

1. The Meteorological Department, with the approval of the Government of India, is now in the course of making a series of changes in the working of the Meteorological returns.

The main objects of the changes introduced are two: the first, the more rapid publication of the Daily Weather Report; and the second, the improvement of the system of collecting rainfall statistics for the information of the Government of India. It is expedient that Local Governments and authorities should be placed in full possession of the reasons which have led to the introduction of the modifications which have been made in the previous system. The present note is drawn up with this view.

2. In order to carry out the first of these objects, it has been determined to alter the hour for taking the observations that are telegraphed to Simla for publication in the Daily Report from 10 A.M. to 8 A.M. The 8 A.M. observations are therefore telegraphed to Simla immediately after they have been recorded, *i.e.*, at a time when telegraphic lines are least occupied with traffic. It is anticipated that when this arrangement (at present in the experimental stage) has settled down into proper working order, it will be possible to despatch the Daily Report by post from Simla on the afternoon or evening of the day to which the observations refer. As it has hitherto not been possible to send off the Daily Reports to a large number of officials until nearly 48 hours after the hour to which the observations belong the change will in many cases give to local authorities 24 hours earlier information than has hitherto been possible. This earlier dissemination of meteorological data and information will, it is hoped, be of material use to Irrigation and Revenue Officers, Engineers, and District Officers generally.

The selection of the hour of 8 A.M. has the additional advantage of enabling the Bengal and Bombay Reporters to issue earlier storm warnings than hitherto, every hour thus gained being an advantage to the ports and shipping concerned.

If, by the experience of the present year, it is found that the 8 A.M. observations (in combination with the additional observations during stormy weather which it is intended to arrange for shortly) are found to provide sufficiently exact and complete information for the Government of India and the public, the observations hitherto taken at 10 A.M. and 4 P.M. will probably be discontinued. This arrangement will not only diminish the work of the Central Office, but also enable the Department to be more economically and efficiently administered than has been possible hitherto.

3. The second series of changes were explained in the letter from the Meteorological Reporter to the Government of India, No. 548 of 30th April last. They improve the system of collecting Imperial Rainfall returns, and have for their immediate object the compilation of Meteorological statistics for Imperial purposes both from a larger area and of a more complete character. It is, however, also expected that the collation and review by the Central Department of statistics which have been hitherto collected mainly for the use of Provincial and Local authorities will lead to the removal of many defects, and to the adoption and maintenance of more correct methods of registration; and that the check afforded by supervision in the Central Office, where a rigid comparison brings to light errors which would otherwise pass unnoticed, will tend to raise the value of the returns to a higher and more uniform standard. These results will also, it is hoped, place a more valuable series of statistics in the hands of the Local Governments, whose co-operation in the reforms has already been invited and cordially acceded.

4. Amongst the defects of the present system are the following: the use of different kinds of rain gauges, the want of efficient supervision of the rain gauge stations and rainfall recording officers, the absence of critical examination of the rainfall returns (shortly after their submission, when detection and correction of error is possible), and the want of uniformity in the hour of recording rainfall, so that the exact comparison of daily rainfall in India is not

possible under present conditions. The effect of this want of uniformity is to render the rainfall returns in India less useful for scientific and economic investigations than they ought to be, and might be with a little care and attention. Among many examples which might be given of the results of the unsystematic method of recording rainfall, the following is one that has recently occurred.

Three years ago, Mr. Blanford devoted some time to the examination of the rainfall records of one of the Provinces for the past 20 years, and showed that if they could be accepted as correct, they established most clearly that forests had considerably increased the rainfall in certain districts. The Government of the Province then being asked whether the returns could be accepted as accurate, replied that the records of rainfall prior to 1883 could not be accepted as altogether reliable. They were thus useless for the investigations Mr. Blanford had in hand, and a period of at least 20 years more must elapse before the effects of afforestation on rainfall in that part of India can be determined from rainfall data.

There might be some excuse for this want of accuracy and scientific method in rainfall measurement if it were a difficult matter. Rainfall registration presents no real difficulty, seeing that attention to a few easy rules will enable any person of ordinary intelligence to measure the fall with precision. It is, in fact, almost as easy to measure it correctly as incorrectly, and there is no sound excuse for want of accuracy. Precise returns are of great value for future scientific investigation as well as present information, whereas inaccurate returns are worse than valueless, as they are misleading, and may give rise to incorrect inductions and conclusions.

5. There are about 1,500 stations which the Government has provided with rain gauges, and where arrangements of some kind have been made for measuring rainfall. About 400 of these send in returns to the Meteorological Department for discussion in the annual report on the Meteorology of India. The following table gives the hours at which rainfall is registered at these stations, and illustrates the remarkable diversity that obtains in this matter:—

Hour.	Number of stations.	Chiefly where situated.
<i>Hour not recorded.</i>	189	Rajputana, Bengal, Hyderabad, Madras, and Burmah.
6 A.M.	24	Hyderabad and Burmah.
7 "	2	Central Provinces and Mysore.
8 "	2	Central Provinces and Hyderabad.
9 "	2	Rajputana and Bombay.
9-30 "	1	North-Western Provinces.
10 "	24	Madras and North-Western Provinces.
11 "	1	Assam.
12 "	23	Madras.
4 P.M.	18	North-Western Provinces, Berars, and Burmah.
5 "	1	North-Western Provinces.
5-27 "	1	North-Western Provinces.
5-30 "	1	Central Provinces.
6 "	163	Bombay, North-Western Provinces, Punjab, Central India, Assam, Bengal, and Central Provinces.
7 "	2	North-Western Provinces and Punjab.
10 "	7	Madras.
12 "	11	Madras.
12-30 "	1	Madras.
6 A.M. & 4 P.M.	1	Burmah.
6 " & 6 "	10	Punjab.
10 " & 4 "	6	Central Provinces and Burmah.
10 " & 6 "	7	Central Provinces and Bombay.
10 " & 4 & 10	5	Madras.
6, 10, 16, & 22 Hrs.	1	Bengal.
Sunrise	1	Rajputana.
Different hours after rainfall	1	Punjab.
	405	

The above table shows most strikingly the want of method and absence of uniformity, and indicates clearly the necessity for a change of system.

6. The preceding remarks are sufficient to point out some of the chief defects in the present method of registering rainfall, and the need for the adoption of uniform arrangements.

If the method of telegraphing rainfall for the information of the Government of India (which is being initiated, and for which instructions have been forwarded to Local Officers with the permission of Local Governments) be successful, it will become a permanent feature of the work of the Meteorological Department, and the Government of India will probably, at an early date, invite the attention of the Local Governments to the irregularities in the present methods of recording rainfall, and ask them to co-operate with it in placing the registration of rainfall upon a uniform and satisfactory footing throughout India.

SIMLA;

30th May 1888.

J. ELIOT,

Offg. Meteorological Reporter
to the Government of India.

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[Signature]

Under Secy P.W.D.

*for
Ag. Chief Secy.*

To

The Public Works Dept

" Revenue Dept

" Port Officer, Madras

" Meteorological Reporter, Madras

" Board of Revenue G. C. Press, Simla, — No. 129 B, & A. D. — 15-6-88-525.

" Govt. Astronomer