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Public	DEPARTMENT.
G.O., DATED	8-5-98
No.	358
	359

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[Despatch Abstract.]

Indian Observatory
Directing that the
report for the In-
dian Observatories
Committee on the
working of the
during 1892-98
be forwarded to
the Govt of India

High Press, No.

67 18

Current No.

1168

67 18

94

Govt. of {1893} Madras.
PUBLIC.

Issued

Recd.

Encl.

G.O., &c., 3rd May 1893,
Nos. 358, 359.

MAY.

Madras Observatory.

Directing that the report for the Indian Observatories Committee on the working of the during 1892-93 be forwarded to the Government of India.

High Press, No.

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1168

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RECEIVED IN THE OFFICE OF THE GOVERNMENT, MADRAS
18th April 1893

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THE OBSERVATORY,

Madras, 25th April 1893.

No 96
93

FROM

THE GOVERNMENT ASTRONOMER,

Madras.

TO

The Chief Secretary to Government
Public Department.

SIR,

I have the honor to submit herein
enclosed the report for the Indian Observa-
tories Committee for the official year just
past.

I have the honor to be

Sir,
Your most obedient servant,

C. Nicolson Smith

Asst. Govt. Astronomer.

Recd 258-858 8/3/93

28

Report for the Indian Observatories Committee.

I have the honor to submit the following report on the working of the Madras Observatory during the official year from April 1st, 1892 to March 31st, 1893.

2. Staff. The second Assistant L. Moghending who had been on the staff since April 1/72 died in July 1892. His familiarity with all the routine of the Observatory and the care with which he performed his work rendered his loss a serious one. His place has been taken by H. V. Sivaramaiah, a graduate of the Madras University who holds the temporary appointment of Computer. Since his appointment Mr. Sivaramaiah has obtained the degree of M. A. in Physical Science. This is the first occasion on which a graduate has held one of the permanent posts in the Observatory, and so long as the salaries remain so low as they are at present it can hardly be expected that graduates will care to hold them except as stepping stones to other appointments. The post of computer was filled by Mr. P. Subbiah B. A. and sanction has been obtained to retain his services and those of the clerk referred to in last report till the close of the present financial year. The work of the staff as a whole throughout the year has been satisfactory.

B. S. S. S.

2.
3. Buildings. The buildings have been maintained in good order throughout the year but the roof of the transit room still leaks in wet weather and it seems to be impossible to make it quite weather-tight by any minor repairs. The roof of the small dome is showing many signs of decay and is now opened and closed with great difficulty. Pending the decision regarding the future of the Observatory it seems undesirable to go to the expense of renewing it but there is always a risk that it may be destroyed if exposed to a severe cyclone. The large dome is in good order.

4. Instruments. The transit Circle has been kept in good working order, but much trouble has been caused by the frequent breaking of the spider lines. These have had to be renewed again and again and no cause has been discovered to account for their breakage. At present they are in good order. The equatorials are both in good working order. The transit clock and the motor clock have both behaved fairly well throughout the year. The transit clock is, however, in too exposed a situation to have a very constant rate, and in stormy weather if there are considerable changes in the temperature the variations are sufficient to cause some uncertainty in the time if the interval between observations is prolonged by clouds. This will be apparent from

3
from the following table:-

Date	Clock correction	Rate
August 2 nd ...	-33.13	-0.53
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" 24 th ...	-35.66	-0.17
Sept. 1--	-36.58	-0.12
" 7--	-37.50	-0.15
" 11--	-39.05	-0.38

As there were no long continued intervals of cloudy weather during the year the accumulated error from this cause never exceeded one second. In settled fine weather the rate is remarkably steady. The two chronometers belonging to the Observatory are both practically worn out and their rates are far too erratic to render them of any use as checks on the clock. Neither is the Shelton clock useful for this purpose; for though an excellent time keeper its position in the large dome exposes it to extreme variations in temperature. A new mean-time chronometer has been asked for. All the minor instruments have been kept in good order.

5. Time Service. The time service has been maintained as in former years except in one respect. From December 1st the lamp-horn at the Post Office has been dropped only once a day - at 1 P.M. instead of twice as formerly. This change was made after consultation with the Marine authorities. The chief reason for the change was that a

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the Motor clock is adjusted to the correct time at 11 A.M. daily so that the noon gun may be fired with accuracy, the error at 8 A.M., when the Semaphore was first dropped, was the accumulated error for about 21 hours, and then in extreme cases might amount to as much as one second. A second advantage of taking 1 P.M. was that it was possible to test whether or not the line was in working order before the signal was sent. If the Semaphore fails, or drops wrongly, at 1 P.M. it is dropped at 2 P.M.

