

ORDINARY PRINTED.

Public DEPARTMENT.

P.O. DATED 31-3-90

No. 246/7.

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(Disputed Abstract)

Registration of Rainfall.

Communicating to the
Govt. of India, Proceedings
of the Board of Revenue re
reporting on certain proposals
of the Meteorological Reporter
as to the Govt. of India regard-
ing the ———

Addressing the Govt. of
India ^{with reference to} the proposals
of the Meteorological Reporter
to that Govt. regarding the ———

Circular No. 77-Meteorology.
1-54

GOVERNMENT OF INDIA.
REVENUE AND AGRICULTURAL DEPARTMENT.

METEOROLOGY.

FROM

J. W. P. MUIR-MACKENZIE, Esq., C.S.,
Offg. Secretary to the Government of India,

TO

The Secy to the Govt of Madras

Rev. & Agri. Dept.
Meteorology.

Simla, the 24th October 1889.

SIR,

I AM directed to forward for the consideration of the *Govt of Madras* a copy of a letter from the Meteorological Reporter to the Government of India, in which he makes certain suggestions for the registration of rainfall throughout India and the collection and publication of the data obtained, and to say that the Government of India will be glad to be favoured with the opinion of *His Excellency the Governor-General* to the extent to which Mr. Eliot's proposals can be carried out in *the Madras Presidency*.

2. I am to observe that in the event of *His Excellency* assenting to the preparation of instructions for inspection, &c., as proposed in paragraph 3 of the Meteorological Reporter's letter, it would probably be preferable to circulate them, after approval by, and with the permission of, *His Excellency* direct to District Officers.

3. With reference to paragraph 2 regarding the best pattern of raingauge, the Government of India would be glad to know what arrangements can be made for replacing the existing defective raingauges by those of an approved type. *The Govt of Madras* will probably concur with His Excellency the Governor General in Council that it is desirable that raingauges at every Station and from whatever funds they are paid for, should be obtained by indent on the Meteorological Department. This would secure the supply in all stations of a uniform and approved pattern of raingauge. The Meteorological Department

would of course be willing to furnish Local Governments and Administrations with the necessary stock of spare raingauges for the satisfaction of sudden and unforeseen requirements.

4. Finally I am directed to invite the special attention of *Sh. G. M. of Madras* to the remarks regarding the divisions of the year suitable for Meteorological purposes. It is most important for the Meteorological Reporter to be furnished with the opinion of Local authorities in order that he may have the fullest materials before coming to an ultimate and permanent decision on a question which will materially affect the utility of his reports to the widely differing Provinces of the Empire.

I have the honour to be,

SIR,

Your most obedient servant,

James Mackenzie

Offg. Secretary to the Government of India.

1889.

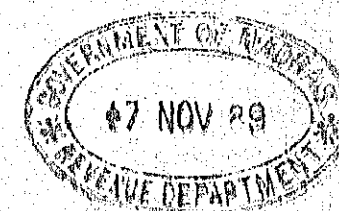
FILE NO. 1.
SERIAL NO. 54.

GOVERNMENT OF INDIA.

REVENUE AND AGRICULTURAL DEPARTMENT.

METEOROLOGY.

To,



Circular No. 77-Meteorology
1-54.

Dated Simla, the 24th October 1889.

SUBJECT.

Asks for the opinion of Local Governments on the proposals made by the Meteorological Department to the Government of India, for the registration of rainfall throughout India and the collection and publication of the data obtained.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read the following letter from the Government of India Revenue and Agricultural Department (Meteorology) dated 18th December 1889, No. 203 Met.

I am directed to invite attention to the communication marginally noted and to request the favor of

Proposals for the adoption of a uniform system for rainfall registration. } an early reply thereto.

Circ. 77th 1-54. D 24-10-89

Order thereon 2nd January 1890 No. 3

The Commissioner of Revenue Settlement Land Records and Agriculture, will be requested to expedite the report called for in G. O. dated 10th December 1889, No.

X Recd. Secy. 7/75.
Comdg. Secy. Revenue
C No 3520/89.

(True Extract)

W. S. S. S.

Secy to Govt.

To The Commr. of R. & L. R. & Agriculture.

Public Dept.

S. K.

Public (No. 3520)

From

The Govt. of India

R. & A. Dept.

Circ. 77th 1-54. D 24-10-89

Circ. 77th 1-54. D 24-10-89

Dated 24 Oct. 1889
Recd. 7 Nov. 1889

27th November 89
Referred to the Meteorological Reporter and the Commr. of Land Records & Agriculture (the Rev. Dept.) for early reply.

W. S. S. S.

To The Met. Rep. & Rev. Dept. 25/11/89
W. S. S. S.

Waiting for the opinion of local govt. on the proposals made by the Meteorological Dept. to the Govt. of India for the regn. of rainfall throughout India and the collection and publication of the data obtained.

Over

Public DEPARTMENT.

Office.

Please send reminder
to Meteorological Reporter
Refce of 35. XI. 89.

70 B.
9.1.90.

From
The Revenue Deptt

No. 246-47 07 31-3-90

No. 3

Dated 2 Jan 1890

Received 3

Enclosures

SUBJECT.

Regarding proposals for the
adoption of a uniform system
for rainfall registration.

The following letter

Madras Meteorological Office
1st February 1890, No. 42.

