

1898.
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VICTORIA.

THIRTY-SECOND REPORT

OF THE

BOARD OF VISITORS

TO

THE OBSERVATORY;

TOGETHER WITH THE

REPORT OF THE GOVERNMENT ASTRONOMER

FOR THE PERIOD FROM 1ST JULY, 1897, TO 30TH JUNE, 1898.

PRESENTED TO BOTH HOUSES OF PARLIAMENT BY HIS EXCELLENCY'S COMMAND.

By Authority:

ROBT. S. BRAIN, GOVERNMENT PRINTER, MELBOURNE.

THIRTY-SECOND REPORT OF THE BOARD OF VISITORS TO THE
OBSERVATORY.

To HIS EXCELLENCY THE HONORABLE SIR JOHN MADDEN, *Knight, the
Chief Justice of the Supreme Court of the Colony of Victoria, and
Administrator of the Government of the said Colony, &c., &c., &c.*

We have the honour to report to Your Excellency that we made our annual visitation to the Observatory, on the 22nd August, and received the report of the Acting Government Astronomer (Mr. P. Baracchi) for the year ending 30th June, 1898, which we append hereto. We also made full inquiries as to the present condition of the establishment, the work in progress, and requirements referred to in the Acting Government Astronomer's report. The various books and ledgers containing the records of observations during the year under review were submitted for our inspection.

We have much pleasure in reporting that we found everything in excellent order, and ample evidence that the work of the year in each branch has been carried out assiduously and systematically, and that the best use has been made of the valuable instruments and appliances under Mr. Baracchi's charge. We also consider the class of work accomplished is such as best meets public requirements from such an establishment, as well as making substantial additions to general scientific knowledge. The Board is much gratified to find that several of its recommendations, made in accordance with former reports of the Acting Government Astronomer, have been approved by the Government, and means provided on the Estimates of the year for carrying them out, and heartily approves of the co-operation agreed upon between the Government Astronomer of New South Wales (Mr. H. C. Russell) and Mr. Baracchi with regard to the measurement of the photographic plates of the Melbourne and Sydney portion of the "Photographic Charts of the Heavens," by which it is arranged that, while the two observatories share the expense, the whole work will be done in Melbourne at much less cost than if a separate staff were engaged for the purpose at each Observatory.

We note with satisfaction that Mr. Baracchi has been able to visit all the principal meteorological stations in the colony and inspect the instruments and methods of observing, and we strongly recommend that this may be done periodically in order to secure uniform and trustworthy information in connexion with our weather and climatic statistics.

In his report, Mr. Baracchi calls our attention to the urgent requirements of more accommodation in the messengers' quarters, and of a room for storing apparatus when not in use; we beg to recommend that steps may be taken as soon as possible to provide the necessary additions. He also informs us that he has been requested by the Seismological Committee of the British Association for the Advancement of Science to co-operate with other parts of the world in obtaining records of earthquake and earth-tremor phenomena with a special form of instrument, which will be used at all Observatories co-operating. The Board is of opinion that Mr. Baracchi should share in this work, and be provided with the necessary instrument, which, he states, will cost £50.

We regret to find that the Acting Astronomer still occupies the anomalous position he has occupied since he has had charge of the Observatory; his salary being that which he enjoyed prior to the retirement of Mr. Ellery, and we venture to hope that the Government will soon be able to appoint Mr. Baracchi to the full position of Government Astronomer, with the emolument fixed thereto under the Public Service Act.

R. L. J. ELLERY, Chairman.
ALFRED DEAKIN.
W. C. KERNOT.
THOMAS R. LYLE.
H. J. WRIXON.
MARTIN H. IRVING.
G. V. SMITH, Hon. Secretary.

REPORT ON THE GENERAL STATE OF THE MELBOURNE OBSERVATORY AND ON THE WORK EXECUTED DURING THE PERIOD 1ST JULY, 1897—30TH JUNE, 1898.

PRESENTED TO THE BOARD OF VISITORS.

GROUNDS AND BUILDINGS.

All the buildings on the Observatory grounds, and the main gates, were repainted externally in October last. Unfortunately, the money allotted by the Public Works for the purpose gave out before completion, in consequence of which the astrophotographic house was only half done. The Department could not be moved to remedy the anomaly.

The regravelling and asphaltting of the main road and minor paths has not been done yet, and the general repainting and repairing of the fences is another item which should be attended to without further delay.

The quarters for the caretaker and senior messenger do not afford sufficient accommodation, and a lumber room is required for the services of the Observatory. The necessary additions could be made by utilizing a part of the yard.

INSTRUMENTS.

