

1907.
VICTORIA.

F O R T I E T H R E P O R T

OF THE

BOARD OF VISITORS

TO

T H E O B S E R V A T O R Y ;

TOGETHER WITH THE

REPORT OF THE GOVERNMENT ASTRONOMER

FOR THE PERIOD FROM 1ST APRIL, 1905, TO 30TH NOVEMBER, 1906.

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

By Authority

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FORTIETH REPORT OF THE BOARD OF VISITORS TO THE
OBSERVATORY.

*To HIS EXCELLENCY THE HONORABLE SIR REGINALD ARTHUR JAMES
TALBOT, Knight Commander of the Most Honorable Order of the
Bath, Governor of the State of Victoria and its Dependencies
in the Commonwealth of Australia, &c., &c., &c.*

We have the honour to inform your Excellency that we made our annual visitation to the Melbourne Observatory on the 14th of December last, and received the report of the Government Astronomer, which is appended.

From this Report, and from inquiries concerning the past year's work, the Board is satisfied that the special as well as the routine duties of the Observatory in all its departments have been efficiently carried out, and that the instruments and apparatus are in good condition and well cared for.

During the past year the Federal Government has, in accordance with our recommendation in a report submitted to the State Authorities in July, 1902, taken over the control of all meteorology for the Commonwealth, and we think that this step will be to the advantage both of Astronomy and of Meteorology in Australia. It will, however, involve important changes in the Observatory, and will necessitate careful consideration of different questions bearing on the transfer of the Meteorological Department to the Federal Authorities, and of the future scope and possibly the future method of control of the Observatory.

These questions have already to some extent been considered by us, but we think it premature to make any recommendation until the Federal Authorities have proceeded further in the establishment of their Meteorological Department. We will then, if required, be glad to advise your Excellency in the matter.

We again strongly urge that the post of Chief Assistant to the Government Astronomer, which has been vacant for many years, should be filled by the appointment of a young Astronomer. It is unwise in the interests of the Observatory, and unfair to Mr. Baracchi, that he should have no fully qualified scientific assistant.

We wish to draw your Excellency's attention to a matter seriously affecting the usefulness and the reputation of the Observatory.

Many years ago, owing to retrenchment, the printing of all scientific work done at it was stopped, and no publications have been issued since. All the Astronomical, magnetic, and meteorological records that have been obtained during these years, at great expense to the State, have been stowed away, and are not available for use.

The Astronomical and Magnetic records would, owing to the unique position of the Observatory, be of great value to Astronomers and Scientists all the world over, and the expense incurred in maintaining the Observatory will be practically wasted unless these records are rendered available for use, and so further the advance of astronomical and scientific knowledge.

Even the publication of the local weather reports has been abandoned for many years.

These reports are being continually asked for, and would be of great value to many sections of the public of this State, especially to engineers and to all those interested in industries that depend more or less on the weather.

In regard to the general upkeep of buildings and grounds, small expenses will have to be incurred during the present year, and the making of the house connexions to the Metropolitan sewerage system should no longer be delayed. The sanitary conveniences at the Observatory are practically in the same state as they were twenty years ago, when the staff was less than one-fourth what it is at present, and it is five years since the Metropolitan Board sewers were completed to the Observatory boundary.

We strongly urge that the work of properly sewerage the Observatory be at once commenced.

THOMAS R. LYLE, Chairman.
W. C. KERNOT.
THEODORE FINK.
H. J. WRIXON.
J. M. REED.
ALFRED DEAKIN.
R. L. J. ELLERY.
A. J. PEACOCK.

I visited on the 8th February, 1907. In all other respects I beg to indorse the report of the other visiting members.

W. R. CRESWELL.

REPORT ON THE STATE OF THE MELBOURNE OBSERVATORY AND
ON THE WORK DONE DURING THE PERIOD 1ST APRIL, 1905—
30TH NOVEMBER, 1906.

Grounds, Buildings, and Equipment.—In my last report I gave the following list of works which were stated to be urgently required, namely:—

- Structures for new wind recording apparatus.
- Sewerage connexions and fittings.
- Repairs to the roofs of the main buildings.
- Repairs and painting of fences.
- Work on the main drive.
- Painting the Astrophotographic houses.

The first item in this list has since been carried out by the Public Works Department, and comprises an iron tower 40 feet in height erected within and near the north-eastern boundary of the Observatory enclosure, on which has been mounted the Dines' Pressure Tube Anemometer; and a stand constructed for the support of the New Maximum-Wind-Pressure-Plate recorder which has been mounted on the roof of the main buildings. It will be remembered that these two instruments were obtained in 1903, through the National Physical Laboratory, but could not be installed and set to work until these structures had been completed.

All the other works, however, still remain to be done, and are still more urgently required.