From.

Miss E. Luis Pigeon F.R. Met. Soc.,
Meteorological Reporter, Madras.

To,
The Secretary to the Commissioner
Revenue Settlement Land Records and
Agriculture
(Board of Revenue)

Sir,

Madras.

With reference to Circular No. 44-Meteorology
1-54
from the Officiating Secretary to the
Government of India and copy of a letter
from the Meteorological Reporter to the
Government of India regarding certain changes
for the future registration of rainfall
referred to me for report, I have the honor
to state that I fully concur with all the
proposals made by Mr. Eliot in his
letter No. 520-3 dated Simla the 5th October
1889 and strongly recommend their adoption
at all the stations at which rainfall
is recorded in the Madras Presidency.

2. Considering that the well-being of
India depends in a measure upon its
rainfall, it is most desirable that
every

every effort should be made to ensure greater accuracy in the returns and that the results should be more accessible to those requiring such information by an extended form of publication.

3. Reference to a letter ~~to~~ the Government Astronomer from the Secretary to the Board of Revenue No 1659 dated 8th June 1883 prior to the transfer of the charge of the Revenue Board. Rain stations to my care will explain the kinds of rain gauges and glass measures hitherto in use in this Presidency and show the amount of attention that has been taken regarding the testing and issue of all rain gauges since 1840 rendering the records reliable from that date. The difficulties pointed out in paragraph 3 of the letter regarding suitable glass measures has frequently been the cause of no little delay in supplying new glasses when old ones were broken. This defect will be remedied by the adoption of one uniform type of rain gauge throughout India

and

38
and I would recommend that all the rain gauges in use at the 320 stations now under my administration be replaced by new ones when the kind has been decided. As all other meteorological instruments are compared and supplied from the Meteorological Department at Calcutta, I think it would be well for a similar arrangement to be made regarding future rain gauges and glass measures. The new rain gauges would be sent to this office and supplied by me as at present and a supply of both gauges and glass measures would always be kept in store at this office to meet the requirements of incidents for new ones through any cause.

4. The occasional inspection of Rain gauge stations is, as pointed out by Mr Elliot, a matter of vast importance and another point which should also receive attention, but which I regret to find appears to have escaped notice in this Presidency, is, the height of the mouth of the rain gauge above the ground. During my inspection at some

as Meteorological Reports I have seen some rain gauges placed on roofs of offices, others on brick columns, while others are on the ground.

5. As, under the present system, the sums of the rain gauges were, generally speaking made to suit the glass measures and the exact positions, surroundings and heights of the various rain gauges have not been ascertained, I think it very desirable that every rain station in the Madras Presidency should be inspected once before the old gauges are removed. The new gauges might be issued and records made of both the old and new instruments until each station has been visited. This would obviate the necessity of any immediate hurry and I shall be happy to undertake to visit the stations myself and give each recording clerk any necessary instructions he may require, if the Revenue Board will permit me, to draw similar travelling allowances to those granted by the Meteorological Department for

40
for journeys by road rail or Steamers. It would of course take some time but once inspected and arranged the positions of the gauges would be more reliable in future.

Future reports might be made from time to time by the District Officers, Civil Surgeons, or any other officials visiting these stations.

6. Uniformity in the method of registration and form of publication of rainfall statistics is also very desirable, but this and the division of the year best suited will be better discussed when the Meteorological Reports to the Government of India returns to Madras which will probably be in the course of a few days.

I have to

(signed) E. Luis. Popeau

Meteorological Reports to the
Government of Madras.

(Enclosure)

Secretary

Ed 20
16/3



C. No 869.

5 P

Proceedings of the Board of Revenue

(Revenue Settlement, Land Records and Agriculture).

Dated 18th February 1890.

No. 45 Press.

Mr. Clopton.

READ G.O. dated 11th December 1889. No. 7975 Revenue.

Read also G.O. dated 2nd January 1890. No. 3. Revenue.

Read letter from the Meteorological Reporter Madras dated 1st February 1890. No. 42 reporting on Circular No. 44. Meteorology - 1-54. regarding changes for the future registration of rainfall in the Madras Presidency.

Resolution. - 18th Feb 90. No. 45. Rev.

The Board have carefully considered the proposals of the Meteorological Reporter to the Government of India and fully agree with him that in view to securing uniformity in the registration of rainfall throughout

throughout British India, it is
desirable to issue a uniform
pattern of rain-gauge to all the
registering stations through the
Meteorological Department.

2. The rain-gauges in use in this
Presidency were all made at the
Government Public Works Workshop
and have been carefully tested
by the Government Astronomer
and since January 1886 by the local
Meteorological Reporter, before
issue to the registering stations. If
however any doubt exists as to
their correctness, there can be no
objection to their being replaced
by the Symon's gauge recommended
by the Meteorological Reporter
to the Government of India.
The Board is of opinion
that the supply of the gauges
should

68
should rest with one central authority
instead of being left to each Province
but that a sufficient stock of spare
gauges should be left with the
Meteorological Reporter of the
Presidency for ready issue whenever
required. Miss Pigeon thinks it
very desirable that every rain station
in this Presidency should be inspected
once, before the old gauges are
removed and offers to undertake
the work if she is paid travelling
expenses at the rates usually granted
by the Meteorological Department,
but it would seem that as
suggested by the Meteorological
Reporter to the Government
of India in paragraph 3 of his
letter, the required inspection
could be more conveniently
made

made by the District Surgeon.