Forty rain-gauges, 51 thermometers, and one barometer were purchased for distribution to up-country observers. The sidereal control, Evans, and hall clocks were cleaned, the driving clocks attached to the ombrograph, and to the time arrangement for rescau-printing, were repaired, and the driving clock of the astrophotographic instrument was taken down and thoroughly examined and cleaned.

The Robinson's anemometer required some repairs and adjustments.

A simple nephoscope has been erected on the grounds for facilitating cloud observations.

Two additional slides for the cloud camera were found necessary for taking cloud photographs in quick succession.

The transit circles, astrophotographic telescope, chronometers, and other apparatus in constant use were periodically attended to in the same way as described in my former reports.

Other occasional repairs and adjustments of minor importance were effected.

At present all Observatory instruments are in good working order.

THE STAFF.

I mentioned in my last report that the Public Service Board advertised for an assistant to the Melbourne Observatory at a salary of £150 per annum. About 45 applications were received, the majority of the applicants possessing very good qualifications and, in several cases, high University degrees.

One of the applicants was Mr. F. Ingamells, who, in 1895, resigned his position in the Observatory after twelve years of creditable services, and the circumstance that his practical experience would enable him to be of immediate use to me, placed him in front of others who had superior educational qualifications, but not Observatory training. The Public Service Board recognised this advantage, and appointed him. Mr. Ingamells entered upon his duties on 1st November last. Messenger Thorp was transferred to the Public Works Department on the 11th March, 1898, and Messenger Hamilton was transferred from the Telegraph Branch of the Postal Department to the Observatory on the same date. The change has so far proved advantageous to this institution.

The list below shows the present constitution of the staff, viz.:—

Chief Assistant	Vacant.
Second Assistant	Mr. W. SWAN.
Third Assistant	Mr. E. T. QUAYLE, B.A.
Fourth Assistant	Mr. W. WALLACE.
Photographic and Meteorological Assistant ...	Mr. F. KEMP.
Meteorological and General Assistant ...	Mr. F. N. INGAMELLS.
Weather Telegraph Clerk	Mr. D. HODGE.
Junior Clerk and Caretaker	J. MANNIX.
Senior Messenger and Mechanical Attendant	J. BYRNE.
Junior Messenger	E. M. J. HAMILTON.

A gardener and a charwoman have been temporarily employed as in the previous years.

Mr. R. Vaughan is the attendant in charge of the tide gauge and time ball apparatus at Williamstown, who is paid at the rate of 1s. 6d. per day.

Twelve observers in charge of meteorological stations included in the intercolonial weather service receive a bonus of £10 a year, excepting one case in which the bonus is £5 a year. There are also some 560 honorary meteorological recorders scattered in every part of the colony.

THE WORK.

TRANSIT CIRCLE OBSERVATIONS.

The meridian work and reductions accomplished during the period under consideration are specified in the following statement, viz.:—

Observations in right ascension, 2,060. Of these, 706 were of clock stars; 208 were of circumpolar stars for azimuth; 1,066 were of list stars for the reduction of plates of the astrophotographic catalogue.

Observations in north polar distance 1,202.

These include all the list stars, and 11 close circumpolar stars specially observed for latitude.

Observations for Level	...	...	...	...	223
Collimation	...	...	...	...	122
Nadir	...	...	...	...	98
Flexure	...	...	...	...	13
Runs	...	...	...	...	45

The state of the reductions is as follows, viz.:—

In right ascension, all stars have been reduced to apparent place to 6th June, 1898.

Clock and azimuth stars have been fully reduced to 6th June, 1898.

All stars have been reduced to correct meridian transit.

In north polar distance, all observed stars fully reduced to 30th June, 1898.

Separate results for 1897 complete. Annual catalogue for 1897 in course of preparation.

Mr. Swan has prepared working lists of stars selected from the plates of the photographic catalogue, arranged in hourly zones.

TIME SERVICE.

On all week days, principal holidays excepted, the following time arrangements were observed:—The time-ball was dropped at 1 p.m. statute time, corresponding to 3 a.m. Greenwich time, same civil date. There were thirteen failures, owing to faults on the line—outside the control of the Observatory in eight cases, and to unavoidable absence of the attendant at Williamstown in five cases.

Time signals sent daily at 1 p.m. to the Central Telegraph Office in town, and thence distributed to all telegraph stations in the colony. Clock beats supplied throughout the day to the Melbourne Railway Station, used for regulating all railway clocks. Hourly signals sent through special lines to Parliament House, Chief Secretary's Office, &c. Post-office clock compared daily by a set of clock beats after 1 p.m., and the error published in daily papers. Control of synchronous clock at the Central Telegraph Office for distribution of time signals to subscribers.

ASTROPHOTOGRAPHIC OPERATIONS.

