

MADRAS RECORD OFFICE.

Government of Madras.

Public

DEPARTMENT.

G.O. No. 857-52

Press
Mis.

Dated 27-8-1866

Not to be folded or roughly handled

Read again the following papers :—

From the Government Astronomer, dated 16th March 1866. } Recorded in the Proceedings
From the Officiating President Sanitary Commission, } of Government, dated
dated 10th April 1866, No. 900. } 14th April 1866, No. 377.

No. 153. Read also the following letter from the Officiating Secretary, Sanitary Commission, Madras, to the Chief Secretary to Government, Fort Saint George; dated Madras, 25th April 1866, No. 956.

I have the honor to request you will submit to the Right Honorable the Governor in Council, with such support as it may be in your power to afford, the accompanying Scheme by this Commission, for the introduction into this Presidency of a well organised system of Meteorological Returns.

Proposed Scheme by the Madras Sanitary Commission, for the introduction into the Madras Presidency of a system of Meteorological Observations, as a means of comparing the increment and decrement of disease with climate.

In the Annual Administration Report of this Commission for 1865, it was stated that they had in contemplation a proposal for the registration of Meteorological Observations at the chief Military stations in this Presidency, and the time has now arrived for laying such before Government.

It will be quite superfluous, on the part of this Commission, to enter into any details as to the great importance attaching to a subject of this nature, not only as one of general scientific interest, but one of peculiar value in its bearings upon the hygiene of the Troops in this country, in leading to a more correct determination of the exact causes of disease, and a better discrimination between those due to climatic and local sources.

It now requires no argument to prove the immense influence which climate directly exercises on the physiological condition of persons exposed to its power, as such is universally admitted; nor can it be doubted that other general and individual causes of disease are either greatly intensified, or altogether held in abeyance by its means.

Amongst the mass of evidence which was given before the Royal Sanitary Commission, although there were but few direct allegations against the climate as being a cause of disease, yet in all there were statements, more or less specific, as to the effect of particular seasons on the amount of sickness.

Every one who has resided for any length of time in any part of India can specify, with some degree of accuracy, the healthy and unhealthy season of a particular locality; while those who have paid any attention to statistics of mortality and sickness at any of our large stations or towns, can point with unerring certainty to the periods when diseases of a certain type will reach their maximum and minimum points.

A glance at the charts of mortality of the Cities of Madras and Bombay shows that the wave line, representing the mean number of deaths for a series of years past, presents a double maximum and minimum at certain periods during the year, with almost the same regularity as the barometer in the tropics shows its double maximum and minimum atmospheric tides; while other diseases, of which small pox is the best example, reach their maximum during a particular month, with a most marked precision, which can only be attributed to some law of which we are entirely ignorant at present.

The existence of these large waves, or tides, in sickness, recurring at stated intervals during the year, is an established fact; while its rationale, although even now to some extent involved in obscurity, is traceable to the differences of the seasons in which they occur.

Again, these larger waves, like those of the atmosphere and ocean, are affected by a multitude of disturbing causes, giving rise to smaller ones, whose sudden and apparently erratic upheavals and depressions are in nine cases out of ten still mere matters of conjecture. Every local cause has had its full share of credit given to it; but those causes which so clearly affect

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the larger waves of mortality and sickness have hitherto remained unexamined, except in a few instances from an entire absence of the means with which to do so.

Most medical men in practice, or in charge of large hospitals, can bear testimony to the fact how often it happens that, on visiting their patients on some particular morning, they meet with the almost universal reply to their enquiry, that all are feeling somewhat better, even although in many of the cases, for some time previous, there had been an apparent stagnation of their onward progress towards recovery. This is a matter of constant occurrence; yet we remain perfectly satisfied with the tacit explanation that "it must be something in the air," and, in the words of the Bengal Cholera Commission, when speaking of the relations which exist between the meteorological conditions of the air and cholera, "we cannot doubt that it is within the power of science to solve many problems regarding such matters which nothing but our deliberate neglect and ignorance have suffered to remain in mystery."

It is to endeavour to trace more clearly what "this something in the air" is, that we require trustworthy registers of meteorological phenomena to be kept at all our large Military stations, for the purpose of minutely contrasting the increment and decrement of disease amongst the Troops, with the daily atmospheric changes which take place; for it can only be in this way that we can discover what diseases can be traced to climate, and also those upon which it has no direct influence whatever.

In a country like India, where the peculiarities of its climatic conditions, such as temperature, humidity, &c., are so clearly defined, it may reasonably be expected that great facilities exist for the study of this very interesting branch of inquiry, which has, up to the present time, been almost entirely neglected; for, to our shame as a nation, it must be stated that were we to leave India to-morrow, we should do so with scarcely a single official scientific record of its climate, excepting those of the Presidency towns. We speak more particularly of this Presidency; and the following extract taken from the Report of the Bengal Cholera Commission shows that the same may be said with equal confidence of the larger Presidency:—

"Between Calcutta and Peshawar, a distance of some 1500 miles through a vast tract of British Territory, there is not at this moment one place where a systematic record even of barometric pressure and of temperature is kept; 'although,' writes Colonel Strachey, 'a large portion of the area under consideration has been more or less accessible to the British for half a century, hardly any satisfactory accounts of the climate of a single place within it exists; still less have we any connected series of simultaneous observations at many distant places, truly comparable with one another, from which alone a thorough insight into the general laws of climate of the whole region could be obtained.' It is a remarkable comment upon a state of things so little creditable that the Russian Government has given us, as Colonel Strachey remarks, for Novo-Petrovsk and Rainsk, two places in Central Asia of which most people have hardly heard the names, 'meteorological records such as are hardly to be found for a single spot in the Northern half of Hindoostan, hardly, excepting Calcutta itself.'"

