been made in it within but a short space of time ; many more may be confidently expected. Above all, it lends itself to vivid description and sensational writing, whilst the old astronomy offers little beyond endless colums of dull figures, and long abstract and wearisome calculations.

But astronomers rightly place the very highest value upon the astronomy of position. and every possible opportunity is seized upon in order to make its data more exact.

Now there are two points in which an Eclipse of the sun affords us a singularly favorable opportunity for getting more exact determinations. When the sun and moon are actually seen in juxtaposition, we are able to ascertain with extreme precision their relative apparent diameters, and their relative apparent places.

It may be asked, surely astronomers know both these quantities precisely ? It is indeed true that they know them very nearly, but in Astronomy as in all sciences, the effort is continually being made to render exactness still more exact, and our knowledge of the relative apparent diameter of the sun and moon was capable of improvement to an appreciable extent, and of their relative positions to a very minute degree. Thus in the total Eclipse of 1898, the predicted time of the middle of the Eclipse for the centre of India was correct to about a second, but the duration of the Eclipse, which was predicted to be just 2 minutes, actually proved to be 4 seconds short of that time, showing that the apparent diameter of the moon was smaller than had been supposed.

It will be seen that the error, though very small, was sufficiently evident to make it worth while to try and remove it, consequently the first item in the programme arranged be-

tween Mr. Claxton and Astronomer Royal, as represented by myself, was this work of determining the relative apparent diameters and places of the sun and moon.

This problem we arranged to attack in two different ways. The first way was by noting as accurately as possible the time of the four contacts — that is to say the first contact when a slight encroachment of the dark body of the moon is first seen upon the disc of the sun—; the second when the Eclipse became total; the third when the Eclipse ceased to be total, and the first ray of sunlight reappeared; and the fourth when the moon moved completely off the sun's disc.. Cloud prevented our observing the first contact, but the other three contacts were independently observed with three very different instruments by my wife, Mr. Walter, and myself, the results agreeing exceedingly closely. Captain Robertson of the S.S. "Ujina" also observed the same three contacts in the Harbour of Port Louis. His results when corrected for the difference of longitude and latitude agreeing completely with ours.

The other method of observation was an entirely different one, but one susceptible of much more accurate results. This Mr. Claxton took in hand. He had the photoheliograph of the Royal Alfred Observatory dismounted from its usual stand and placed in a horizontal position, the light from the Eclipse being reflected into it, from a plane mirror of silver on glass, mounted in the method which is known amongst astronomers as that of the Cœlostat. With this instrument Mr. Claxton took 34 photographs during the partial phases of the eclipse on a scale of 8 inches to the sun's diameter. These photographs constitute an exceedingly fine series, and the Royal Alfred Observatory not possessing an instrument for their proper measurement, Mr. Claxton has placed them in my hands to take to England for measurement and reduction. This will be an exceedingly laborious work, and it will require many weeks to carry through; but the character of the photographs leaves, I think, no possible doubt as to the value of the results which they will yield.

As an illustration of the necessity that there is for the co-operation of many helpers in eclipse work I may mention that the taking of these photographs required the asssistance of four persons—Mr. Claxton himself manipulated the instrument, and noted the time, by chronometer, of the fall of the exposing shutter, Corporal Cox entered the times and released the spring shutter at Mr. Claxton's signal, Corporal Truman ran with the exposed plates to the dark room and brought back dark slides with fresh plates in them, whilst Mr. Charles Garrioch in the dark room put away the exposed plates and charged the dark slides with new ones.

In the department of the new astronomy, the work of our expeditions was practically confined to photographing the Corona with a number of cameras differing much in size and construction. The official cameras—that is to say, those belonging to and sent out by the Royal Observatory, Greenwich—were two in number. The first of these had an aperture of 4 inches and was 7½ feet in length. Its equivalent focal length however was equal to 22½ feet, as it contained a negative enlarging lens on the principle of the telephotographic cameras with which Dallmeyer has made us familiar. It gave therefore an image of the sun 2¼ inches in diameter, and the plates used with it measured 12 inches by 10. The other instrument had likewise an aperture of 4 inches, but its focal length was much shorter. It was a Rapid Rectilinear Lens by Dallmeyer with focus of only 32 inches. Thus, though the two instruments had the same aperture, the resulting image in the first was 8½ times the diameter of that in the second. The Coronagraph as the first was called for the sake of distinction, therefore gave an image only $\left(\frac{1}{8\frac{1}{2}}\right)^2$ of the brightness of the Rapid Rectilinear; in other words the Rapid Rectilinear was 72 times as quick an instrument as the Coronagraph. The exposures with the Coronagraph varied from 5 seconds to 40; those with the

Rapid Rectilinear were in each case 20 seconds long, but, in both series, plates of widely different sensitiveness were used. The programme proposed by the Astronomer Royal named seven photographs with the Coronagraph, and six with the Rapid Rectilinear during totality, all these photographs were successful, and the two series combined give a complete view of the Corona as shewn by exposures varying over a range of from 1 to 1000 when the differences of the sensitiveness of the plates and the light gathering power of the two instruments are borne in mind.