3. Instructions for the proper record of rainfall and for the inspection of the rain-gauge by Collectors and Divisional officers when on tour have been issued from time to time, but it is desirable that they should be drawn up afresh by the Meteorological Department and circulated to the District officers and District Surgeons, who should report the result of their inspection of the gauges to the Meteorological Reporter.

4. There

28
4. There are 319 stations at which the rain-fall is registered in this Presidency. Of this number 149 are taluk or Tahsil stations and 124 are Deputy Tahsildar's stations. Collectors furnish the Meteorological Reporter with a monthly statement showing the rainfall at each station in the district on each day of the month. These returns are scrutinized by the Meteorological Reporter who corresponds direct with the District Officers about any errors that may be found in the registration, and the results are published in the local Gazette every month. In the table appended to paragraph 6 of the Meteorological Reporter's letter to the Government of India, he says that the returns are published at "irregular intervals". The remark probably refers to the delay that often occurs in publishing the statistics monthly. The delay is said to be caused by references made to local officers regarding mistakes discovered in the taluk returns. The Meteorological Reporter will be requested to see that such delays are avoided and that the returns are published within one month of the period to which they relate.

5. The statistics published by the Meteorological Reporter give the rainfall at each registering station and are made up for the Calendar year. For purposes of agricultural statistics a separate return is compiled monthly in the Board's office from statements received from Collectors direct showing the total rainfall at each station. This is made up for the official year and is published with the statistics of cultivation and prices within the close of the month following that to which the information relates.

6. In addition to the above returns, the Board also publishes every Tuesday the rainfall reported for the week ending the previous Saturday. The Government of India recently made enquiry as to whether the weekly telegrams now sent to it could be made up for the week ending Wednesday. This was reported to be impossible - vide G.O. dated 28th October 1887, 10884.

7. In all cases the rainfall is required to be recorded at 8 A.M. - vide Government of India telegram in G.O. no 312 dated 24th April 1887.

8. In the Presidency, the official year

is divided into two seasons, the first half, that is, from 1st April to 30th September, representing the South-West monsoon and the second half, or from 1st October to 31st March, representing the North-East monsoon. This division is convenient for all practical purposes, but is not quite accurate as the South-West monsoon seldom begins before the 15th May, while the North-East begins sometimes earlier and at other times later than the 1st October and continues up to the end of December. If, therefore, it is desired to make a change in the existing division of the year on the lines indicated in the letter of the Meteorological Reporter to the Government of India, the Board would suggest the following division:-

South-West monsoon May 15th to September 30th
North-East monsoon October 1st to December 31st
Dry weather January 1st to May 15th

It seems hardly necessary to make a separate division from 1st January to 15th March. Miss Pogson has not favored the Board with her opinion on the subject but she suggests that the question may be discussed

when

when the Meteorological Reports to
the Government of India returns to
Madras.

{ True Extract }

Muzumdar,
Secretary

To
The Secretary to Government,
Revenue Department. ✓

Copy to the Meteorological Reports to Government.

Dec
26/1900

21/11/88 22 960 Postage Paid
Pub. C. to 869

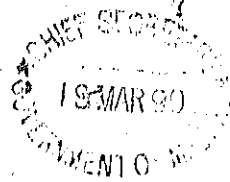
(1890.)

REVENUE DEPARTMENT.

No. 1625

Pub. C. to 869

ABSTRACT.



98
Endorsement No 1833

Orig From

The Board of Revenue
(Settlement)

Transferred to the Public De-

-partment.

Fort St. George,
17 March 90

Chatterjee
Secretary to Govt.

Recd for reg. 20-3-90.

L. No. 246-47 0731-3-90 encl.

Dated 18 Feb'y

Received 27.

Enclosures are

No. 45



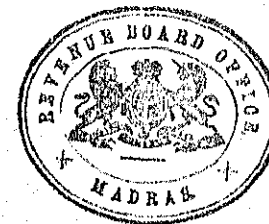
ak.

To
The Public Deptt

SUBJECT.

Submitting report called for on
certain proposals of the Meteorological
Reporter to the Government of India regarding
Registration of Rainfall.

O. S. O.



Proceedings of the Board of Revenue

(Revenue Settlement, Land Records and Agriculture).

Dated 6th March 1890.

No. 1402 Routine

READ *Memorandum* from the Under Secretary to Government
Revenue Department dated 3rd March 1890.

Resolution

Ordered accordingly.

(Incl. Extract)

M. J. S. S. S.
Secretary

To

The Under Secretary to Government
Revenue Department.

STP 18/3

1890.

Board of Revenue

(Revenue Settlement, Land Records
and Agriculture),

MADRAS.

To

The Under-Secretary to Government
Revenue Department



No. of Enclosures.

Proceedings, dated 6th March 1890,
No. 402 Routine

Subject.

Furnishing with copy
of letter from the Meteorological
Reporter Maun dated
1st February 1890 No. 42.

Revenue and Agricultural Department,

(Meteorological)

Simla The 18th March 1890.

24 MAR 90

Subject.

Proposals made by the
Metro. Reporter to the Govt.
of India for the registration
of rainfall throughout India,
the collection & publication
of the data obtained.