The time-gun which is fired twice a day failed only 11 times, and was 1st late on one other occasion. Of the 11 failures, 3 were due to bad friction tubes, one was unexplained, and the remaining 6 were due to the firing instrument having broken down and having to be removed for repairs.

The Semaphore failed or was more than 1st wrong on 18 occasions out of a total of 609. 3 of the failures were due to faults at the Observatory; 3 others to one of the lines from the Telegraph office having come in contact with the Observatory line and dropped the Semaphore too soon by means of false currents. The remainder were apparently due to the Consummator in the Telegraph office. The failures were much less numerous than in any former year.

6. Observations. No systematic observations other

other than those required for time determination have been made but a considerable amount of time was spent in completing the observations referred to in last report, for comparing the merits of Kodakanal, Kotalgiri, and Madras as sites for an Observatory. These observations were discussed in a separate report and it is only necessary to add here that the meteorological observations which have since been discussed entirely support the conclusions that were arrived at. Some time has also been spent on observations of the Sun with the object of obtaining suitable absorption media for viewing the prominences without the use of a spectroscope. A few observations were also made on the zodiacal light which was remarkably conspicuous in December 1892 and January 1893. The officiating Govt. Astronomer greatly regrets that so little has been done in the way of observation but so long as the publication of the old observations is continued at the present rate it is quite impossible to devote much time to anything else.

7. Reductions and Publications. The fifth volume of the Madras Meridian Circle observations (1874-75-76) was completed early in July and was distributed soon after. The sixth volume was complete, with the exception of a few pages of the introduction, at the close of the year. This volume has

has been a particularly heavy one for several seasons. It deals with 9,637 observations against 4,639 in the previous volume. A large proportion of the stars, too, were observed for the first time and for these the constants had to be revised throughout. There exists a sheet of constants for each star observed, but these were worked for only approximate places and with 4-place logarithms and hence when dealing with the first year in which any star was observed the constants have to be revised, using the exact place and 5-figure logarithms. This would not take much time if the original calculations had been accurately made but though each logarithm and each addition is "checked" as an indication of having been revised no farther evidence is to be found of revision in the work, for probably at least 80 per cent of the sheets contain arithmetical blunders while at least 10 per cent more contain serious errors in the assumed place of the star. The whole of this revision was done by the Astronomer himself. Probably it would have been less laborious to calculate the precessions and secular variations afresh from Stone's tables. In addition to the blunders referred to it has been found that the reductions of the observations themselves during the period dealt with were very inaccurate and

and a great part of the time of the First Assistant has been taken up in revising these. One of the reasons of this state of affairs seems to have been that the observer M instead of doing his own reductions handed them over to his son who had no interest in the work such as would induce him to take any special care with it. Every care has been taken to check the final results and it is hoped that at least a fair degree of accuracy has been attained, but the expenditure of time and labour has been very heavy. A good deal of preliminary revision for the next volume has been completed and as there were fewer stars observed for the first time in the period 1880-82 the preparation of the volume will take less time than was taken for the last. Meanwhile the work on the final catalogue progresses slowly. The mean positions, magnitudes and dates of all the stars included in the printed volumes have been tabulated for hours 0 to 4 and in a few cases the mean position for 1875 has been deduced. It is now time to consider the exact form which the Catalogue should take and the Official Government astronomer will be glad to receive the advice of the Committee on this point. The arrangement that at present seems most convenient is that of the Cape Catalogue but with different references. In particular

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it seems that the references to Bradley and the B. A. C. should be given and probably also those for the Cape (1880) and Argentine Cataplos, while at least Piazzi, Salas, Henderson, Johnston, Cape 1860, and Melbourne might be omitted. Another point on which advice is desired is the extent to which an attempt should be made to calculate proper motions from Taylor's observations. It seems doubtful whether it is worth doing this, except in cases of large change, until Taylor's places have been thoroughly revised.