Steps are, however, being taken (vide G. O., dated 30th December 1865, No. 5491) to rectify these shortcomings.

Of our own Presidency may be repeated what has already been stated in our Annual Report for 1865, viz., that of all our Military and Civil stations, there is not one where for five continuous years anything like an accurate record of the peculiar climatic features of the locality can be procured; and out of all the stations of the Madras Army there is only one which, to our knowledge, has a person appointed for the special duty of recording these observations; and even at this station, with its increased advantages over the rest, the observations which have been made up till within the last three years are to a great extent worthless.

At most stations, even supposing them to be all provided with instruments (which is far from being the case), these (instruments) are so badly situated, as a general rule, as to give no results of any scientific value.

As a practical example of the way in which meteorological observations are kept up in this Presidency, we may take those recorded at Secunderabad from 1851 to 1863 as a type; and in doing this, it may be confidently stated that these are by far the best specimens of any that are

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to be met with at other up-country stations, not only as regards the length of time over which they extend, from there having been a paid writer for taking them, but also the apparent regularity with which the register has been kept.

The register has been kept at the Artillery Hospital at this station, the observations being taken by a native writer paid at the rate of fifteen Rupees a month for the purpose. Five observations are supposed to have been taken daily since 1851, viz., at sunrise, 10 A.M., 2 P.M., 4 P.M., and 10 P.M., and judging from the regular columns of figures recorded in the Journals from year to year, and duly signed by the Medical Officers in charge, they might at first sight be looked upon as a valuable contribution to meteorological science.

But a glance into one or two months' records gives a very fair insight into the whole. Take any day in any year, and the temperature, as recorded by a self-registering minimum thermometer, will be found invariably higher than the temperature as recorded at sunrise on the same day, and the self-registering maximum thermometer often gives a temperature lower than that shewn by observations taken at 2 P.M. and 4 P.M.

The observations taken day after day show a suspicious resemblance, and some in fact rarely differ. But this is not all, supposing the writer to have taken his observations with the greatest regularity, a thing highly improbable, and that the instruments could be depended upon for giving accurate results, which a late comparison with corrected standards proved one or two not to be, the observations would still be worthless to a great extent (as the results show) from the want of attention paid to the position of the instruments, the indications of which were vitiated by reflected and radiated heat.

The thermometers were suspended from the side of a table placed in the hospital verandah, the bulbs being about 2½ feet from a chunamed floor; not only were persons constantly passing them, but patients were often congregated so near them as to even endanger the instruments themselves, to say nothing of their indications; and on one occasion the Surgeon in charge of the Artillery, who had lately joined the corps, discovered the writer taking his observations with the direct rays of the sun shining on a thermometer which was supposed to be suspended in the shade.

It is gratifying, however, to state that since 1863 a series of observations have been taken at this station, and are still being carried on, which may be depended upon for some degree of scientific accuracy, and enable us to contrast the result of one year's work with the Report made upon the climate of this station by Mr. Glaisher, whose figures were of course obtained from the Register just alluded to.

Without going into details, which may be found elsewhere, it may be stated that some of the most important features of the climate of the Deccan have been entirely misrepresented, as may be better understood when it is stated that the average daily range of temperature is laid down at 12° F. for ten years, when for 1864 it was found to be 22° 2' F.

Having thus shewn what the present state of this science is in this Presidency (which, as far back as July 1862, attracted the notice of the late Governor Sir W. Denison, vide Appendix A) and the very urgent necessity which exists for placing it upon a footing by which some practical results may be obtained as bearing upon questions which it is our peculiar province to investigate, we may now proceed to propose certain measures, for the sanction of Government, which we are of opinion will fulfil the object we have in view.

1st.—It will be necessary to appoint a person upon whom the whole of the authority of supervising the plan of the undertaking should rest, and who would be entirely responsible for the way in which the various details of the work are carried out. This Commission observe that, with reference to certain suggestions of a similar nature to the above, made by the Bengal Sanitary Commission, the following Extract from the Proceedings of the Right Honorable the Governor General in Council in the Home Department, No. 5491, under date the 30th December 1865, is recorded:—

"The Sanitary Commission remarks that it is quite possible by turning to useful account, at a small expense, the sources of information which already exist, to obtain results of great value; that the chief object now is to make a commencement towards the establishment of a

"system to be developed hereafter. Experience can only show how existing meteorological observations can be best improved and utilized. In order to obtain this experience, the Sanitary Commission recommends that, as a commencement, Dr. Thomson, Professor of Natural Science at Roorkee College, be appointed Meteorological Reporter for the North Western Provinces, and that he be directed to carry out experimentally the Scheme proposed by Colonel Sirachey, according to paragraph 15 of the letter of the Sanitary Commission. Dr. Thomson might be allowed Rupees 250 a month, with the understanding that the allowance is to cover expenses of every kind, including office establishment, which would not be large. Some extra, but trifling, expense might be necessary for providing new instruments, and it might be desirable to provide the Meteorological Reporter with standard instruments to enable him to compare and verify those that are in use by the several observers. The Sanitary Commission believes that the experience of one or two years would show the real value of this scheme; and, should it succeed, similar arrangements might be extended to other Provinces. Should the Government think it desirable to try the experimental scheme in another Province simultaneously with the North Western Provinces, the Commission thinks that the Punjab should be chosen, and that one of the Professors of the Lahore Medical College be appointed Meteorological Reporter for that Province. A more satisfactory result, it is observed, would be arrived at if the Scheme were tried in two Provinces simultaneously."

"2. The Governor General in Council, being pleased to decide that the recommendations of the Sanitary Commission shall be carried out, approves of the proposed appointment of Dr. Thomson as Meteorological Reporter for the North Western Provinces, on an addition to his salary of Rupees 250 per month, with effect from the date on which he may enter on his duties; and, looking to the moderate expense of the proposed arrangement, the Governor General in Council considers that a similar plan should be simultaneously adopted in the Punjab."