I have the honour to be,

SIR,

Your most obedient Servant,

J. L. Dally

for Under-Secretary to the Govt. of India.

Recd. No. 77th, dated 24.10.89
subsequent reminder
No. 203 dated 18/12/89

Pub. C. No 915

From
The Govt of India
R. & A. Dept

No 1271 Mts
Dated 18th }
Recd 24th } March 90.

No 246-47 of 21-3-90 Encl

Subject

Reminders on letters regard-
ing proposals for the
registration of rainfall
throughout India & the
collection & publication
of the data obtained.

28 (See 7th)
minutes of the B. D. Com. (Rev. Secy, Land Revenue
Department), dated 18th Dec 1899, para 45, para
again Gov. Secy, 1899, No 2975, Com.
also Gov. Secy, 1899, No 3, Com. 1899, No 3

1899, No 3, Com. 1899, No 3

Public dept.

Current nos 3520 of 1889
and 869 of 1890.

Order. 31st March 90. no. 246

The Pros: of the Board
of Revenue read above
will be commd. to the
Govt: of India with the
intimation that the
Govt: of Madras concurs
in the views expressed
by the Board.

W
28/3/90

27/3

To the Revenue dept. 7th Dec^r 15/4/90

Letter. of 31st March 90. no. 247.

To the Secy. to the G. of India
Rev: & Agri. Dept. (letter 7)

Letter 9 order
each 57 Cps
Dec^r 15/4/90

Sir,
With reference to
Circular No. 77. Allet. d^r.
24.2.89, I am directed to
forward copy of G.O. No. 246
of 31st March 1890, and to say
that the Govt: of Madras
concurs in the views
expressed by the Board
of

of Revenue in its Pres.

No. 45 of 18.2.90.

2. The Govt. of alladras
is of opinion that it is
very desirable that a
uniform pattern of
rain gauge ^{should} be intro-
duced at all registering
stations in India, and
that clear instructions
^{should} be issued for the guidance
of all registering and
inspecting officers. There
is no objection to the
instructions being
circulated direct to the
District officers concerned.

3. The arrangements
for the supply of rain
gauges proposed in para.
3 of the Circular under
reply are ^{as proposed} concurred in
and with reference to
para. 4 I am to say that
the divisions of the
year for meteorological
purposes suggested
by the Board of Revenue
appear to be the most

118
suitable for this Pres.

JG
27/3

J.B.B.
26.3.90.

[illegible]

How: How: No: No: C. S. S.

2000-01

From J. W. P. MUIR-MACKENZIE, Esq., C.S., Officiating Secretary to the Government of India, Revenue and Agricultural Department (Meteorology), to the Chief Secretary to the Government of Madras, dated Simla, the 24th October 1889, Cir. No. 77—Meteorology—1-54.

2. I am to observe that, in the event of His Excellency assenting to the preparation of instructions for inspection, &c., as proposed in paragraph 3 of the Meteorological Reporter's letter, it would probably be preferable to circulate them, after approval by, and with the permission of, His Excellency, direct to District officers.

4. Finally, I am directed to invite the special attention of the Government of Madras to the remarks regarding the divisions of the year suitable for meteorological purposes. It is most important for the Meteorological Reporter to be furnished with the opinion of Local authorities in order that he may have the fullest materials before coming to an ultimate and permanent decision on a question which will materially affect the utility of his reports to the widely differing provinces of the Empire.

Read—again G.O., dated 11th December 1889, No. 7975, Revenue.

Read—the following letter from Miss E. ISIS FOGSON, F.R. MET. SOC., Meteorological Reporter, Madras, to the Secretary to the Commissioner, Revenue Settlement, Land Records and Agriculture, dated Madras, 1st February 1890, No. 42:—

With reference to Circular No. 77-Meteorology—1-54 from the Officiating Secretary to the Government of India, and copy of a letter from the Meteorological Reporter to the Government of India, regarding certain changes for the future registration of

rainfall, referred to me for report, I have the honor to state that I fully concur with all the proposals made by Mr. Eliot in his letter, No. 520-S, dated Simla, the 5th October 1889, and strongly recommend their adoption at all the stations at which rainfall is recorded in the Madras Presidency.

2. Considering that the well-being of India depends in a measure upon its rainfall, it is most desirable that every effort should be made to ensure greater accuracy in the returns, and that the results should be more accessible to those requiring such information by an extended form of publication.

3. Reference to a letter to the Government Astronomer from the Secretary to the Board of Revenue, No. 1659, dated 8th June 1885, prior to the transfer of the charge of the Revenue Board rain stations to my care, will explain the kinds of rain-gauges and glass measures hitherto in use in this Presidency and show the amount of attention that has been taken regarding the testing and issue of all rain-gauges since 1870 rendering the records reliable from that date. The difficulties pointed out in paragraph 3 of the letter regarding suitable glass measures has frequently been the cause of no little delay in supplying new glasses when old ones were broken. This defect will be remedied by the adoption of one uniform type of rain-gauge throughout India, and I would recommend that all the rain-gauges in use at the 320 stations now under my administration be replaced by new ones, when the kind has been decided. As all other meteorological instruments are compared and supplied from the Meteorological Department at Calcutta, I think it would be well for a similar arrangement to be made regarding future rain-gauges and glass measures. The new rain-gauges would be sent to this office and supplied by me as at present, and a supply of both gauges and glass measures would always be kept in store at this office to meet the requirements of indents for new ones through any causes.