8. Meteorological. Meteorological observations were continued as in the previous year except that since January 1st, the R. P. M. observations have been discontinued, and that additional cloud observations were made throughout the year for comparison with the observations made at Roda Island and Kotagiri. Considerable progress has been made with the reduction and publication of the old meteorological observations. At the close of the year the whole of the hourly observations for the period - January 1856 to February 1861 - were in type and the introduction and final tables of averages were in the hands of the printers. The preparation of tables of 5-day averages has been begun. In the case of the rainfall this will contain the results

of

9
of 80 years observations, as the rain records for that period are thoroughly trustworthy. The period for the other elements has not yet been decided upon as, except in the case of the barometer, there are difficulties due to changes in exposure and use of a different class of instruments which may render it impossible to utilize the older observations along with the newer. The full discussion of the great mass of really good observations available will take much time, and so it is proposed to revise the volume dealing with them in parts. The first part taken in hand is the rainfall, and the tables for this are well advanced.

9. General. The work of cataloguing and arranging the library has been pushed on as rapidly as other duties would permit. The names of all the bound books have been entered on slips and rough lists have been made of the pamphlets and unbound volumes. Some progress has also been made in completing imperfect sets, but in this, as in many other ways, the Officiating Government Astronomer has felt himself to be considerably hampered by the temporary nature of his appointment. A large part of the MSS. in the Observatory has been catalogued and all those referring to meteorological observations

the observations made throughout the Presidency
outside of Madras have been arranged, indexed,
and handed over to the Meteorological Reporter
to the Government of Madras. Up to the end
of the year 316 volumes were bound at the
Government Press and 33 other volumes are
at the Press for binding.

C. Michie Smith,

Offg. Astronomer.

Enclosure

to letter from the Govt. Astro-
nomer, Madras, dated 25th
April/93. No. $\frac{96}{93}$.

Report for the Indian
Observatories Committee.

3

Pills

India No. 1

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Public (1893) Department

Pub. go. 306-7 26. 5-9 myp.
654-5281-8-91 A.C.

Is the Report to be printed as an enclosure to the Astronomer's letter, or, from the way the endorsement to the Govt of India is worded, is it to be put after the endorsement?

3RD MAY 1893, Nos. 358, 359, PUBLIC.

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the Astronomer himself
Arrangement is all right
1575-36

GOVERNMENT OF MADRAS.

PUBLIC DEPARTMENT.

READ—the following paper:—

From C. MICHIE SMITH, Esq., B. Sc., F.R.S.E., F.R.A.S., Officiating Government Astronomer, to the Chief Secretary to Government, dated Madras, 25th April 1893, No. 96-93.

I have the honour to submit, herein enclosed, the report for the Indian Observatories Committee for the official year just past.

ENCLOSURE.

REPORT for the Indian Observatories Committee.

I have the honour to submit the following report on the working of the Madras Observatory during the official year from 1st April 1892 to 31st March 1893.

2. *Staff.*—The Second Assistant, L. Moghansing, who had been on the staff since April 1872, died in July 1892. His familiarity with all the routine of the Observatory and the care with which he performed his work rendered his loss a serious one. His place has been taken by K. V. Sivaramiah, a graduate of the Madras University, who held the temporary appointment of computer. Since his appointment Mr. Sivaramiah has obtained the degree of M.A. in Physical Science. This is the first occasion on which a graduate has held one of the permanent posts in the Observatory, and so long as the salaries remain so low as they are at present, it can hardly be expected that graduates will care to hold them except as stepping stones to other appointments. The post of computer was filled by Mr. P. Soobiah, B.A., and sanction has been obtained to retain his services and those of the clerk referred to in last report till the close of the present financial year. The work of the staff as a whole, throughout the year has been satisfactory.

3. *Buildings.*—The buildings have been maintained in good order throughout the year, but the roof of the transit room still leaks in wet weather and it seems to be impossible to make it quite water-tight by any minor repairs. The roof of the small dome is showing many signs of decay and is now opened and closed with great difficulty. Pending the decision regarding the future of the Observatory, it seems undesirable to go to the expense of renewing it, but there is always a risk that it may be destroyed if exposed to a severe cyclone. The large dome is in good order.

4. *Instruments.*—The transit circle has been kept in good working order, but much trouble has been caused by the frequent breaking of the spider lines. These have had to be renewed again and again and no cause has been discovered to account for their breakage. At present they are in good order. The equatorials are both in good working order. The transit clock and the motor clock have both behaved fairly well throughout the year. The transit clock is, however, in too exposed a situation to have a very constant rate, and in stormy weather if there are considerable changes in the temperature the variations are sufficiently great to cause some

H.W.
R.S.