One of the photographs taken with the Coronograph was "standardized", to use an expression which has come into use during the last two or three Eclipses. It appeared desirable that some means should be available for comparing the brightness of the corona on one occasion with its brightness on another, and this was effected in the following way. A plate—or in this particular case a celluloid film—was prepared with a series of squares of different densities. Then the photographic plate which had been exposed to the light of the Corona was exposed to the light of a standard candle, at a measured distance, for a definite length of time, under one of these prepared plates or films. The plate was then developed in the usual way and two pictures were of course found upon it—one the photograph of the Corona, the other the photograph of the standard squares as illuminated by the standard candle. Then it is easy, by means of a special photometer, to compare the density of the silver deposit in various parts of the photograph of the Corona with the deposit in the series of the squares. By these standard squares we can determine two important questions : 1°, from a given photograph of one particular eclipse, we can ascertain the relative brightness of different parts of that particular Corona, and their actual brightness as compared with that of a standard light at definite distances, and 2° we can compare the brightness of the Corona as seen in different eclipses. It is a matter of great regret to me that owing to my unfortunate illness, I was only able to stan-

dardize one of the seven photographs taken with the Coronagraph, and none of those taken with the Rapid Rectilinear. The standardized photograph is however a very successful one, and as I succeeded in printing two sets of squares upon it, I am confident that it will give a very good determination both of the brightness of this Corona as a whole, and of the relative brightness of its several parts. The measurement of the photograph and its subsequent reduction cannot of course take place until after my return to England.

The measurement of standardized eclipse photographs in former years has shown us that the brightness of the Corona diminishes at least as rapidly as the square of the distance of the Corona from the sun's limb increases. It will be readily seen therefore, that the outer portions of the Corona are extremely faint as compared with the inner. This indeed has always been the great difficulty of coronal photography. An exposure which was long enough to show the faint outer regions, was manifestly immensely too long for those inner portions which were at least 1,000 times as bright. These, under such circumstances, were so much over exposed as practically to give no result, all the details being, to use a photographic technicality "burnt up." The advantage therefore of a series of photographs, such as the the 18 taken with the two Greenwich instruments is, that the details which one exposure failed to give, could be shown by another, and by comparing the entire series together, a very full conception may be formed of the true structure of the Corona. On the two instruments above mentioned, four persons were employed during totality. I myself manipulated the plate-carriers for the Coronagraph, whilst Sergt. Wade made the exposure at the object-glass. Similarly, Mr. Pope managed the dark slides for the Rapid Rectilinear, whilst Mr. Rowden made the exposures.

My wife brought a variety of photographic cameras out to this eclipse ; of these, one—the Water's Camera —was brought chiefly out of respect to the memory of its original owner, who

bequeathed it to the Royal Astronomical Society with the express desire that that it should be used in Eclipse work. It was a telephotographic combination, much smaller indeed than the Greenwich Coronagraph, but having about the same relative proportions. Six photographs were taken with it, each with about ½ second exposure, the plates employed being half-plate size. Corporal Balgué worked this instrument which was rigidly fixed and pointed to the sun. All six photos were successful, but the first two were developed only a day or two after the eclipse, the other four were unavoidably left untouched for about three weeks. I mention this as the difference in the quality of the photographs can only be ascribed to this delay. The plates, instrument, exposures, and method of development being the same throughout. The superiority of the two plates first developed shows how great a debt I owe to Mr. Walter and to my wife who, during my enforced absence, carried on the work of development on my behalf.

The next series is, I think, the finest obtained during the present eclipse. This is a series of 14 photographs every one of them successful, which was taken by Mr. Walter, with the assistance of Corporal Thorne, with the fine telescope of 4½ inches aperture lent to my wife by Mr. George Newbegin. This instrument was mounted on the stand of the photoheliograph belonging to the Royal Alfred Observatory, the photoheliograph itself being dismounted and fixed in a horizontal position for use in conjunction with the 16-inch Cœlostat.

My wife brought also two other instruments for special purposes. As early as 1870 the photographs of the Corona had shown the presence of certain very bright curved lines. These curves were of a special character, resembling the curves of a hyacinth bulb, or of a Florence flask. And they were arranged in pairs, the two members of any pair leaning over towards each other. They thus got the name of synclinal curves. But why they bent over towards each other, and whether their connection was apparent only, or real, was unknown for many years.

In 1898 however my wife, using a little camera of very wide angle which she had had constructed for surveying the Milky Way, succeeded in photographing the extreme outer regions of the Corona, and it was seen at once that the two members of a pair of synclinal rays ran together at a great distance from the sun, and formed a single rod-like ray which shot out in a straight line to a distance, in one case, of 5 millions of miles from the sun's surface. The synclinal curves were therefore seen to be the boundary lines of vast structures rising from the sun's surface. The rod-like rays are no doubt due to a strong repulsive power in the sun, probably electrical, by which finely divided matter in its neighbourhood is driven away in a straight line. But the wide distance apart of the two members of a synclinal pair shows that, in some way or other which we have not as yet followed, this repulsive force exerts itself as a whole over large areas of the sun at a time. The coronal matter, whatever its nature, rises from the sun at the circumference of a ring, sometimes as much as 60° of solar latitude in diameter, and narrows as it recedes from the sun, till we see it taper away into one of these thin rod-like rays.

We have only observed these rod-like rays in three eclipses, 1898, 1900, and 1901; all at times when there were few or no spots on the sun, and when the Corona, in consequence, was comparatively simple in structure. We shall not fully understand the significance of these remarkable formations until we have had the opportunity, expected in 1904 and 1905, of seeing them in the complicated Corona of the sun spot maximum.