With reference to the above, this Commission would strongly recommend that a similar trial should be made in this Presidency, and that Mr. Pogson, the Government Astronomer, should be asked to accept the charge of this Department as Meteorological Superintendent upon a similar addition to his present allowances.

2nd.—It would perhaps appear preferable to leave every detail in carrying out the arrangements required to the Government Astronomer; but as the special object which this Commission have in view in these proposals is to solicit that these meteorological observations be carried out so as to be distinctly comparable with the sanitary condition of the Troops serving in this Presidency, we consider it advisable to enter fully into the subject.

3rd.—We propose that Meteorological Observatories be placed at the following stations in this Presidency, these being selected as being the Head Quarter Cantonments of the different divisions, in most of which a large number of European Troops are quartered. Their geographical position is also very good for taking observations on the climate of Southern India, although it is probable that some might be rejected, and others added, for the purpose of a strictly meteorological inquiry.

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| 1. Kamptee. | 4. Bellary. | 7. Trichinopoly. |
| 2. Secunderabad. | 5. Bangalore. | 8. Wellington. |
| 3. Vizagapatam. | 6. Cannanore. | 9. Rangoon. |

4th.—At each station, the most eligible Officer for the charge of the observations would be the Garrison Surgeon, or Medical Officer in charge of the Garrison Hospital; but we strongly recommend that a Native writer be appointed to each station whose sole duties should be to take the observations, reduce them, and prepare the necessary Returns under the Orders of the Garrison Surgeon. We consider that it is a point of paramount importance to the efficient working of the plan, that this class of men should be provided; otherwise it is impossible to expect that the work will be carried out for any length of time with any degree of regularity if the reading of the instruments, and the reduction of the observations be entrusted to a Dresser or Apothecary, whose numerous other duties would constantly interfere with the proper carrying on of the meteorological work.

It may fairly and truly be stated, without any reflection upon the zeal of Medical Officers, that extra work of this description is often not altogether so much appreciated either by them or their subordinates as the interesting nature of the result would lead us to imagine; and if we are to expect that returns will be furnished worthy of confidence, it is positively necessary that a person should be appointed who is solely responsible for these particular duties to the Officer under whom he is placed.

We suggest that the pay of these writers should be 20 Rupees per mensem, and that they undergo a short training in the Madras Observatory, so as to be at once qualified for their duties.

For the last three years the system has succeeded at Secunderabad, and the Native writer employed there now works remarkably well and is perfectly qualified for reading and reducing all the necessary observations. All now required is that his work should be daily examined by the Medical Officer who undertakes these duties; otherwise it is to be feared the record would but too soon relapse into its former worthless condition of made-up figures.

5th.—We suggest that the following instruments be supplied to each station:—

- 1 Standard Mountain Barometer.
- 1 Aneroid Barometer.
- 1 Wet and dry Bulb Thermometer.
- 2 Maximum Self-registering Thermometers.*
- 2 Minimum do. do.*
- 1 Solar Thermometer in glasscase.
- 1 Terrestrial Thermometer.
- 1 Rain Gauge.
- 1 Wind Bane.
- 1 Anemometer.

6th.—Also that the following books be supplied:—

- Drew's Meteorology.
- Glaisher's Hygrometric Tables.
- Do. Barometric Corrections.
- Colonel James' instructions for taking Meteorological Observations.

7th.—Hitherto the instruments have generally been suspended in a hospital verandah without much regard to frontage, and we strongly advise that for the more efficient registration of Meteorological phenomena that a small outlay be sanctioned for the erection of Thermometer stands. We would suggest that a very good description of stand could be obtained by making a few simple alterations and additions to the numerous old condemned wooden sentry boxes which are always to be obtained at our Military stations, and that these be placed beneath a chupah shed, or other good non-conducting material, well removed from buildings, whose proximity would vitiate the indications of the instruments by reflected and radiated heat.

8th.—We suggest that this stand shall be erected at the Garrison Hospital of the station, if practicable, and in such a position as to be under the eye of the sentry, one of whose special instructions should be the charge of the instruments, and the guard should also be specially directed to report to the Medical Officer every morning that the writer did take the observations at the particular hours laid down for his so doing. In this way a constant check can be kept upon the writer doing his duty, without which there would be no guarantee that the figures in the journal were not falsified.

9th.—We would recommend that the instructions laid down in the work of Colonel James, R. E., on the directions for taking Meteorological observations be adopted as containing every thing which would render them fully applicable to sanitary purposes, and we would especially insist upon the desirability of the instruments being read four times daily at equidistant periods, viz., 4 A. M., 10 A. M., 4 P. M., and 10 P. M.

* One for keeping a Self-registering Maximum and Minimum wet Bulb.

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10th.—We suggest that monthly returns be regularly furnished to the Superintendent at Madras, and that weekly* ones should be sent

* Vide Appendix B.

to the Deputy Inspector General of Hospitals, embracing the same periods over which the weekly sick return in use by the British Army extends, viz., from Saturday to Friday. These observations being entered in the weekly stational return of sick, would at once afford the means of comparing the increment and decrement of disease with climate.

With a view to making this Report as complete as possible, we would beg to direct attention to a plan of contrasting meteorological phenomena with disease by means of diagrams which have been adopted at Secunderabad by Assistant Surgeon W. Arnold Smith, M. D., and which met with the approval of the Principal Inspector General, Medical Department, (vide correspondence, Appendix C). The diagrams to which these remarks refer in the letter here alluded to are in the office of the Head of the Medical Department; but they are of nearly the same form as those attached to this Report, and are sufficient to illustrate the method adopted.