Order 3 May 1893, No. 358.
3 May

The report will be forwarded to the Govt. of India

C.S.
11/5

45793

The Govt. Astronomer's Despatch 20/5/93

Despatch 20/5/93 No. 359.

Copy of the above, and of the report, forwarded to the Govt. of India, Revenue & Agricultural Department.

11/5

CHIEF SECRETARY
28 APR 93
GOVERNMENT OF MADRAS

Dated 25th April 193-

Recd.

28/4

Enclosure. one

Submitting the Report
for the Indian Observatories
Committee for 1892-93.

C-2/5
R-3/5

Pub. No. 306-7 256. 5-9 myo.
654-5221-8-91 A.C.

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As there were no long-continued intervals of cloudy weather during the year, the accumulated error from this cause never exceeded one second. In settled fine weather the rate is remarkably steady. The two chronometers belonging to the Observatory are both practically worn out, and their rates are far too erratic to render them of any use as checks on the clock. Neither is the Shelton clock useful for this purpose; for, though an excellent time-keeper, its position in the large dome exposes it to extreme variations in temperature. A new mean-time chronometer has been asked for. All the minor instruments have been kept in good order.

5. *Time Service.*—The time service has been maintained as in former years except in one respect. From 1st December the semaphore at the Port Office has been dropped only once a day—at 1 P.M.—instead of twice as formerly. This change was made after consultation with the Marine authorities. The chief reason for the change was that as the motor clock is adjusted to the correct time at 11 A.M. daily so that the noon gun may be fired with accuracy, the error at 8 A.M., when the semaphore was first dropped, was the accumulated error for about 21 hours, and this, in extreme cases, might amount to as much as one second. A second advantage of taking 1 P.M. was that it was possible to test whether or not the line was in working order before the signal was sent. If the semaphore fails, or drops wrongly, at 1 P.M., it is dropped at 2 P.M.

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ORDER—dated 3rd May 1893, No. 358, Public.

The report will be forwarded to the Government of India.

(True Extract.)

J. F. PRICE,
Chief Secretary.

To the Government Astronomer.

ENDORSEMENT—dated 3rd May 1893, No. 359, Public.

Copy of the above, and of the report, forwarded to the Government of India, Revenue and Agricultural Department.

Chief Secretary.

Gobt. of {1893} Madras.
PUBLIC.

Issued

Recd.

Encl.

G.O., &c., 3rd May 1893,
Nos. 358, 359.

MAY.

Madras Observatory.

Directing that the report for the Indian Observatories Committee on the working of the — during 1892-93 be forwarded to the Government of India.

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The time gun, which is fired twice a day, failed only 10 times, and was 1 second late on two other occasions. Of the 10 failures, three were due to bad friction-tubes, one was unexplained, and the remaining six were due to the firing instrument having broken down and having to be removed for repairs.

The semaphore failed or was more than 1 second wrong on 18 occasions out of a total of 609; three of the failures were due to faults at the Observatory; three others to one of the lines from the Telegraph Office having come in contact with the Observatory line and dropped the semaphore too soon by means of false currents. The remainder were apparently due to the commutator in the Telegraph Office. The failures were much less numerous than in any former year.

6. *Observations.*—No systematic observations other than those required for time determinations have been made, but a considerable amount of time was spent in completing the observations referred to in last report, for comparing the merits of Kodaikānal, Kóttagiri and Madras as sites for an observatory. These observations were discussed in a separate report, and it is only necessary to add here that the meteorological observations which have since been discussed entirely support the conclusions that were arrived at. Some time has also been spent on observations of the sun with the object of obtaining suitable absorption media for viewing the prominences without the use of a spectroscope. A few observations were also made on the zodiacal light which was remarkably conspicuous in December 1892 and January 1893. The Officiating Government Astronomer greatly regrets that so little has been done in the way of observation, but so long as the publication of the old observations is continued at the present rate it is quite impossible to devote much time to anything else.