These rod-like rays were best seen in the eclipse of 1898, observed in the dry pure air of Central India. They were seen, but not so well, in the eclipse of 1900, and in that eclipse though my wife's little camera showed them distinctly, other cameras showed them just as well. In the present eclipse, the Rapid Rectilinear camera showed them better than did my wife's instrument, though not quite so well as they had been seen in 1898 and 1900. But you will readily understand that whether

it should eventually prove to be the best form of instrument for showing these long faint rays, it was of no small importance to try to secure them again and again with precisely the same instrument as that by which they were first photographed.

My wife was assisted in her work at this instrument by Sergt. Tyson R. A. M. C.

In examining the photographs taken in the eclipse of 1900, we were struck with the remarkable fact that, besides bright rays, the Corona showed also dark rays; and on looking up earlier photographs it was seen that similar dark rays had been photographed in former eclipses. As to the origin and significance of these dark rays I can say nothing at present, they are a mystery which we have not yet solved. Our last camera was brought out with the special purpose of repeating the photographs taken in Algeria in 1900, and Mrs. Claxton kindly worked it for us.

One other little camera may also be mentioned but that was merely a toy. Mr. Walter tried photographing the Corona with a pinhole, and really succeeded much better than I had expected.

In all therefore we secured :—

4 determinations of the times of each of the three last contacts.

34 fine photographs of the partial phase.

47 photographs of the Corona with cameras of very different sizes and constructions, and with exposures of a wide range of length.

One or two items of our intended programme we were unable to carry out, but the foregoing summary will show that we have very good reason indeed to be gratified with the successes which we have obtained.

I ought not to omit mention of the very interesting drawing of a group of prominences. and of the Corona in its neighbourhood, which was made by Mr. Piggott at the 6 inch equatorial telescope of the Royal Alfred Observatory.

A few other photographs were also taken by us for the adjustment of our instruments, and I ought also not to omit 6 photographs of the Corona taken by a camera brought up to to the Observatory by Mr. Ireland, the exposures being made by Mr. Hanning. If we include these, our total number of photographs of the Corona is increased to 53.

You may judge then that if we look a little regretfully at the one or two items of our programme which we were not able te carry out, my wife and myself felicitate ourselves most heartily on the good fortune which brought us to this beautiful island, and which enabled us to secure so large a number of valuable and beautiful photographs. Some of these I have now the pleasure of laying before you, and I may mention that Mr. Walter has very kindly made transparencies from several of the Newbegin series, and these have been placed in the hands of Mr. Alex. Rambert, for reproduction. Of the unofficial photographs, the Newbegin series were the most suitable for this purpose. The photographs taken with the instruments of the Royal Alfred Observatory are the property of the Admiralty, and I have no authority to permit their publication.

THE TOTAL SOLAR ECLIPSE AT MAURITIUS 1901, MAY 18.

I.—*Origin of the Expedition.*

The Eclipse expedition to Mauritius was organised by the Astronomer Royal, and Mr. E. W. Maunder, F.R.A.S., Superintendent of the Solar Department of the Royal Observatory Greenwich, was selected to take charge of it.

In the month of March Mr. Maunder received final instructions to proceed to Mauritius to observe the Eclipse in concert with the Director of the Royal Alfred Observatory.

II.—*Arrival in Mauritius; landing of the Instruments &c.*

Mr. Maunder sailed from Marseilles on March 26, on board the M.M. S.S. *Melbourne,* accompanied by Mrs. Maunder. They arrived in the Colony on Saturday, April 20, and landed at 3 p.m. after a delay for some unknown cause of 5 hours.

By consent of Sir Graham Bower, K.C.M.G., who was temporarily administering the Government, it was arranged that Mr. Maunder's luggage and instruments should be passed through the Customs free of charge, and conveyed to Pamplemousses in a special waggon. He also authorized the issue of free railway passes for Mr. and Mrs. Maunder, a concession usually granted to eclipse parties in all parts of the world.

The instruments were landed on Tuesday, April 23, and conveyed to the Observatory the same day.

They included :

Official.

(1) The Greenwich Coronagraph, with a 4 inch objective, and negative magnifier giving an image of the sun $2\frac{1}{4}$ inches in diameter on a 12×10 plate.
(2) The 4 inch rapid rectilinear Dallmeyer lens of 32 inch focus, with its camera.
(3) Mr. Eversheds 2 inch prismatic camera.
(4) A 16 inch coelostat.
(5) A 12 inch cœlostat, with spare working mirror.
(6) The eclipse clock.

Non-Official.

(7) Mr. Newbegin's photographic telescope of $4\frac{1}{4}$ inch aperture, and 71 inch focal length.
(8) The Waters equatorial telescope and camera.
(9) Mrs. Maunder's 2 Dallmeyer stigmatic lenses of $1\frac{1}{2}$ inch aperture and 9 inch focal length, with their cameras.
(10) The Niblett lens, 4 inch aperture and 32 inch focus, with its drum camera.

(11) Mr. Maskelyne's kinematograph. } Non-
(12) A Pinhole camera. } Official.

The Mauritius instruments used during the Eclipse were the Dallmeyer Photoheliograph, the 6 inch Equatorial by Cooke & Sons, and the 12 inch Theodolite by Troughton and Simms.

III.—*Official Programme.*

The Official Programme drawn up by the Astronomer Royal was as follows :

1. Photographs of the General Corona, to be taken with a 4 inch Dallmeyer Coronagraph, giving an image of the Sun $2\frac{1}{4}$ inches in diameter, and to be used in conjunction with a 12 inch cœlostat.