Should a system of meteorological registration be carried out in this Presidency, it would be most desirable that the wave lines of climate and disease should be projected on charts, as it may safely be asserted that this is the only plan by which any practical use can be made of the recorded climatic phenomena when attempting to compare them with the progress of disease. Numerous facts of the greatest importance are certain to escape notice without some means of this description, but which at once burst upon the mind so soon as they are projected.

In the Report by the Royal Commission appointed to inquire into the Regulations affecting the sanitary condition of the Army, the greatest importance is attached to the use of diagrams, and in reporting upon the mortality of the British Army at Home and abroad, constant use is made of these means for the more clear delineation of facts; indeed, they commence their Report by the assertion that "Diagrams are of great utility for illustrating certain questions of vital statistics by conveying ideas on the subject through the eye which cannot be so readily grasped when retained in figures," and use these aids for giving greater clearness to the numerical results appertaining to every question which is brought forward in their Report.

Attached is an approximate estimate of the necessary outlay to be incurred.

	Per mensem.	Per annum.
	RS.	RS.
One Superintendent, at.....	200	2,400
Office Allowance.....	50	600
Nine Meteorological Writers for taking observations, at 20 Rupees each.....	180	2,160
Sundries for nine stations, such as oil, lamp-thread, &c., &c., at Rupees 3½rd.	30	360
Total.....	460	5,520

IMMEDIATE OUTLAY.

Nine Sets of Meteorological Instruments, Books, &c.....	2,520
Building nine Thermometer Stands, at 100 Rupees each.....	900
Nine Lamps for taking night observations, at Rupees 5 each.....	45

Total outlay..... 3,465

Since the above was written, this Commission (in compliance with a request made by the

Public Department, No. 377, dated 14th April 1866.

Officiating President have been furnished with Government Proceedings as per margin, containing propositions from the Government As-

tronomer for the registration of meteorological observations in this Presidency.

The Government Astronomer considers this subject under three heads—

1st. The supply of the requisite instruments.

2nd. The probability of finding volunteer observers at the places selected.

3rd. The mode of dealing with the results obtained.

This Commission, after a careful and attentive perusal of the suggestions made under these heads, remark as follows:—

Concerning the 1st and 3rd propositions, we have no remark to make, as the suggestions made by Mr. Pogson, with the exception of a few trifling details, entirely coincide with much that has been recommended by this Commission, and we are of one accord with the Government Astronomer in all that he has stated under these two heads. The sets of instruments required, of course, entirely depend upon the number of stations selected, concerning which our opinion has been given above.

In the 3rd proposition, viz., as to the stations to be selected, and the probability of securing trustworthy observers thereat, Mr. Pogson writes as follows:—

"As to the stations to be selected, and the probability of securing trustworthy Observers thereat, a Circular issued by the Principal Inspector General of the Medical Department, early in 1843, inviting the co-operation of Medical Officers for the object in view, was promptly met by offers from no less than fifteen volunteers willing forthwith to take charge of instruments, to register their readings, and to transmit the same to the Government Astronomer for examination and publication. It was to be regretted that most of these gentlemen appeared to have misinterpreted the Circular issued by Dr. Cole into an offer of the charge of the instruments, upon the understanding that a fair and efficient Register should be maintained; whereas, the information sought was merely to know how many, if any, of the Medical Officers in the various parts of the Presidency would be willing and able to lend their aid, in the event of the supply of requisite instruments being sanctioned by Government. Most of the volunteers in question promised their own individual charge of the desired records; but in one or two cases the aim seemed to be rather to secure some additional pay to a Writer or Apothecary to whom the care of the Register was to be entrusted. It need scarcely be remarked that such offers merited only decided and immediate rejection. It is, however, certain that there will be no difficulty, at any time, in securing the valuable co-operation of more than twice as many disinterested and able observers as it is now proposed to provide instruments for. It is also desirable that a clear understanding should exist, that incomplete or interrupted records being comparatively worthless, a preference will be given in the supply of sets of meteorological instruments to these gentlemen who can hold out the best hopes of a continuous series of not less than five years' observations being obtainable at their stations. To secure this most important end, it will, of course, be necessary for the Officer in charge to train some intelligent subordinate to read off the various instruments in use during his absence, or when otherwise engaged; but the entire care of the Register, and more especially the reduction of the observations should never be made over to any inferior or unskillful hand upon any pretence whatever."

After careful consideration of the above, with what has been already recommended by this Commission, we are compelled to state we are of opinion that the above means would entirely fail in the object proposed, viz., to secure a trustworthy series of meteorological observations for a continuous period of five years from any of the principal Military stations, and we see no reason whatever to change the views which we have already expressed upon this, the most important part of the subject.

Even supposing that volunteers could be found to come forward for the purpose of taking charge of the observations at each of the stations where it has been proposed to establish Observatories, the nature of the service to which Medical men belong entirely precludes the idea of their being able to undertake a five years' or even five months' series of observations. We therefore think that it is a point of paramount importance that the charge of the observations should be officially recognised as a part of the duties of the Surgeon in charge of the Garrison Hospital, where the Stand would be permanently erected, and every instrument and document belonging to the Meteorological Department kept.

Volunteers would doubtless be the more zealous workers to obtain, but supposing their services to be accepted, it would probably entail the removal of the observatory, the instruments, document, &c., from one part of the station to another every time the Medical Officers so volunteering were removed either by the marching of their Corps, or the exigencies of the service, the consequences being most detrimental to the meteorological records, and to the instruments themselves, which would most probably be either lost or damaged.

We have already stated our views with regard to the employment of Medical Subordinates for the duty of registering the observations, which are not based upon theory but on long practical acquaintance with the working of the subject, and we are still of opinion that to secure an efficient system, paid writers must be employed for this duty and the daily reduction of the observations.