Number of catalogue plates exposed, 39; rejected, 2.

Number of chart plates exposed, 149; rejected, 15.

Number of plates for trails, 20; rejected, 0.

Number of plates for adjustment of centre, 10; rejected, 0.

Number of plates for Oxford type charts, 9; rejected, 0.

Number of plates for region round the South Pole, 28; rejected, 0.

One plate on ω Centauri; exposure, 3 hours.

One plate on κ Crucis; exposure, 3 hours.

Two plates on comet Coddington; exposure, 1 hour.

Two plates for scale values.

Six hundred and fifty-one stars were selected from 145 catalogue plates, measured and tabulated for transit observations.

The adjustments of the polar axis, &c., of the instrument were periodically examined, and found very steady and satisfactory.

Ilford plates were used throughout, as in past years.

The actual state of the astrophotographic work to 30th June, 1898, was as follows:—Catalogue plates complete; chart plates, total 278.

METEOROLOGICAL SERVICE.

This part of the Observatory duties involved practically the same routine as in previous years, namely, the issue of daily weather forecasts; preparation of daily distribution of rainfall, &c., from telegraphic returns; preparation of monthly statistics from the records made at all existing stations; daily observations of meteorological elements at the Observatory, as the central first-class station of the service; and information for the press.

A new barometric station was established at Warrnambool in November, and a similar one at Cape Patton in March last.

The number of new rainfall stations established since 1st July, 1897, is 50.

The total number of meteorological stations is now 573.

The records and statistics for the half-year ending 31st December, 1897, are in the hands of the Government Printer.

TERRESTRIAL MAGNETISM.

Absolute determinations of the values of the magnetic elements were made on 24 days.

The photographic registration of magnetic declination, horizontal and vertical component, was secured throughout the year, with some slight interruptions occasioned by accidental occurrences, such as failures of the gas light, &c. The total aggregate durations of these interruptions is three hours. A two days' curve of the horizontal component was lost through misplacement of the paper on drum.

MISCELLANEOUS.

Twelve chronometers were rated, and one thermometer, one aneroid, and one steel tape were tested during the year.

Thirty-six photographs of the sun were taken on occasional days.

The great telescope and south equatorial were used only for visitors and for a few scattered observations; but no regular work was done with them.

CLOUD OBSERVATIONS.

This work was undertaken in connexion with the scheme, and at the request, of the International Meteorological Committee, and its character and purpose were explained at some length in my last report to the Board. The up-country observers completed their task by the end of December last, and we have now some 20,000 complete records of cloud observations awaiting to be examined, discussed, and prepared for publication.

The photographic operations carried on simultaneously at the Observatory and on the roof of Parliament House have been continued throughout the year, with the assistance of Messrs. Killen, Woods, Harvey, and Mulvany, who have had charge of the station at Parliament House. One hundred and forty-eight pairs of plates were obtained, a number of which have been measured, and found to give satisfactory results. The work has proved interesting, and will not be brought to a conclusion till the end of the current year.

VISITORS.

It has been found impracticable, as usual, to strictly enforce the rule that no visitors can be allowed at night. Hundreds of applications were received from visitors to the colony, and persons specially interested in astronomy.

In the course of the year ending 30th June, 1898, the number of visitors admitted at night was 208, and that of visitors on Wednesday afternoons 164. At the request of the Victorian Branch of the British Astronomical Association an arrangement has been made to allow 12 members to visit the Observatory at night once a month.

LIBRARY.

From 1st July, 1897, to 30th June, 1898, 286 volumes, 111 pamphlets, and 39 periodicals were presented to the library of the Observatory.

Twenty-one new books were purchased, and 17 scientific periodicals were obtained by annual subscription. Fifty volumes were bound at the Government Printer's office.

GENERAL REMARKS.

After the appointment of Mr. Ingamells it became possible to partly re-arrange the routine work of the Observatory, with the object of facilitating the progress of the astrophotographic operations. Accordingly, the observer engaged in these operations was entirely relieved of all other work and duties of a periodical character, thus being enabled to devote the whole of his time to the chart plates, and to utilize any part of the night offering the best atmospheric conditions for the long exposure photographs. For this night-work the observer is allowed to take equivalent time off on the day following an observing night when the work is protracted beyond half-past eleven p.m., and receives besides half a holiday on Thursday afternoons, in addition to the usual half Saturdays and full Sundays. These arrangements have so far worked satisfactorily. All the observers engaged in night-work applied, some time ago, for payment or other compensation in lieu of overtime, and the authorities granted them time allowance to the extent indicated above, in the case of the astrophotographic observer, and as indicated below in the case of the two transit observers, viz.:—Each transit observer is on night duty on alternate weeks, the work amounting, on an average, to five hours, distributed generally over two or three nights at most. For this they are relieved from attendance at the Observatory on alternate Saturdays, and are allowed to leave half-an-hour earlier than regulation time on the days of their respective observing week.