2. Photographs of the spectra of the " Flash " and of the Corona. to be taken with Mr. Evershed's two-inch prismatic camera, and served by the above 12 inch cœlostat.

3. Photographs of the Coronal extensions to be taken with a 4 inch Dallmeyer R.R. lens, giving an image of the Sun 0.3 inches in diameter, and to be used in conjunction with a 16 inch cœlostat.

4. It is suggested that the Mauritius photoheliograph (dismounted) be used in conjunction with the above 16 inch cœlostat for

(a) Observations of times of Contacts.
(b) Photographs of the Partial Phase.
(c) Photographs during totality of the Prominences and inner Corona.

IV.—*Disposal of the instruments ; adjustments &c.*

The idea of dismounting the photoheliograph, and feeding it by means of a cœlostat, was to ensure a perfectly steady image on the photographic plate during totality.

For our daily photographs of the sun an exposure of $\frac{1}{100}$ of a second is sufficient and a good driving clock is not necessary, but during the total phase of the Eclipse the exposure decided upon was 20 seconds, and as the sun apparently moves in the heavens over his entire diameter in from 128 to 142 seconds, according to the time of year, for so long an exposure we must make our instrument drive at exactly the same rate as the sun, or a blurred image will result. With the photo-heliograph perfect driving is impossible, recourse was therefore made to what is termed a cœlostat, a form of heliostat in which the axis of the mirror is parallel to the axis of the earth, and about which the mirror rotates once in 48 hours.

Except for those rays which fall perpendicularly on to it, the effective reflecting surface of the (circular) mirror is an ellipse, and the greater the inclination of the incident ray, the greater will be the eccentricity ; the relation being

$$b = a \cos i$$

Where b=the minor axis, a=major axis (always the diameter of the mirror), and i=the angle of incidence.

We must be careful, therefore, to fix our instruments in such a position that the minor axis of the reflected ray is greater than the aperture of the telescope, or telescopes, to be fed.

During the Eclipse it was possible to use the telescopes in a horizontal position,* but with the sun near the meridian it is necessary to tilt them, as the angle of incidence becomes a minimum† when the sun's rays are reflected back to the same hour angle as the sun, and a maximum when reflected 180° from this point.

With regard to the adjustment of the cœlostat, it is only necessary that the mirror should be parallel to the polar axis, and that the latter should be parallel to the earth's axis.

The Mauritius photoheliograph was dismounted on April

* The computed azimuth for this position was S. 69° E.

† The minimum angle of incidence to the mirror-normal is always equal to the sun's declination.

24 and pointed horizontally towards the 16 inch cœlostat marked (a) on the accompanying plan. It was firmly secured in wooden collar blocks, and supported on two of the instrument boxes filled with stones. Fed by the same cœlostat were the Dallmeyer rapid rectilinear lens and the Maskelyne kinematograph; the latter indirectly, by means of a second mirror attached to the photoheliograph. The Greenwich coronagraph and the prismatic camera were fed by the 12-inch cœlostat placed 15 yards to the N.W. of the 16-inch cœlostat. The instruments, when not in use were protected from sun and rain by tarpaulins stretched over a strong frame work, as shown in the accompanying photographs.* The Newbegin telescope was mounted on the equatorial stand of the photoheliograph by means of collar blocks; on to which the pinhole camera was also attached. The Water's equatorial was mounted 40 yards to the N.E. of the 16 inch cœlostat, and rested on 3 stone pillars built of sufficient height to give a 5 feet drop for the clock weight.

The fixed cameras were each screwed firmly to a wooden base and pointed to the computed altitude and azimuth of the sun at mid-totality. The instruments were focussed by means of star trails; that is to say by making a series of exposures on a convenient part of the heavens and, commencing with the lens screwed out past the approximate focus, screwing back by a known amount after each exposure until well within the focus, and allowing a convenient interval between each exposure Between the first and second, however, twice the usual interval was allowed for the purpose of identification. In this manner a series of black lines was obtained for each star photographed: the lens was then screwed back to the position which gave the sharpest definition for stars near the centre of the field. In the case of the coronagraph and photoheliograph only the very bright stars could be photographed in this way. A suitable star was therefore chosen and made to trail on the plate at the

* Not reproduced.

desired distance from the centre. The coronagraph was also focussed by pointing the instrument to a mirror and photographing the reflected image of a piece of wire gauze let into the centre of the plate holder. The focus of the photoheliograph was checked by photographing a portion of the sun on each corner of the plate, and varying the focus slightly between each exposure.

The adjustment of the cœlostats was carefully made on April 25-26 and tested from time to time in order to detect any irregular settling of the cases on which they were mounted. It was well this was done, for considerable changes took place. Notwithstanding re-adjustment on May 5, observations with the theodolite of the 16 inch cœlostat, on May 10 gave the following results :

Error in altitude ... ... − 21″·2″ (North end too low)
Error in azimuth ... ... − 8·6 (North end too far East)

The instrument was then adjusted, and further observations gave :

Error in altitude ... ... + 2′·52″ (North end to high)
Error in azimuth ... ... + 0·9 (North end too far West).