This Report having been submitted to Inspector General Shaw in charge of the Principal Inspector General's Office, that Officer fully concurs in the proposed scheme, and accords his assent to Garrison Surgeons supervising the Native writers as proposed.

Mr. Shaw observes that in Bombay, he believes, European Soldiers are trained at the Observatory to conduct these duties, and suggests that, supposing the plan to have been successful there, that it might be advisable to adopt similar measures in this Presidency. This Commission will make inquiries upon this point; at the same time we remark that, from information received while passing through Bombay, we are doubtful whether such measures are carried out at the present time in that Presidency, and are inclined to the opinion that Native writers will be the most suitable for the work.

Mr. Shaw further observes that, if Native writers are trained for the above service, it might be advisable to lay down a graduated scale of pay increasing after five years, so as to induce good men to retain their positions, in which suggestion this Commission fully concurs.

This Commission having carefully gone over the foregoing Report with the Government Astronomer, beg to append the views of that gentleman on the various propositions made. We consider it unnecessary to make any comment upon these remarks as they chiefly relate to matters of detail, which can be satisfactorily arranged hereafter should Government accord their sanction to the scheme.

The Government Astronomer agrees to the spirit and general plan, and appends the following remarks to the various proposals:—

Proposal 2nd.—Thinks that the details of the plan should be arranged, at starting, by the Government Astronomer and Secretary to the Sanitary Commission, and printed forms and tables of reduction duly prepared before the Instruments are issued for use.

Proposal 3rd.—That the nine stations named will do, but one nearer the North-east Coast is desirable—say Ganjam or Cuttack.

Proposal 4th.—Agrees with this entirely.

Proposal 5th.—The list of Instruments being nearly identical with that suggested by the Government Astronomer, thinks it might be better to adopt his specification, adding thereto—

One Aneroid Barometer, reading to 0.02 inch of pressure.

One Terrestrial Thermometer.

Glaisher's Barometrical Tables.

Fitzroy's Weather Guide.

Glaisher's Hygrometrical Tables are objected to.

Proposal 7th.—Thinks the Radcliffe Observatory form of stand is probably the best of all, with slight modifications, but it would be rather expensive.

Proposal 9th.—Entirely objects to this proposal. The Government Astronomer considers that the printed instructions issued by him (in consultation with the Secretary to the Sanitary Commission), should be the sole guide.

Proposal 10th.—Thinks half monthly Returns will be far better than monthly ones. Twelve points per year are insufficient to define the maxima and minima of annual curves; but a smaller sub-division would be too troublesome and extended, besides being inconvenient for publication.

The Government Astronomer proceeds further to remark as follows:—

“All corrections should be based upon the tables deduced from the Madras Observatory, ‘20 years’ series, and not upon any derived from observations made elsewhere than in the ‘Tropics. European tables cannot be applicable to Indian meteorology, but factors into LOCAL ranges may be safely relied upon for Barometers, Thermometers, and Humidity. Wind is a ‘much neglected and most important subject.’”

“By far the heaviest labor involved, so far as the Government Astronomer is concerned, ‘would be the comparisons of all the Instruments, and the preparation of the special tables ‘required for each place, before the actual registrations commenced.’”

“The Instruments should be supplied to the Government Astronomer at least two clear months before their being required for use up-country; and the aid of the Mathematical Instrument-maker, Public Works Department, (Mr. F. Dodoret) will be required in regard to their safe packing and despatch. A muster Thermometer stand might be prepared, and when approved, the requisite number constructed here, in pieces, so as to be quickly screwed together, ready for immediate use when issued with the Instruments.”

“Sudden and remarkable depressions of the Barometer, or unmistakable indications of approaching storms, should be instantly telegraphed to Head Quarters whenever they occur especially from stations near the Eastern Coast. In such cases half hourly records of pressure, direction, and velocity of wind, and if possible of rainfall, should be made and forwarded to Madras by next post.”

This Commission in giving a general concurrence to the above observations by the Government Astronomer, conclude this Report by recommending the scheme herein set forth to the favorable consideration of Government.

OFFICE OF SANITARY COMMISSION,
25th April 1866.

(Signed) D. MACPHERSON,
Offg. President Sanitary Commission.

APPENDIX A.

PUBLIC DEPARTMENT.

Proceedings of the Madras Government.

Read the following:—

MINUTE by the Honorable the PRESIDENT, dated—July 1862.

In many Districts of the Presidency, I believe, some kinds of meteorological observations are made and recorded, but so far as I can ascertain, no attempt has as yet been made to arrange these, to compare the results of one year with those of another, or in fact to deduce from them results which might have any practical tendency, or which might lead to a knowledge of the laws which regulate the succession of phenomena, if indeed there be such Laws.

2. I think it would be of great use, both to the community and the Government, if the records of the observations already made were placed in the hands of the Astronomer, with a request that he would examine and report upon them in their existing form, and would make such suggestions as to the mode of keeping such records from henceforward as would simplify the comparisons to be made by establishing uniformity in the observations. I hear constantly remarks as to the deterioration of the climate, the want of rain, the consequent falling off in the crops, &c., and these complaints are often accompanied by suggestions as to the cause of this change—for my own part, I doubt the fact of any change, but whether I am right, or those who complain of the change, it would be very desirable that we should, by some reliable series of observations, establish or contradict the statement.

3. The Astronomer should be asked to state what additions to, or changes in, his establishment would be required to enable him to carry out fully the reduction and comparison of the

(Signed) W. T. DENISON.

(True Extract).

(True Copy),

APPENDIX B.

[illegible]

APPENDIX C.

I have the honor to forward, for your inspection, three diagrams illustrative of the meteorological condition of this station for the first quarter of the present year, together with the relative amount of sickness amongst the troops stationed here and at Trimulberry for the same period.