7. *Reductions and Publication.*—The fifth volume of the Madras Meridian Circle Observations (1874–75–76) was completed early in July and was distributed soon after. The sixth volume was complete, with the exception of a few pages of the introduction,

at the close of the year. This volume has been a particularly heavy one for several reasons. It deals with 9,637 observations against 4,639 in the previous volume. A large proportion of the stars, too, were observed for the first time, and for these the constants had to be revised throughout. There exists a sheet of constants for each star observed, but these were worked for only approximate places and with 4-place logarithms, and hence when dealing with the first year in which any star was observed the constants have to be revised, using the exact place and 5-figure logarithms. This would not take much time if the original calculations had been accurately made, but though each logarithm and each addition is "ticked" as an indication of having been revised, no farther evidence is to be found of revision in the work, for probably at least 10 per cent. of the sheets contain arithmetical blunders, while at least 10 per cent. more contain serious errors in the assumed place of the star. The whole of this revision was done by the Astronomer himself. Probably it would have been less laborious to calculate the precessions and secular variations afresh from Stone's tables. In addition to the blunders referred to, it has been found that the reductions of the observations themselves during the period dealt with were very inaccurate and a great part of the time of the First Assistant has been taken up in revising these. One of the reasons of this state of affairs seems to have been that the observer M, instead of doing his own reductions, handed them over to his son who had no interest in the work such as would induce him to take any special care with it. Every care has been taken to check the final results, and it is hoped that at least a fair degree of accuracy has been attained, but the expenditure of time and labour has been very heavy. A good deal of the preliminary revision for the next volume has been completed, and as there were fewer stars observed for the first time in the period 1880–82, the preparation of the volume will take less time than was taken for the last. Meanwhile, the work on the final catalogue progresses slowly. The mean positions, magnitudes, and dates of all the stars included in the printed volumes have been tabulated for hours 0 to 4 and in a few cases the mean position for 1875 has been deduced. It is now time to consider the exact form which the catalogue should take, and the Officiating Government Astronomer will be glad to receive the advice of the Committee on this point. The arrangement that at present seems most convenient is that of the Cape Catalogue, but with different references. In particular it seems that the references to Bradley and the B.A.C. should be given and probably also those for the Cape (1880) and Argentine Catalogues, while at least Piazz, Fallows, Henderson, Johnston, Cape 1860, and Melbourne might be omitted. Another point on which advice is desired is the extent to which an attempt should be made to calculate proper motions from Taylor's observations. It seems doubtful whether it is worth doing this, except in cases of large change, until Taylor's places have been thoroughly revised.

8. *Meteorological.*—Meteorological observations were continued as in the previous year, except that since 1st January, the 2 P.M. observations have been discontinued, and that additional cloud observations were made throughout the year for comparison with the observations made at Kodaikānal and Kóttagiri. Considerable progress has been made with the reduction and publication of the old meteorological observations. At the close of the year, the whole of the hourly observations for the period—January 1856 to February 1861—were in type and the introduction and final tables of averages were in the hands of the printers. The preparation of tables of 5-day averages has been begun. In the case of the rainfall, this will contain the results of 80 years' observations, as the rain records for that period are thoroughly trustworthy. The period for the other elements has not yet been decided upon, as, except in the case of the barometer, there are difficulties due to changes in exposure and use of a different class of instruments which may render it impossible to utilize the older observations along with the newer. The full discussion of the great mass of really good observations available will take much time, and so it is proposed to issue the volume dealing with them in parts. The first part taken in hand is the rainfall, and the tables for this are well advanced.

9. *General.*—The work of cataloguing and arranging the library has been pushed on as rapidly as other duties would permit. The names of all the bound books have been entered on slips, and rough lists have been made of the pamphlets and unbound

volumes. Some progress has also been made in completing imperfect sets, but in this as in many other ways, the Officiating Government Astronomer has felt himself to be considerably hampered by the temporary nature of his appointment. A large part of the manuscripts in the Observatory have been catalogued, and all those referring to meteorological observations made throughout the Presidency, outside of Madras, have been arranged, indexed, and handed over to the Meteorological Reporter to the Government of Madras. Up to the end of the year, 316 volumes were bound at the Government Press and 33 other volumes are at the Press for binding.

ORDER—dated 3rd May 1893, No. 358, Public.

The report will be forwarded to the Government of India.

(True Extract.)

Chief Secretary.

To the Government Astronomer.

ENDORSEMENT—dated 3rd May 1893, No. 359, Public.

Copy of the above, and of the report, forwarded to the Government of India, Revenue and Agricultural Department.

J. F. PRICE,
Chief Secretary.

Govt. of {1893} Madras.
PUBLIC.

Issued

Recd.

Encl.

G.O., &c., 3rd May 1893,
Nos. 358, 359.

MAY.

Madras Observatory.

Directing that the report for the Indian Observatories Committee on the working of the — during 1892-93 be forwarded to the Government of India.