V.—*Assistance from the Military Authorities.*

To do justice to the large instrumental equipment at our disposal it was obvious that outside help would be required, and Lieut.-Colonel Jessep, R. E. Commanding the Troops at Mauritius, readily responded to the call for help, and placed at our disposal 9 non-commissioned officers of the garrison, whose services were invaluable. Staff-Sergeant Smith A.O.C. and Company Sergeant-Major Wade R.E., were specially useful in unpacking and mounting the instruments, which had apparently been roughly handled on the voyage and needed several slight repairs. Sergeant Smith also thoroughly cleaned the clocks and made them all work smoothly.

Even the whole month at our disposal was none too long for getting everything into perfect working order, what with clocks driving well one day and indifferently the next, focus adjustments apparently perfect one night and far from perfect on other nights, and an unusual number of cloudy nights, we were kept in ~~an~~ a by no means agreeable state of uncertainty.

Two days before the Eclipse the whole observing party assembled at the Observatory for rehearsals, and although there was a considerable amount of nervousness and uncertainty at first, after a little practice and study of the written instructions the programme was rehearsed without a hitch; and here the military training of the soldiers was evident, they quickly mastered their allotted tasks and performed them accurately and well.

Arranging for the housing and feeding of 22 persons with practically no accommodation was no easy work, but the military authorities again came to our help and provided beds, linen, and crockery. To one of our own party I am specially indebted for thoughtful and generous help in many ways.

VI.—*The day of the Eclipse.*

On the day of the Eclipse the sun was covered with thin cirro-cumulus cloud until 7.5 a.m. after which we had an unclouded view of the Eclipse. The first part of the programme consisted of finally testing the driving of the cœlostats, and taking partial phase photographs with the photoheliograph. After eleven of these had been taken the ground glass was put into place and the diaphragm and exposing slit removed.

At 30 seconds before totality, as shown by the length of the crescent on the ground glass of the photoheliograph (previously computed), the word "stand by" was given by the Director of the Observatory, and Mr. Maunder commenced his series of exposures. At the signal "go", 10 seconds before totality, Sergeant Smith released the pendulum of the Eclipse

clock, which was to ring a bell every 10 seconds, and bell N°. 1. rang out almost exactly at the beginning of totality. Sergeant Smith called the number of each bell, and Lieut. Robertson R.E. timed them by chronometer Kullberg.

The plate carriers were labelled on the back in large letters with the number of the bell at which they were to be exposed; for instance the six slides for the photoheliograph were numbered 3, 6, 9, 12, 15 and 18 respectively, so that 20 seconds was allowed for observing the second contact (beginning of totality), removing the ground glass, and inserting slide N°. 1. The exposure being 20 seconds, the slide was closed at the 5th bell and N°. 2 inserted, ready for exposure at the 6th bell. Unfortunately the lever broke during the exposure of plate N°. 4 and no attempt could be made to extract the slide until after totality, for fear of shaking the R. R. lens and the mirror feeding the kinematograph. Thus, in addition to losing 3 photographs during totality, the 3rd contact was lost; the 2nd contact was also lost owing to the object glass having been closed by the exposer before the appointed time.

To prevent shaking during the exposures, the actual method of proceedure was to open each slide, by means of a lever, *before* the appointed time of exposure, and at the proper signal from the eclipse clock an assistant withdrew a piece of card-board from the front of the photoheliograph and R. R. lens, replacing it at the signal for ending the exposure.

The complete list of persons who took part in the observations is as follows:

At the Royal Alfred Observatory, Pamplemousses.

MR. E. W. MAUNDER: Greenwich Coronagraph. Large scale photographs of the corona; contacts.

MRS. MAUNDER: Stigmatic lenses mounted on the Waters equatorial for coronal extensions; contacts.

MR. T. F. CLAXTON: Dallmeyer Photoheliograph. Large scale photographs of prominences and inner corona; and partial phase photographs; contacts,

Mrs. Claxton : Niblett lens, with drum camera.

Mr. A. Walter : Newbegin Telescope, 14 photographs ; contacts.

Mr. G. H. Ireland : Maskelyne Kinematograph.

Mr. F. T. Piggott : Six Inch Equatorial. Sketch of prominences and part of corona.

Lieut. F. W. Robertson, R.E. : Timed the ten second bells.

Mr. T. A. Pope : Rapid Rectilinear Lens. Coronal extensions.

Mr. T. W. Hanning : The Ireland Camera ; contacts.

Mr. E. Rowden : Exposed at the object glass end for Mr. Claxton and Mr. Pope.

Mr. C. Garrioch, assisted by Mr. Agathe, changed plates for partial phase photographs.

Mr. N. V. Olivier assisted Mr. Piggott.

Staff Sergeant Smith, A.O.C., called the number of each ten second bell.

Comp. Sergt. Major Wade, R.E., exposed the prismatic Camera.

Sergt. Tyson, R.A.M.C., assisted Mrs. Maunder and made a pencil sketch of the corona.

Corporal Balguey, K.O.Y.L.I. : Waters Camera.

Bomb. Cox, R.A., assisted Mr. Claxton.

Corporal Baillie, K.O.Y.L.I., and Bomb. Lillie, R.A., assisted Mr. Maunder.

Bomb. Thorne, R.A., assisted Mr. Walter.

Bomb. Trueman, R.A., carried plates for partial phase photographs from the dark room to the photoheliograph, and back.

Mr. Figon.
Mr. Gourdin.
Mr. Rassoo.
Mr. O. L. Olivier. } Made meteorological observations.

At Lynnwood, Moka.