11. Their filling in at the end of each week would be the work of a few minutes and could be done by any ordinary person to which this duty was entrusted. These records, contrasted with

the prevailing meteorological phenomena, would furnish a readily recognisable series of facts which might be of the greatest value in their bearings upon the subject of hygiene and disease.

From the Secretary to the Principal Inspector General, Medical Department, Fort Saint George, to the Deputy Inspector General of Hospitals, Hyderabad, Subsidiary Force.

Referring to letter of date 9th ultimo, I am desired by the Officiating Principal Inspector General to request that Assistant Surgeon Smith will be so good as to forward blank forms of Meteorological and Sickness Charts of the size required for printing.

2. The Officiating Principal Inspector General is of opinion that these diagrams, if conducted carefully for a lengthened period, in connection with careful registration of meteorological phenomena, must lead to useful results.

3. You will be pleased to convey to Assistant Surgeon W. A. Smith the thanks of the Officiating Principal Inspector General, for his interesting and valuable communication.

MEMORANDUM.

Forwarded for information of Dr. W. A. Smith, R. H. A.—Requested to be returned.

(Signed) J. T. MAULE, M. D.,

Dy. Inspector General.

(True Copy).

(Signed) W. A. SMITH,

Officiating Secretary Sanitary Commission.

No. 154.

ORDER THEREON, 27th August 1866, No. 851.

The last of the papers above recorded relates to a proposition of the Sanitary Commission for making and registering Meteorological Observations at the chief Military stations of this Presidency.

2. The importance of such observations for sanitary purposes cannot be questioned. The difficulty is to get them accurately made and recorded; for, unless accurate and reliable, they are worse than useless.

3. In the North-West, the Government of India have appointed Dr. Thompson (Professor of Natural Science at Roorkee) to be Meteorological Reporter for those Provinces, on Rupees 250 per mensem, and have suggested a similar appointment for the Punjab. What arrangements are in force for correctly securing the observations which Dr. Thompson is to report are not apparent. The Sanitary Commission propose that in this Presidency the Astronomer should be appointed Meteorological Superintendent, on the same allowances as in the North-West. For subordinate agency, the Commission propose that the Garrison Surgeon, or Medical Officer in charge of the Garrison Hospital, at each of the nine stations named by them, should have "charge of the observations", with a Native writer, "whose sole duties should be to take the observations, reduce them, and prepare the necessary returns", under his orders. The Commission attach the greatest importance to the appointment of these writers, remarking that "it is impossible to expect that the work will be carried out for any length of time with any degree of regularity, if the reading of the instruments and the reduction of the observations be entrusted to a Dresser or Apothecary, whose other duties would constantly interfere with the proper carrying on of the Meteorological work."

4. There can be no doubt that the Commission are right in so earnestly pressing the necessity of special aid for taking the observations. The Garrison Surgeon cannot reasonably be expected to do more than superintend. The observations

must be made at set times when, frequently, he and his Medical Subordinates would be otherwise employed. It is obvious that the best plan will be, as the Commission suggest, to employ persons trained by Mr. Pogson at the Government Observatory. Their duty should be simply to observe and record; their registers, countersigned by the Garrison Surgeon or other person in local charge, should be sent in weekly to Mr. Pogson, in whose office all reductions should be made; for the less the observers have to do with reductions and other calculations, the less the chance of error. Weekly returns are very desirable, as enabling inquiry to be promptly made when any doubt arises.

5. The Commission propose that these writers should receive Rupees 20 per mensem, but the Government are confident that no competent men could be got for that sum in these days;—and it must be remembered that on these observers every thing depends; that they cannot be under constant supervision; and that parsimony in this direction may involve the waste of the time and money expended in the whole business, and lead to erroneous and mischievous deductions.

6. The Government consider that Rupees 40 per mensem will not be too much to secure really reliable agency. It will not answer either to have unreliable men, or men who, feeling themselves underpaid, work perfunctorily, and are ever on the look-out for other and more remunerative employment.

7. As to the stations where observations are to be taken, the Commission recommend the nine Chief Military Stations entered in the margin, "in most of which a large number of European Troops are quartered." "Their Geographical position," the Committee

Kamptee.
Secunderabad.
Vizagapatam.
Bellary.
Bangalore.

Cannanore.
Trichinopoly.
Wellington.
Rangoon.

add, "is also very good for taking observations on the climate of Southern India, although it is probable that some might be rejected, and others added, for the purpose of a strictly meteorological inquiry." The latter, however, within the limits of practical utility—mere scientific curiosity being eschewed—is the object in view. Valuable as the lives and health of the European soldiery are, the millions of our Native subjects must not be forgotten, thousands of whom annually perish by epidemics, the dependence of which on atmospheric and climatic influences it is the object of these inquiries to elucidate.

8. The stations selected by the Commission cover an enormous extent of territory, so great, in fact, that the observations will be of little more than purely local value. The Commission propose no station South of Trichinopoly; the whole area occupied by the Madura and Tinnevely Districts is not represented. For the whole Eastern sea-board, observations are to be taken only at Vizagapatam and Madras. Then, again, those stations, Salem for instance, where cholera and fever notoriously prevail, are left out.

9. The Government think that Kamptee and Rangoon should be struck out of the Madras list. Though garrisoned by Madras Troops, those stations are very distant, and are under the Supreme Government, who will doubtless make such arrangements for similar observations in these and the adjoining territories as may be deemed expedient.

27th August 1866.

10. The Government consider that the scheme, to be complete, should embrace eight other stations, 15 in all.

Tinnevely. Coimbatore.
Negapatam, or Tranquebar. Kurnool.
Madura. Masulipatam.
Salem. Cochin.

Meteorological Superintendent...	250
15 Observers, at 40 Rupees each...	600
Carriage hire for 15 Officers in local charge...	450
Total...	1,300
	12
	15,600
Stationery &c...	400
	16,000

They would propose, therefore, that the stations named in the margin be added to the seven mentioned by the Commission.