The filtered water tank used in connexion with photographic operations only was removed on the eastern side of the Astrophotographic house, and a small wooden enclosure was built under it for the purpose of installing a "Salvator Water Sterilizer" and a set of filters, the Delphin and the H. Berkefeld. This new arrangement is intended to serve in the dark room an ample supply of filtered and sterilized water for developing and finishing Astrophotographic plates.

The electric circuits required for recording astronomical observations, for the Time service, and for the direct telegraphic communication with outside places, having been in use for many years, had become so deteriorated and out of date that the renewal of the entire system became necessary. This task was undertaken by the officers of the Postal Department, and successfully carried out in July, 1905. For this purpose a new telegraph bench, with battery cupboards, switch boards, and accessories, were mounted in the West Transit room, and a considerable quantity of new telegraphic material was obtained. At the same time all electric light cables within the Observatory enclosure leading to the various buildings were rearranged and partly renewed, in order to complete the inside work done in previous year for the improvement of the Electric Light Service, which has since been satisfactory.

The tide-gauge house wells and apparatus, also the mechanism for dropping the time ball at Williamstown, were repaired and generally overhauled on three occasions in 1905, and twice this year.

The work done to the existing instruments consisted chiefly of small repairs, and the usual periodical cleaning and adjusting, to ensure satisfactory performances.

The additions made to instrumental equipment since 1st April, 1905, are as follows, viz.:—

- 100 Raingauges, complete.
- 100 Extra raingauge glass measures.
 - 1 Mercurial barometer with specially extended scale.
 - 1 Thermograph.
 - 1 Hygrometer.
 - 1 Pocket Dust Counter.
 - 2 Reading microscopes.
 - 1 Reading telescope.
 - 1 Telemicroscope.

Various microscope objectives, astronomical eyepieces, laboratory stands, and other laboratory accessories.

Staff.—The only change occurred in the permanent staff since April, 1905, is the transfer of Mr. J. T. Curtain to the Law Department in February last. The permanent staff is at present constituted as follows:—

Chief Assistant	...	...	...	...	Vacant.
Assistant Observer and Computer	...	...	...	...	Mr. W. J. SWAN.
Assistant Observer and Computer	...	...	...	...	Mr. E. T. QUAYLE, B.A.
Assistant Observer and Computer	...	...	...	...	Mr. W. J. WALLACE.
Meteorological and Photographic Assistant	...	...	...	...	Mr. F. KEMP.
Meteorological and General Assistant	...	...	...	...	Mr. F. N. INGAMELLS.
Weather Telegraph Clerk	...	...	...	...	Mr. D. HODGE.
Assistant Astronomical Computer	...	...	...	...	Miss C. E. PEEL.
Caretaker, also acting as Clerk	...	...	...	...	Mr. J. J. MANNIX.
Senior Messenger and Mechanical Attendant	...	...	...	...	Mr. J. BYRNE.
Office Cleaner	...	...	...	...	Mr. A. E. ANNISS.

The Temporary Staff.—As in previous years, one section of the temporary staff, consisting of young ladies, was employed for the measurement of stellar negatives, and another section for the measurement and reduction of the long series of magnetic curves of past years.

The following changes occurred in the temporary staff since 1st April, 1905:—

- Miss M. C. Greer, resigned 31st May, 1905;
- Miss E. Watts, resigned 18th April, 1905;
- Miss R. Rayson, re-entered on duty on 1st June, 1905, and resigned on 9th October, 1906.

The vacancies were respectively filled by the appointment of—

Miss E. Hockin, on 1st May, 1905;
Miss H. M. Browne and Miss M. A. Heagney, on 28th November, 1906.

In the Magnetic Staff—

Mr. H. J. Exley, resigned 30th April, 1905;
Mr. R. S. Browne, resigned 31st July, 1905;
Mr. H. M. Parke, resigned 30th June, 1906;
Mr. C. J. Briggs, served from 1st May, 1905, to 19th August, 1905;
Mr. S. B. Gravenall, served from 9th August, 1905, to 31st January, 1906.

The vacancies were successfully filled by the appointment of—

T. R. Sorrell, on 13th February, 1906.
P. McNabb, on 13th February, 1906.
G. M. Farrell, on 30th October, 1906.

The present Temporary Staff is constituted as follows:—

Measuring Bureau.

Miss E. Sheldon,
Miss B. C. Scott,
Miss E. Hockin,
Miss I. Trigge,

Miss A. Alexander,
Miss M. A. Heagney,
Miss H. M. Browne.

Magnetic Staff.

Mr. J. A. Moroney,
Mr. G. H. Woodhouse,

Mr. T. R. Sorrell,
Mr. G. M. Farrell.

Mr. P. McNabb is assisting in meteorological and general office duties.