The Hon. H. Stein made notes ; and observed contacts.

The Rev. Canon Pendavis sketched the corona and prominences, as seen with a 3 inch telescope.

MRS. STEIN. } Made pencil sketches of the corona and
MISS MC IRVINE. } observed shadow bands.

MR. BROWN BAGGOTT took a series of 6 landscape photographs to show the gradation of light before and after totality.

At the Manse, Beau Bassin.

The Rev. G. MCIRVINE made notes and observed shadow bands.

At the Nursery Gardens, Curepipe.

MR. F. O. BIJOUX made meteorological observations and observed the effect of the eclipse on different plants.

At the Railway Station, Reduit.

MR. K. DE LUCA made meteorological observations.

At Quatre Bornes.

MR. Cecil HALL made notes and, by a visibility test, estimated during twilight the time at which the light most nearly resembled that of mid-totality.

In the Harbour, Port Louis.

Captain J. W. ROBERTSON observed contacts.

At three Police Stations.

The OFFICER ON DUTY made meteorological notes.

At Beau Plan Estate, Pamplemousses.

MR. HADDON obtained one photograph of the corona, and one of the partial phase, with the back lens of a 1½ inch R.R. combination. He also roughly sketched the corona, made meteorological observations, and took a series of four landscape photographs to show the gradation of light before and after totality.

At the Asylum, Beau Bassin.

DR. J. I. PADDLE made notes, took meteorological observations, and made a rough sketch of the corona.

At Beau Champ, Flacq.

MR. S. COCHRAN took readings of a standard Fortin barometer every 15 minutes.

At the Military Camp, Vacoa.

Sergeant BIGG, R.E., made meteorological observations.

VIII.—*Results.*

Photographs:—In all, 53 photographs of the corona were taken at the Royal Alfred Observatory.

With the Thomson coronagraph	6
With the Greenwich R. R. lens	6
With the Mauritius photoheliograph	3
With the Newbegin telescope	14
With the pinhole camera	1
With the Niblett lens	6
With the Waters camera	6
With the Ireland camera	6
With the stigmatic lens	5
Total	53

After totality 23 partial phase photographs were taken with the photoheliograph, exposures Nos. 5, 6 and 7 being made on the same plate; the clock was stopped, and about forty seconds allowed between each exposure to obtain the exact path of the sun's image on the photographic plate. All these photographs,

together with those taken during the total phase, have been forwarded to the Astronomer Royal, for the purposes already explained by Mr. Maunder.

Undoubtedly the finest series of photographs was that taken by Mr. Walter with the Newbegin telescope.

In the 14 photographs of this series the exposure varied from the quickest hand-exposure possible to 10 seconds ; and different brands of plates were used as follows :

N°.	Plate.	Exposure.
1 and 14	Flash light (lumière)	instantaneous (hand).
2 to 6	Imperial (fine grain) ordinary.	2, 4, 6, 8 and 10 seconds respectively.
7 and 8	Imperial Ordinary.	6 seconds.
9 to 13	Imperial (fine grain) ordinary.	10, 8, 6, 4 and 2 seconds respectively.

The three photographs taken with the photoheliograph, so far as definition is concerned, were a failure. The magnification was too great and the cœlostat mirror too near the ground. That the instrument was correctly focussed is shown by the partial phase photographs ; but apparently the driving clock was not sufficiently accurate to warrant so long an exposure (20 seconds for each plate). In addition to the excessive "boiling" which probably played even a greater part in destroying the definition than the inaccurate driving, it is possible that dew formed on the cœlostat mirror during totality, and this is borne out by the inferior definition of the photographs taken immediately after, as compared with those taken immediately before totality.

The plates used were :

No. 1..... Empress (Ilford).
No. 2..... Imperial Ordinary.
No. 3..... Imperial Special Rapid.

Contacts :—The observed times of the contacts were as follows :

Observer.	Contacts.			
	1	2	3	4
		h. m. s.	h. m. s.	h. m. s.
Mr. Maunder	Lost owing to clouds.	7· 51· 40	7· 55· 13	9·4·42·4
Mrs. Maunder		7· 51· 41	7· 55· 11	9·4·42·9
Mr. Walter.....		7· 51· 41	7· 55· 13	...
Mr. Claxton		...	...	9·4·42·6
Mean	...	7·51·40·7	7·55·12·3	9·4·42·6
Nautical Almanac ...	6·51·0	7·51·49·0	7·55·24·0	9·5· 0· 0
Correction to Nautical Almanac	...	— 0·8·3	— 0·11·7	— 0·17·4

The last three contacts were also observed by Captain Robertson, on board the *S.S. Ujina*, in Port Louis Harbour, as follows :

	h.	m.	s.	
Second contact.....	7·	51·	38	M. C. T.
Third contact.....	7·	55·	12	„
Fourth contact.....	7·	4·	38	„

Captain Robertson's ship bore S 40° W, 5·9 miles from the Observatory ; he was therefore 2·5 miles nearer the line of central eclipse (which passed about 8 miles to the South of the Observatory in a direction N 65° E., travelling at the rate of

74 miles a minute at mid-totality) and would therefore have 1 second longer totality. Moreover, mid-totality at his station would occur 4 seconds earlier, as it was 5·3 miles in advance of the Observatory along the shadow track.