11. Taking 15 Stations, and sanctioning a small allowance as carriage hire (Rupees 30 per mensem) to the Officer in local charge, the cost per annum, with an allowance of Rupees 400 for Stationery, &c., will be Rupees 16,000, certainly

a moderate sum, when the health of some thirty millions of people is interested.

12. With these observations, the Governor in Council resolves to submit the papers to the Government of India, with a recommendation that the scheme be sanctioned at the outlay proposed. On this sanction being received, Mr. Pogson's application of the 16th March last for a supply of Meteorological Instruments will be considered, and such further detailed instructions as are necessary will be issued.

(Signed) J. D. SIM,

Secretary to Government.

No. 155. To the Secretary to the Government of India, Home Department, dated Fort Saint George, 27th August 1866, No. 852.

I am directed by the Governor in Council to forward to you the accompanying papers, having reference to a scheme proposed by the Sanitary Commission, Madras, for the introduction into this Presidency of a system of Meteorological Observations, together with a copy of the Proceedings of this Government in review of the subject.

2. Of the importance of such observations for sanitary purposes, there can be no question, and this would seem to be admitted by the Government of India, under whose recent sanction similar observations are to be carried on in the North-West Provinces and in the Punjab.

3. It will be seen that the Commission propose that the observations should be made and registered at the nine chief Military stations named in the margin. Two of these, however, Kamptee and Rangoon, are very distant, and are under

Kamptee. Cannanore.
Secunderabad. Trichinopoly.
Vizagapatam. Wellington.
Bellary. Rangoon.
Bangalore.

the Supreme Government, and the Governor in Council thinks that they should be struck out of the Madras list, it being left to the Government of India to make such arrangements in these and the adjoining territories as they may deem expedient. At the same time, he considers that the scheme, to be complete, should embrace eight other stations, fifteen in all.

Tinnevely. Coimbatore.
Negapatam or Tranquebar. Kurnool.
Madura. Masulipatam.
Salem. Cochin.

27th August 1866.

4. The arrangements proposed will involve an outlay of Rupees (16,000) sixteen thousand per annum, a sum certainly moderate when the health of some thirty millions of people is interested.

5. The Government are satisfied that this important work cannot be efficiently carried out for less than the proposed outlay, and they would earnestly advocate a comprehensive and liberal measure as alone likely to afford satisfactory results.

6. The examination, &c., of the local returns will throw much additional duty on the Government Astronomer, Mr. Pogson, and the Government, therefore, propose to give him the same remuneration as is allowed to Dr. Thompson for the same duties at Roorkee. Mr. Pogson's fitness for the work is beyond question.

7. I am instructed, with these remarks, to recommend the scheme to the favorable consideration of the Government of India.

(Signed) J. D. SIM,

Secretary to Government.

Exd. J. H. Burns.

[illegible]

The Committee on the subject of the
 "National Academy of Sciences" should
 be authorized to take the necessary
 steps to secure the establishment of
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 of Sciences" and to be organized
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With Diagrams attached to the
 Sanitary Commission report.

Public Department.

PROCEEDINGS of the MADRAS GOVERNMENT.

Read again the following
 letters: -

From the Govt Astronomer, dt 15th March 1866. } Recorded in the
 Offg President Sanitary Commission } Pres of Govt., 16th
 dt 10th April 1866 N: 900. } April 1866 N: 377.

Read also the following
 letter:

From Off. Secretary - do. Recd letter 25 April 1866 N: 956.

(Order thereon 27 August 1866 N: 851.

The last of the
 papers above recorded
 relates to a proposition
 of the Sanitary Commis-
 sion for making and
 registering meteorological
 observations at the chief
 military Stations of the
 Presidency.

W. D.

2 The importance of such observations for sanitary purposes cannot be questioned. The difficulty is ~~now~~ to get them accurately made and recorded; for, unless accurate and reliable, they are worse than useless.

3 In the North West the Govt. of India have appointed Dr. Thompson (Professor of Natural Science at Pooree) to be Meteorological Reporter for ~~the~~ Provinces on Rs 250 per mensem, and have suggested a similar appointment for the Punjab. What arrangements are in force for correctly securing the observations which

E/P 2

which Dr. Thompson is to report are not apparent. ~~then~~ The Sanitary Commission propose that ^{in the Presidency} the Astronomer should be appointed Meteorological Superintendent on ^{as in the N. West} the same allowances. For subordinate Agency the Commission propose that the Garrison Surgeon or Medical Officer in charge of the Garrison Hospital, at each of the 9 stations named by them, should have "charge of the observations" with a native writer whose sole duties should be to take the observations, reduce them and prepare the necessary returns under his orders. The Commission

Commission attach the greatest importance to the appointment of ~~the~~ writers, remarking that "it is impossible to expect that the work will be carried out for any length of time with any degree of regularity, if the reading of the instruments and the reduction of the observations be entrusted to a Druggist or Apothecary whose other duties would constantly interfere with the proper carrying on of the meteorological work".

There can be no doubt that the Commission are right in so earnestly pressing the necessity of special aid for

for taking the observations. The Garrison Surgeon cannot reasonably be expected to do more than superintend. The observations must be made at set times when, frequently, he and his medical subordinates would be otherwise employed. It is obvious that the best plan will be, as the Commission suggest, to employ persons trained by Mr Pagson at the Government Observatory. Their duty should be simply to observe and record - their registers, countersigned by the Garrison Surgeon or other person in local charge, - should be sent in weekly to Mr Pagson in whose office all

all reductions should be made; for the less the observers have to do with reductions and other calculations, the less the chance of error. Weekly returns are very desirable, as enabling inquiry to be promptly made when any doubt arises.