4. The occasional inspection of rain-gauge stations is, as pointed out by Mr. Eliot, a matter of vast importance, and another point which should also receive attention, but which, I regret to find, appears to have escaped notice in this Presidency, is the height of the mouth of the rain-gauge above the ground. During my inspection tours as Meteorological Reporter, I have seen some rain-gauges placed on roofs of offices, others on brick columns, while others are on the ground.

5. As, under the present system, the rims of the rain-gauges were, generally speaking, made to suit the glass measures, and the exact positions, surroundings and heights of the various rain-gauges have not been ascertained, I think it very desirable that every rain station in the Madras Presidency should be inspected once before the old gauges are removed. The new gauges might be issued, and records made of both the old and new instruments until each station has been visited. This would obviate the necessity of any immediate hurry, and I shall be happy to undertake to visit the stations myself, and give each recording clerk any necessary instructions he may require, if the Revenue Board will permit me to draw similar travelling allowances to those granted by the Meteorological Department for journeys by road, rail or steamer. It would, of course, take some time, but, once inspected and arranged, the positions, &c., of the gauges would be more reliable in future. Future reports might be made from time to time by the District officers, Civil Surgeons, or any other officials visiting these stations.

6. Uniformity in the method of registration and form of publication of rainfall statistics is also very desirable, but this, and the division of the year best suited, will be better discussed when the Meteorological Reporter to the Government of India returns to Madras, which will probably be in the course of a few days.

Resolution—dated 18th February 1890, No. 45.

The Board has carefully considered the proposals of the Meteorological Reporter to the Government of India, and fully agrees with him that, in view to securing uniformity in the registration of rainfall throughout British India, it is desirable to issue a uniform pattern of rain-gauge to all the registering stations through the Meteorological Department.

2. The rain-gauges in use in this Presidency were all made at the Government Public Works Workshop, and have been carefully tested by the Government Astronomer, and since January 1886 by the local Meteorological Reporter, before issue to the registering stations. If, however, any doubt exists as to their correctness, there can be no objection to their being replaced by the Symon's gauge recommended by the Meteorological Reporter to the Government of India. The Board is of opinion that the supply of the gauges should rest with one central authority, instead of being left to each province, but that a sufficient stock of spare gauges should be left with the Meteorological Reporter of the Presidency for ready issue whenever required. Miss Pogson thinks it very desirable that every rain station in this Presidency should be inspected once before the old gauges are removed, and offers to undertake the work if she is paid travelling expenses at the rates usually granted by the Meteorological Department, but it would seem that, as suggested by the Meteorological Reporter to the Government of India in paragraph 3 of his letter, the required inspection could be more conveniently made by the District Surgeon.

3. Instructions for the proper record of rainfall, and for the inspection of the rain-gauges by Collectors and Divisional officers when on tour, have been issued from time to time, but it is desirable that they should be drawn up afresh by the Meteorological Department and circulated to the District officers and District Surgeons, who should report the result of their inspection of the gauges to the Meteorological Reporter.

4. There are 319 stations at which the rainfall is registered in this Presidency. Of this number, 149 are taluk or tahsil stations and 124 are deputy tahsildar's stations. Collectors furnish the Meteorological Reporter with a monthly statement showing the rainfall at each station in the district on each day of the month. These returns are scrutinized by the Meteorological Reporter, who corresponds direct with the District officers about any errors that may be found in the registration, and the results are published in the local Gazette every month. In the table appended to paragraph 6 of the Meteorological Reporter's letter to the Government of India, he says that the returns are published at "irregular intervals." The remark probably refers to the delay that often occurs in publishing the statistics monthly. The delay is said to be caused by references made to local officers regarding mistakes discovered in the taluk returns. The Meteorological Reporter will be requested to see that such delays are avoided, and that the returns are published within one month of the period to which they relate.

5. The statistics published by the Meteorological Reporter give the rainfall at each registering station, and are made up for the *calendar* year. For purposes of agricultural statistics a separate return is compiled monthly in the Board's office from statements received from Collectors direct showing the *total* rainfall at each station. This is made up for the official year, and is published with the statistics of cultivation and prices within the close of the month following that to which the information relates.

6. In addition to the above returns, the Board also publishes every Tuesday the rainfall reported for the week ending the previous Saturday. The Government of India recently made inquiry as to whether the weekly telegrams now sent to it could be made up for the week ending Wednesday. This was reported to be impossible.—*Vide* G.O., dated 28th October 1889, No. 884.

7. In all cases, the rainfall is required to be recorded at 8 A.M.—*Vide* Government of India telegram in G.O., No. 312, dated 24th April 1889.

8. In this Presidency, the official year is divided into two seasons—the first half, that is, from 1st April to 30th September, representing the South-west monsoon, and the second half, or from 1st October to 31st March, representing the North-east monsoon. This division is convenient for all practical purposes, but is not quite accurate, as the South-west monsoon seldom begins before the 15th May, while the North-east begins sometimes earlier, and at other times later, than the 1st October and continues up to the end of December. If, therefore, it is desired to make a change in the existing division of the year on the lines indicated in the letter of the

Meteorological Reporter to the Government of India, the Board would suggest the following division :—

South-west monsoon	..	..	..	May 15th to September 30th.
North-east monsoon	..	..	..	October 1st to December 31st.
Dry weather	..	..	..	January 1st to May 15th.