Shadow bands :—This phenomenon was noticed by several of the observers. The bands appear to have been more distinct than in other Eclipses. Their velocity was estimated at 7 or 8 miles per hour, but the same observer estimated that the waves were 4 inches wide and 1 foot apart, and that about 14 passed a given point in 10 seconds, which gives a velocity of 1·3 miles an hour. Other observers state that the waves were travelling rapidly, and though the speed may have been over estimated, in the same way as that of shallow running water, over a rough bed, yet it is improbable that the impression of great velocity would be given by a real velocity of 1 mile per hour. They were visible for 1 minute before totality, ceased at second contact, commenced again immediately after third contact and remained visible for 1½ minutes. The direction of motion was at right-angles to their length, or from S.E. to N.W. which is also (approximately) at right angles to the track of the moons shadow.

Illumination during totality :—At Beau Bassin four observers estimated the time during the evening twilight of May 18 at which the illumination appeared to be the same as at mid-totality, and obtained practically the same results as Mr. Cecil Hall, at Quatre Bornes, who describes his method of observation as follows :

" I prepared a black board with ten pieces of white paper on it. The sizes of the papers were 1½, 3½, 5, 7, 9, 11, 12½, 14, 15, and 17cms square respectively. I was under the impression that it would have been darker, hence the unnecessarily large size of some of the papers.

When the Eclipse was almost total, I placed the board so

that the sun shone directly on it, and I backed towards the East until the smallest paper was hardly visible. I was then at a distance of 62½ metres from the board.

At 7.53 a.m. the two smallest pieces of paper became invisible; from 7.54 to 7.55 the three smallest were not visible; at 7.56 the sun shone on the board again.

In the evening I stood at the same distance from the board, which was placed facing the West instead of, as in the morning, facing the East.

At 5.50 p.m. I could see all the papers, but the smallest was very blurry; at 5.55 p.m. the smallest could not be seen, and the next in size was dim; at 5.58 I lost sight of the three smallest papers.

I therefore estimate that the illumination at 5.58 p.m. was similar to that during the darkest part of the eclipse."

It should be remembered that mid-totality really occurred at 7.53½. Mr. Hall's watch must therefore have been 1 minute fast, giving 5.57 as the time at which the twilight illumination was similar to that of mid-totality.

The observers at Beau Bassin having viewed the Eclipse from Pamplemousses, had nothing further than the impression obtained there of the illumination at mid-totality with which to compare the illumination during twilight, and it is not a little surprising that there should have been such close agreement in the times, which were independently observed and entered by each observer in the following order.

	h.m.
(1) Mrs. Maunder ...	... 5.57
(2) Mrs. Claxton ...	... 5.58
(3) Mr. Maunder ...	... 5.57
(4) Mr. Claxton ...	... 5.58
Mean ...	... 5.57½

which is practically identical with that observed by Mr. Hall by the aid of a definite standard of reference. At this time the sun was 7° below the horizon.

Planets visible during totality :—Jupiter, Venus, Saturn, and Mercury were visible during totality, but apparently none of the fixed stars were seen.

Effect on Animals, Plants &c. :—There was a marked effect on birds. Fowls went to roost as totality came on, and at the return of light cocks crowed. Horses, mules &c. were unaffected. The Director of the Royal Botanical Gardens, Pamplemousses, states that none of the plants there were affected during totality, but Mr. Haddon at Beau Plan Estate, Pamplemousses, states that the " belle de nuit " flowers began to open.

*Effect on Magnetical and Meteorological Elements** :—During the last few years this subject has received considerable attention from magneticians and meteorologists in different parts of the world. The observations made at Mauritius during the recent eclipse furnish additional information, but our position in the shadow track was by no means favorable for a thorough investigation.

It must be remembered that the moon's shadow falls very obliquely on the earth near the beginning and end of its track, and that this obliquity is then changing very rapidly, so that observations made at a station where totality occurs at noon are not comparable with those made where totality occurs shortly after sunrise or before sunset.

At Mauritius the sun's altitude was $5\frac{1}{2}°$ at first contact, $18\frac{1}{4}°$ at mid totality, and $32\frac{1}{2}°$ at last contact.

With regard to the magnetic elements, on an otherwise smooth curve a negative wave ($-.000024$ m.m.s. units) is shown in the Horizontal Force register between $7^{h.}\ 12^{m.}$ a.m. and $8^{h.}\ 24^{m.}$ a.m. with minimum at $7^{h.}\ 53^{m.}$ a.m. If not caused by the Eclipse, this is at least a curious coincidence. It is true that even larger movements than this frequently occur on days of magnetic

* It is proposed to embody the results of the magnetical and meteorological observations made during the Eclipse in a separate paper.

calm ; but not in the form of an isolated and regular peak or crest on an otherwise smooth trace. Moreover, the fact that the movement in qu estion occurred during the Eclipse and that the maximum phase of both occurred at abo ut the same time, certainly points to a connection between the two.

In Vertical Force and Declination a very slight departure from average is shown, but not of a type which would justify the assumption that it was caused entirely by the eclipse.

The greatest fall of air temperature (2.°1) occurred about 10 minutes after mid-totality, and the temperature of evaporation fell 1.°1 ; the relative humidity, which was 4.3 % above normal at this time, increased to 5.6 % above normal at 8.15 a.m. ; the vapour tension and dew point temperature were slightly decreased by the Eclipse.

The oscillations of the barometer, after proper correction for diurnal variation and the gradual increase of pressure owing to the passage of an anticyclone, were very small, in fact but little larger than the probable error of observation or the departure from average which occurs on almost any day.