The Adelaide Observatory has continued the observations of zero stars for the reduction of our photographic catalogue. The number of such stars completely observed at Adelaide to 1st July, 1898, is 200; observed twice, 70; once, 80.

These added to the Melbourne observations make, so far, a total of 2,830 zero stars observed at least three times, 135 observed twice, and 116 observed once.

In January last I went to Sydney to consult with Mr. H. C. Russell, the Government Astronomer of New South Wales, as to the best means of measuring and reducing the plates of the photographic catalogue of our respective zones. We came to the conclusion that there would be many advantages if the whole of this work were done at one Observatory, instead of each Observatory doing its own part. Mr. Russell suggested, and I accepted, that the measurements should be made at the Melbourne Observatory, the two colonies sharing the expense of the undertaking.

It was agreed that four young assistants (preferably women) should be employed for this work, assisted by one of the officers of the Melbourne Observatory, at an aggregate cost of £257 a year.

These proposals were duly submitted to our respective Governments, and I am glad to report that they have been sanctioned. The annual sum of £257 for this purpose is very low indeed, but Mr. Russell thought that our chances of succeeding with the authorities would have been greatly diminished if we proposed a larger sum.

I am now awaiting instructions from the Honorable the Chief Secretary as to the course to be followed in making the necessary appointments, and I hope that the work may be commenced without further delay.

At the last Sydney meeting of the Australasian Association for the Advancement of Science, the General Council resolved to ask the Victorian Government to provide the necessary funds for dealing with the observations in terrestrial magnetism made at the Melbourne Observatory during the past 30 years, in view of the great interest that would be attached to the results of a complete investigation of these records. The Board pointed out the desirability of utilizing the magnetic observations of past years in their Thirtieth Report. I am glad to inform the Board that the Honorable the Chief Secretary has placed a sum of £100 on the Estimates for the current financial year, to be employed for this purpose.

In March, 1897, the Honorable the Chief Secretary granted permission to a young gentleman, who was to have joined the Belgian expedition to the South Pole this year, to frequent the Observatory, in order to gain experience in practical astronomy and terrestrial magnetism. This gentleman attended for about twelve months, during which time he was trained in sextant work and in the use of magnetic instruments.

In August, 1897, I applied to the Superintendent of the Kew Observatory, Dr. Charles Chree, for the loan of a complete set of magnetic instruments, and after some correspondence, the Kew committee acceded to my request, on condition that a guarantee be given for the return of the instruments in good order. As the transaction was somewhat outside the ordinary course of departmental matters, I asked the Council of the Royal Society of Victoria to give the necessary guarantee, which was readily granted. The instruments arrived in June last.

My reason for obtaining the instruments was the concurrence of several circumstances which offered opportunities to utilize them for valuable and much-needed service, either in Victoria Land in connexion with the Belgian expedition, or in New Zealand, where a reliable observer had expressed a strong desire to devote a year or two to magnetic work in that colony, or in Victoria, for the redetermination of the magnetic elements at some of Dr. Neumayer's stations.

Unfortunately, the wreck of the *Belgica* brought the Belgian expedition to a sudden end.

In regard to New Zealand, a great movement is taking place to initiate a magnetic survey of the island, and the establishment of a permanent magnetic observatory; and it is most likely that the Kew instruments will be sent there to commence at once the preliminary operations, and to be used till new instruments are obtained.

In regard to Victoria, it is very desirable to train a few professional men in other departments of the civil service for field magnetic work, in order to take every available opportunity to gradually make a fresh magnetic survey of the colony.

The Seismological Committee of the British Association for the Advancement of Science sent an urgent request to the Australian Observatories to undertake a more systematic registration of earthquakes, specially recommending the Ewing's horizontal pendulum.

The seismograph now in use at the Melbourne Observatory is not sufficiently sensitive to record slight earth tremors, in consequence of which many such occurrences, probably more than we suspect, pass unnoticed.

It would, therefore, be very desirable to purchase the new instrument of the form recommended by the B.A.A.S.

Last autumn I visited the principal meteorological stations in the colony. This inspection brought to light various matters requiring attention, and gave me the opportunity of learning personally the public requirements in meteorological matters at the different localities. I presented to the Honorable the Chief Secretary a detailed report on the present state of the meteorological service in Victoria, with suggestions for rectifications and additions, which were approved, and a sum of £150 has been placed on the Estimates for carrying them out.

P. BARACCHI.

Melbourne Observatory,
22nd August, 1898.