It seems hardly necessary to make a separate division from 1st January to 15th March. Miss Pogson has not favored the Board with her opinion on the subject, but she suggests that the question may be discussed when the Meteorological Reporter to the Government of India returns to Madras.

(True Extract.)

P. RAJARATNA MUDALIAR,
Secretary.

To the Secretary to Government, Revenue Department.
Copy to the Meteorological Reporter to Government.

No. 1833.

Transferred to the Public Department.

FORT ST. GEORGE,
17th March 1890.

(Signed) C. A. GALTON,
Secretary to Government.

ORDER—dated 31st March 1890, No. 246, Public.

The Proceedings of the Board of Revenue read above will be communicated to the Government of India, with the intimation that the Government of Madras concurs in the views expressed by the Board.

(True Extract.)

Ag. Chief Secretary.

To the Revenue Department, with an enclosure.

Exd. A. Raitt.

No. 520-S., dated Simla, the 5th October 1889.

From—The Meteorological Reporter to the Government of India,

To—The Secretary to the Government of India, Revenue and Agricultural Department.

I HAVE the honour to submit a series of proposals with regard to the registration of rainfall throughout India, and the collection and publication of the data thus obtained, in continuation of my suggestions on the subject in the re-organization scheme. Before finally deciding on the changes to be introduced it would be desirable to obtain the opinion of local Governments on these suggestions.

2. There are at present, I believe, several types of raingauges in use throughout India, of which at least one, viz., Fleming's Float gauge, is very defective, and invariably registers less than the actual amount than that which would be registered by several other and more accurate forms of rain-gauge under the same circumstances. The rain-gauge in use at many stations, viz., Symon's rain-gauge, is very commonly used in England. It is simple in construction and is sufficiently accurate for all practical purposes. It would be advisable hence to adopt that form as the type of rain-gauge for all Government stations in India. By the use of a common type of rain-gauge it would be possible for the Meteorological Department to draw up instructions for the proper record of rainfall and for the inspection of the rain-gauge and the officer registering the rainfall. A point on which it would be desirable to have a distinct ruling is whether the supply of these instruments should be left to the provincial authorities, or whether it should be undertaken in future by the India Meteorological Department who would obtain supplies either locally or by indent from England (whichever was cheaper). If the latter method of supplying raingauges to rainfall registering stations be adopted, the instruments could be tested before issue to see whether the diameter of the receiving vessel (upon the correctness of which the exact measurement of the rainfall depends) is exact.

3. Occasional inspection is absolutely necessary in order to see that the rain-gauge is properly placed and that the officer recording the rainfall is able to do it accurately. Raingauges have been found placed under trees, close to houses (on the lee side), slanting at a considerable angle, &c., and it is not improbable that at least five per cent. of the returns are seriously vitiated by improper exposure of the instrument, &c. There are in all about 2,000 stations in India at which rainfall is recorded for the information of the Local or Imperial Governments. Even if an inspector were able to inspect one of these stations daily (which would be hardly possible considering the slowness of communication between stations not on the line of rail in India) it would take at least six years to inspect them once. It would hence be certainly impossible for the Meteorological Department to undertake to do this work properly unless it were provided with a considerable staff of inspectors. This would be a costly mode of inspection and be quite unnecessary, if District Officers, Civil Surgeons, &c., when visiting the sub-Divisional stations and other stations in the interior of a district where a rain-gauge is maintained, made an examination of the rain-gauge and rainfall records, &c., a part of their duty of inspection. A few minutes would generally suffice to see if the rain-gauge was properly placed and in good order, and the Observer able to measure the rainfall correctly. A brief set of instructions for the inspection of raingauges could be easily drawn up by the Meteorological Department provided of course the type of rain-gauge in use was known. If this method of inspection were adopted, it would be advisable that the District Officer or Civil Surgeon should report very briefly to the Local Officer dealing with the rainfall statistics the result of his inspection.

4. A next important point is the early and frequent collection of the rainfall data and the examination of these returns for the detection and elimination so far as possible of erroneous measurements such as necessarily occur in the collection of any extensive system of statistics. The present arrangements, so far as they are known in the Meteorological Office, are stated in the following table.

Province.	No. of Station.	Officer who collects and publishes information in full or in Local Gazette.
Burma ...	34	Director of Land Revenue.
Bengal ...	255	Meteorological Reporter.
Assam ...	72	Secretariat.
North-West Provinces ...	274	Meteorological Reporter.
Punjab ...	180	Director of Land Revenue.
Central Provinces ...	69	Secretariat.
Berar ...	?	?
Bombay ...	400	Director of Land Records.
Madras ...	316	Meteorological Department.

There are local systems in force in certain Native States including Mysore, Hyderabad, Jeypore, &c.; but so far as is known the data obtained are not published, and hence are not available for general information.

Nothing is known in the Meteorological Office as to whether the rainfall statistics collected by the officers named above are carefully examined for the elimination of doubtful and erroneous data, except in the case of Bengal and the North-West Provinces. The Reporters for these two areas, I believe, use every effort to secure correct registration and communicate directly with the registering officers about probable errors in the registration.