5. The Commission propose that these writers should receive 20 Rs per mensem. but the Government are confident that no competent men could be got for that sum in these days; and it must be remembered that on these observers every thing depends that they cannot be under constant supervision. & that parsimony in this direction

direction may involve the waste of the time and money expended in the whole business and lead to erroneous and mischievous deductions.

6. The Government consider that 40 Rs per mensem will ~~be too much~~ ~~well laid out~~ and not be too much to secure really reliable agency. It will ^{answer} not ~~do~~ either to have unreliable men, or men, who, feeling themselves underpaid, work perfunctorily and are ever on the look out for other and more remunerative employment.

7. As to the Stations where observations are to be taken, the Commission

Recommend

recommend the 9 chief military Stations entered at the margin, "in most of which a large number of European Troops are quartered". "Their geographical position" the Committee add "is also very good for taking observations on the Climate of S. India, although it is probable that some might be rejected, and others added, for the purpose of a strictly meteorological enquiry". The latter however, within the limits of practical utility - mere scientific curiosity being excluded - is the object in view. Valuable as the lives and health of the European soldiery are

- Ramptee.
- Secunderabad.
- Vizagapatam.
- Bellary.
- Bangalore.
- Cannanore.
- Trichinopoly.
- Wellington.
- Rangoon.

are, the victims of our native fevers, must not be forgotten - thousands of whom annually perish by epidemics, the dependence of which on atmospheric and climatic influences is the object of these enquiries to elucidate.

8. The stations selected by the Commission cover an enormous extent of territory - so great, in fact, that the observations will be of little more than purely local value. The Commission propose no station south of Trichinopoly - the whole area occupied by the Madras and Tinnevely Districts is not represented. For the whole of Eastern sea-board observations are to be taken only at Vizagapatam and Madras. There are again three stations, taken for instance where Cyclones and other storms prevail, are left out.

9. The Government think that Ramptee and Rangoon should be struck out of the Madras list. Though garrisoned by

by Madras troops, these stations are very distinct and are under the Supreme Government who will doubtless make such arrangements as may be deemed expedient.

10. The Govt. consider that the scheme, to be commenced, should embrace eight other stations - 15 in all. They would propose therefore that the stations named in the margin be added to the seven mentioned by the Commissioner.

11. Taking 15 stations, and sanctioning a small allowance as carriage hire (Rs. 30 per mensem) to the officer in local charge, the cost per annum, with an allowance of Rs. 400 for stationery, &c., will be Rs. 16,000 - a trifling or moderate sum when the wealth of some 30 millions of people is considered.

Trivellore
Nagapatnam, or Nagapattinam
Madras
Salem
Coimbatore
Kurnool
Masulipatam
Cochin.

Meteorological Deptt.	250
15 Observers at 40 Rs. each	600
Carriage hire for 15 officers	450
in local charge	
	<u>1300</u>
	12
	<u>15600</u>
Stationery &c.	400
	<u>16000</u>

To the Sanitary Commissioner
 " Govt. Responder
 " Mils. Deptt.
 " P. & S. Deptt. Secy. to Govt.

12. With these observations the Governor in Council resolves to submit ~~to~~ ^{for} the papers to the Govt. of India, with a recommendation that the scheme be sanctioned at the outlay proposed. On this sanction being received, Mr. Poyser's application of the 16th March last for a supply of Meteorological Instruments will be considered and such further detailed instructions as are necessary will be issued.

Recd. 31/8/86

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3 spare files of
each of the Prov.
No 377. & 851 -
& 2 Diagrams -

Public Department.

No. 852.

To

The Secretary to the Government
of India,

Home Department.

Amila

Sir,

I am directed by the
Governor, in Council to forward
to you the accompanying papers,
having reference to a scheme pro-
posed by the Sanitary Commission
Madras, for the introduction into
this Presidency of a system of
Meteorological Observations together
with a copy of the Proceedings
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Of the importance of
such observations for sanitary
purposes there can be no question,
and this would seem to be
admitted by the Government
of India under whose recent
sanction similar observations
are to be carried on in the

North

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Recd. 14 April 1866 L. 54-59
August - 153 + 164

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PROCEEDINGS OF GOVERNMENT.

27th August 1866

No. 851.

Public 1866. Department.

North West Provinces and in the Punjab.

3 It will be seen that the Commission propose that the observations should be made and registered at the nine Chief & Military stations named in the margin. Two of these, however, Kanphee and Rangoon, are very distant and are under the Supreme Government, and the Governor in Council thinks that they should be struck out of the Madras list, it being left to the Government of India to make such arrangements in these and the adjoining territories as they may deem expedient. At the same time, he considers that the scheme, to be complete, should embrace eight other stations - 15 in all.

Kanphee
Secunderabad
Vizagapatam
Bellary
Bangalore
Mannanore
Trichinopoly
Wellington
Rangoon

Tinnevely
Vizagapatam or Mangalore
Madras
Salem
Cannalore
Munnar
Masulipatam
Cochin

4 The arrangements proposed will involve an outlay of Rs. 16,000 ^{eighty thousands} per annum - a sum certainly moderate when the health

health of some thirty millions of people is interested.

5 The Govt are satisfied that this important work cannot be efficiently carried out for less than the proposed outlay, and they would earnestly advocate a comprehensive and liberal measure as alone likely to afford satisfactory results.

6 The examination of the local returns will throw much additional duty on the Government Astronomer, Mr. Pogson, and the Government therefore propose to give him the same remuneration as is allowed to Dr. Thompson ^{for the same duties} at Pooree. Mr. Pogson's fitness for the work is beyond question.

I am instructed, with these remarks, to recommend the scheme to the favorable consideration of the Govt of India.

T. St. George
27 August 1865

Miss Abby Richard

1852

Nov 7/6 of 1862
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