The following are the reports by Dr. Paddle and the Rev. G. Mc Irvine who both observed the eclipse at Beau Bassin :

Report by Dr. J. I. Paddle, M.D., Superintendent of the Lunatic Asylum, Beau Bassin.

Owing to the presence of heavy clouds the first contact was not observed. The eclipse was first visible at 7h. 12m. 30s. a.m.

The second contact occurred at 7h. 51m. 15s. a.m., and the termination of totality at 7h. 54m. 45s. The last contact was noted at 9h. 3m.

The degree of darkness during totality was observed by me to be, as nearly as I could remember, equivalent to that of twilight at 6h.10m. p.m, on the same day. The sketch of the corona was made by candle light.

I was unable to note the shadow bands on a white screen

as referred to by Mr. Maunder in his letters, but as I was seated before a window with the sash closed I had the opportunity, before and after totality, of observing the phenomena of bright crescents and shadow bands, which were formed on a table before me.

These crescents and wave bands were no doubt produced by slight defects in the pane of glass of the sash, but they are interesting in showing the bright crescents inverted before totality and corresponding with the inverted bright crescent of the sun at that moment, while the reverse was noted after totality.

The wave bands and crescents, as already stated, were not stationary, but moved diagonally across the paper as totality approached and reappeared immediately after. They were more pornounced immediately before and after totality and were observed for ten minutes in each case.

I observed the temperature of the air during the eclipse with a view of ascertaining what fall, if any, would occur at Beau Bassin during totality. The observations were made in the upper story of the building, the thermometer being placed against the closed sash of a window, the upper part of which was opened.

The results of the observations were as follows :

Time. A.M.	Observed Temperature (Centigrade.)	Normal rise.	Eclipse Effect.
h. m.	°	°	°
6.53	20.3	20.3	0.00
7.25	20.6	20.6	0.00
7.39	20.85	20.8	+0.05
7.56	20.5	20.95	−0.45
8.14	20.8	21.2	−0.40
8.20	21.4	21.4	0.00
8.30	21.5	21.75	+0.25
8.46	22.4	22.4	0.00
9.03	22.5	22.5	0.00

The fall was evident to the senses and several persons present remarked it. I regret that I did not take the temperature more frequently before totality in order to observe whether the fall was gradual or sudden.

With reference to the effects produced here on persons and animals, I was informed by the matron that two of our female servants were panic-stricken and had fits of hysterical crying during totality ; one of the female lunatics howled with fright during the whole of the 3½ minutes.

I was surprised to find that all the other inmates looked upon the event with composure. They had been warned, however, not to be disturbed by the occurrence, and many of them observed it with evident interest.

I am informed by a friend that all his fowls went to roost during totality, and that one of his cocks crew immediately after.

J. I. PADDLE.

Note :—The times given were taken from a watch corrected by the Time ball which was specially dropped at 6 a.m. on the Signal Mountain and well observed here.

The thermometer used was one corrected at the Kew Observatory.

J. I. P.

Report by the Revd. G. Mc Irvine, M.A.

"The Manse", Beau Bassin.

Until 6h. 45m. a.m., the sun was well in view. It then became obscured by cloud, and a shower of rain fell. The sun disappeared at 6h. 56m. a.m., with a distinct gap in its upper limb. From this time the view was no more intercepted.

	h.	m.	s.
The 2nd contact took place at	7.	51.	52
The 3rd „ „	7.	55.	22
The 4th „ „	9.	4.	30

My impression is that the time of last contact is given a few seconds too early.

At the 2nd contact moon-light darkness came on with startling rapidity. The corona was distinct all round the sun; projecting considerably above and below: a red tongue was observed in each of these two projections.

Shadow bands were distinctly seen by my wife, myself, and my three sons, both on a sheet nailed to the wall along its whole length, and more strikingly still on the level grass (100 ft. square) close to the terrace.

They were visible for about 1 minute before, and 1½ minute after totality, travelling in a direction S.E. to N.W., with a velocity of 7 or 8 miles per hour before, and somewhat faster after totality, no change in direction was noted after totality. The bands, which were about a foot apart and each 4 inches wide, came uniformly at the rate of about 14 in 10 seconds, and as far as I could judge were at right angles to the direction of motion. During totality no bands were visible. The direction of the wind was E.b.S. Venus and Mercury in the east, and Jupiter and Saturn in the west, were visible during totality. The effect on some fowls in the yard was very marked; some flew screeching over the roof of the kitchen, others hurried to roost in the fowl house and on the nearest trees, while several flew up and perched on the roof of the stables: after totality had passed the cocks crowed for some time.

G. Mc Irvine.

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List of Presidents since the foundation of the Society on 1851, August 1.

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Date of Election.	
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1854, April 3,	Lieut. Colonel Robe, C.B.
1854, October 20,	Lieut. Colonel Frome, R.E.
1855, August 30,	Capt. T. W. West, R.N.
1856, May 15,	C. C. Brownrigg, Esq.
1858, August 28,	Lieut. Colonel Sir Henry Johnson.
1862, December 29,	Robert Stein, Esq.
1878, April 18,	Charles Bruce, Esq., C.M.G.
1878, September 30,	Capt. J. T. Russell, R.N.
1886, November 18	Sir Virgile Naz, K.C.M.G.
1901, September 10,	Revd. G. Mc Irvine, M.A.