5. A portion of the rainfall data is communicated weekly by District Officers to the Meteorological Reporter, Government of India, by telegrams, and is utilized in the preparation of the weekly rainfall charts submitted to the Government of India and in drawing up the weekly Weather Report of the whole of India, published in the *Gazette of India*. The India Meteorological Reporter also collects in various ways the complete rainfall data of about 450 stations which are kept for record in M. S. books in the Meteorological Office and are used for the rainfall section of the annual report.

6. The following defects obtain in the present methods of collecting and publishing rainfall information.

(1st) There are large areas in India for which no one is apparently directly responsible for the collection of rainfall statistics. Some of these are large and important areas occupied by Native States, others comprise recent additions to our territories, *e.g.*, Baluchistan, but which are as yet outside the regular Provinces.

(2nd) It is doubtful whether there is any proper examination of the rainfall returns in many Provinces, and there is certainly no general uniformity of procedure in this matter.

(3rd) the method of publication is open to many objections. The following table gives a statement respecting the publication of the results:—

Burma ...	Published weekly in <i>Gazette</i> on Saturdays, seven days after termination of the week for which rainfall data are given.
Assam ...	Published weekly in <i>Gazette</i> on Saturdays, nine days after termination of the week for which rainfall data are given.
Bengal ...	Published weekly in <i>Gazette</i> on Wednesdays, five days after termination of the week for which rainfall data are given.
North-West Provinces	Published weekly in <i>Gazette</i> on Saturdays, eight days after termination of the week for which rainfall data are given.
Central Provinces ...	Published weekly in <i>Gazette</i> on Saturdays, fourteen days after termination of the week for which rainfall data are given.
Punjab ...	Published weekly in <i>Gazette</i> on Saturdays, ten days after termination of the week for which rainfall data are given.
Berars ...	Not known.
Bombay ...	Published monthly in <i>Gazette</i> about a fortnight after the end of the month.
Madras ...	Statements of monthly rainfall are published at irregular intervals.
India ...	Published in the <i>Gazette of India</i> on Saturdays, four days after the termination of the week for which rainfall data are given.

(4th) District Officers are in many if not in all cases asked to furnish two sets of rainfall data weekly, *viz.*, one for the local authorities and the other for the Government of India. The weekly periods of these returns terminate on different days. The submission of two different weekly returns for different periods not only gives double work but increases the possibility of error in these returns. It would be much better in every way if the weekly period was the same throughout India and identical with that adopted by the Government of India for its rainfall information, and then the same forms could be employed throughout and a uniform system of registration and submission of data be introduced. If desired the necessary forms could be drawn up by the Meteorological Department and issued yearly by that Department to all officers requiring them.

7. The following appear to me to be the chief improvements which might be made to obviate these defects:

(1st) It is desirable that the rainfall data should be collected by a local officer as at present. The duties of his office in this respect should be defined as including the critical examination of the returns, pointing out probable errors and arranging for their elimination as far as possible. These data he should publish in the form required for local information in the local Gazette, and he should forward the whole data at intervals to the Meteorological Reporter to the Government of India. Any errors subsequently found out in the India Reporter's Office would be (if desired) pointed out to the local officer who would take any further steps necessary. It may be noted that the various comparisons of the returns for the elimination of errors will be facilitated by the adoption of the same hour, 8 a.m., and be a much simpler matter than hitherto. It is also desirable that the duty of collecting full information from areas such as are not included in these local

systems should be definitely assigned to the Meteorological Reporter to the Government of India.

(2nd) It is also desirable that in order to avoid unnecessary trouble and also to minimize the chance of errors, all weekly rainfall returns should end on the same day. The best day so far as can be judged from the preceding data is Saturday (8 a. m.). The day is necessarily a compromise, but it is the end of the ordinary week, and so far as can be judged it will enable the data to be collected by the Imperial and Provincial officers in time for their respective Gazettes as published at present.

(3rd) In the daily weather and other reports published by the India-Bombay Meteorological Department are columns giving total rainfall up to date for certain seasons or periods of the year; but it is doubtful whether they are properly selected, and the present opportunity might be taken to select a suitable division of the year for this purpose. It is for example very desirable in Northern India to be able to compare during any South-West monsoon the actual rainfall from the commencement of the monsoon to date with the normal, and similarly the cold weather rainfall up to date in any season with the normal, &c. Such a comparison would evidently be far more useful and suggestive than that of giving the rainfall from the 1st January to date. Hence it is necessary for this purpose to divide the year into rainfall periods for future adoption in comparison of rainfall in the daily weather and other reports of the Department. Unfortunately the most suitable periods as determined by agricultural operations differ to some extent in different parts of India, and it is only possible to give a division which roughly corresponds with the actual rainfall and agricultural seasons in any part of India. The following division of the year is suggested for adoption in the India and perhaps the Bengal and Bombay Weather Reports:—

- (1) From 15th December to 15th March, cold weather rains in North India.
- (2) From 15th March to 1st June, period of hot weather showers.
- (3) From 1st June to 15th October, period of ordinary South-West monsoon rains.
- (4) From 15th October to 15th December, the period of late South-West rains in Southern India (the so-called North-East monsoon).
- (4th) The extent and form of the publication of current rainfall data in the Provincial Gazettes for the use of officials, merchants, planters, &c., is a question which can be dealt with by the Local Governments. By the complete publication in this form those who are interested can obtain the information of the Province they require. It appears however to be desirable that the Local Governments should adopt practically the same form of publication. Some Provinces publish daily rainfall, either weekly or monthly. Others, as for example Burma, publish weekly total rainfall, and there is no means available to the ordinary public of knowing the daily rainfall; again, others, as Madras for example, publish monthly totals only; and until recently, as I found out by experience, it was practically not possible to obtain information of daily rainfall for that Presidency. The Government of India collects rainfall data from the whole of India for its own information, and thus obtains approximately exact data of the seasonal distribution of rainfall. The abstracts of the weekly data thus collected are published in the *Gazette of India* with a brief discussion.

The present methods of publication probably suffice for ordinary current purposes, although I think it would be most satisfactory if the same general form of publication of daily rainfall data were adopted by all Local Governments, and that the system of merely publishing weekly or monthly totals were discontinued. For many other objects in view the present method is, however,

practically useless. As already pointed out, the publication of rainfall statistics is incomplete; it is made in the local Gazettes and is hence only available to those officers who obtain and file them complete for future use. The information is not comparable in extent and kind in different Provinces. There are many purposes for which it is desirable to have the rainfall data of a country published in a complete and handy form. It appears for example to be absolutely necessary for Engineers in India engaged in designing and constructing irrigation works, bridges over rivers, &c., and weekly or monthly totals are utterly useless to them. These officers frequently wish to know the heaviest flood-producing rainfall in the district or area they have to deal with. It is also essential for all who wish to take up the discussion of questions connected with the distribution of rainfall in India. European Meteorologists might probably investigate such questions if the complete data were available, but at present the field is closed to them by the scattered and partial publication of the data in the Local Gazettes.

In Australia, for example, where the rainfall is of no greater importance than in India, much greater attention is paid to the publication of rainfall statistics.

It is hardly too much to say that the prosperity of India year by year depends almost entirely upon the distribution of rainfall; and it would appear to be as desirable to publish accurate and complete returns of rainfall statistics for the whole of India as of railway irrigation, trade and other statistics.

My own opinion is strongly in favour of the publication in a complete form of the rainfall statistics for the whole of India, year by year, as it would probably tend to improve the quality of the observations themselves by directing greater attention to them. It is however no more than a personal opinion. The adoption of the suggestion underlying the opinion, I may point out, would give a considerable increase of work to my office and some increase of expenditure for printing which Government may not be prepared to sanction. As the question is of importance, I think it would be very desirable to obtain the opinion of the Heads of Irrigation and Public Works Departments, Railway authorities and others interested in rainfall statistics. The Government could then decide whether it would be desirable to continue the present form of publication of rainfall data, or publish the whole in a complete form annually for future handy reference, and to distribute these volumes of rainfall statistics to those interested in a complete record of the rainfall of India.

If, however, the Government of India should think the cost of printing would be considerable and more than would justify the publication of such an annual volume, I shall endeavour to arrange for my office collecting the rainfall information for the whole of India and entering it in the most suitable form in M. S. books. It will in time form a library of rainfall information which will of course be available to all Government officers desiring any information of rainfall that can be obtained from past records.

PUBLIC DEPARTMENT.

LETTER—from

THE CHIEF SECRETARY TO THE GOVERNMENT OF
FORT ST. GEORGE,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
REVENUE AND AGRICULTURAL DEPARTMENT (METEOROLOGY).

SIR,

With reference to Circular No. 77-Met.—1-54, dated 24th October 1889, I am directed to forward copy of G.O., No. 246, dated 31st March 1890, and to say that the Government of Madras concurs in the views expressed by the Board of Revenue in its Proceedings, No. 45, dated 18th February 1890.

2. The Government of Madras is of opinion that it is very desirable that a uniform pattern of rain-gauge should be introduced at all registering stations in India, and that clear instructions should be issued for the guidance of all registering and inspecting officers. There is no objection to the instructions being circulated direct to the District officers concerned.

3. The arrangements for the supply of rain-gauges proposed in paragraph 3 of the circular under reply are approved, and, with reference to paragraph 4, I am to say that the divisions of the year for meteorological purposes suggested by the Board of Revenue appear to be the most suitable for this Presidency.

I have the honor to be,

Sir,

Your most obedient servant,

FORT ST. GEORGE,
31st March 1890.

Ag. Chief Secretary.

Exd. A. Raitt.

Issued

Recd.

Encl.

G.O., 31st March 1890, No. 246.

MARCH.

Registration of Rainfall.

Communicating to the Government of India Proceedings of the Board of Revenue reporting on certain proposals of the Meteorological Reporter to the Government of India regarding the —.

1890.
PUBLIC DEPARTMENT.

From the Government of
Fort St. George.

Issued

Recd.

Encl.

Letter, 31st March 1890, No. 247.

MARCH.

Registration of Rainfall.

Addressing the Government of India with reference to the proposals of the Meteorological Reporter to that Government regarding the —.

ADAMANTIA GOVT. DEPARTMENT, MADRAS
1890, No.

12
Date Paper, No.

62, 136

Perman. Paper, No. 2686

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