Extended leave owing to ill health was granted to—

Miss C. E. Peel, for five months, from 22nd March to 21st September, 1905.
Miss B. C. Scott, for three months, from 17th May to 16th August, 1906.
Mr. W. J. Wallace, for four months, from 16th May to 16th September, 1906.

Mr. H. J. R. Lawrence has been employed at occasional intervals assisting in the preparation of the *Star Catalogue* for 1900.

Mr. C. M. Otto has been continuously employed as instrument maker, and his routine duties have been chiefly to keep the Observatory equipment in good working order, and to adjust standard weights and measures, and to repair and adjust weighing apparatus for Government Departments and municipalities.

Mr. R. Vaughan has attended daily to the tide-gauge and time-ball at Williamstown.

A gardener and charwoman have been employed as usual.

The number of official observers in connexion with the Victorian Weather Service has increased to 991, of which only ten receive a bonus of £10 per annum, the others rendering their services to the Observatory gratuitously.

MERIDIAN OBSERVATIONS.

Stars.	Observations in—	
	R.A.	N.P.D.
Azimuth stars	363	191
Clock stars	888	...
List stars	2,231	2,238
Total	3,482	2,429

The list stars were selected in accordance with previous practice, from the plates of the Astrophotographic Catalogue, to be used as fundamental stars for the reduction of these plates.

The total number of this class of stars which have been completely observed three times or more, is now 5,519.

The annual catalogue for 1904 and the separate results for 1905 have been prepared.

ASTROPHOTOGRAPHIC OPERATIONS.

The following table shows the extent to which this work has been carried out:—

Designation of Regions, &c.	No. of Plates—	
	Passed as Satisfactory.	Rejected.
Chart plates with triple exposures of 30 ^m each ...	93	7
Catalogue plates, duplicate series	32	2
Test plates on South Polar Region	29	...
Test plates on Oxford Type Regions	13	...
Plates for Trails, adjustment, &c.	24	...

The total number of chart plates with triple exposure passed as satisfactory up to 30th November, 1906, is 588, and that of the duplicate catalogue series is 487.

I intend to extend the triple exposure method to the regions with centres at even degrees of Declination, for which negatives with single exposure of one hour have already been obtained. I intend also to complete the Duplicate series of Catalogue plates.

For a considerable time, however, I have been extremely dissatisfied with the poor progress which has been made in photographing our zones, and this proposed continuation of the work could not possibly be undertaken without radical changes in the permanent staff.

The Astrophotographic Measuring Bureau.—The measurement of plates has been continued throughout the period under consideration, and satisfactory progress has been made in regard to both the Sydney and Melbourne zones. The Bureau is still maintained at the joint expense of the States of New South Wales and Victoria.

The work done since 1st April, 1905, is as follows, viz. :—

Catalogue plates completely measured in the direct and reversed position.

234 Sydney plates, containing 145,032 stars.

224 Melbourne plates, containing 62,110 stars.

The state of the work to 30th November, 1906, is as follows:—

Plates completely measured—

For Sydney, 551 plates, containing 322,101 stars.

For Melbourne, 836 plates, containing 268,714 stars.

The Photoheliograph, the Great Telescope, and the other two equatorials were used occasionally, but no systematic work was done with them.

The astronomical programme was practically limited to Meridian observations and Stellar photography.

Time Service.—The time-ball at Williamstown Lighthouse was dropped daily at 1h. om. os., Melbourne statute time, 10 hours fast on Greenwich. Time signals were supplied daily as usual to the Post Office, and thence to all telegraph stations in the State. The transmission of clock beats, without interruption, to the Railways and Public Departments was continued as in previous years.

Terrestrial Magnetism.—The magnetic instruments by which the variations of the magnetic elements are registered photographically, have been in action throughout the period covered by this report. The magnetic work was carried out according to previous practice. The measurement of the hourly ordinates on the photographic traces obtained since 1868 is now practically complete, and the classification of disturbances for the whole period has been commenced.

Seismology.—The photographic registration of earth tremors by the Milne Horizontal Pendulum has been continued without serious interruptions.

Tides.—A continuous register of the behaviour of the tides at Williamstown has been obtained as usual by the self-recording tide-gauge.

A tide-gauge of the same type as that employed at Williamstown, which was installed by Professor Gregory on the pier of San Remo some years ago, was destroyed by fire last March. The records of a complete year were, however, obtained with this instrument, and are now in my possession. The tide records from visual observations made daily at South Channel, Pile Light, Point Lonsdale, and Geelong have been regularly supplied to the Observatory, once a month.

Weights and Measures.—The Bureau of Standard Weights and Measures, which became a part of the Observatory in 1902, has been more active than usual during the current year.

The work done in this Department consisted in the verification and re-issue of various sets of standards for the municipalities of Numurkah, Ballarat, Footscray, Donald, Portland, South Melbourne, North Melbourne, Bendigo, for the Victorian Railways and the Customs Department; also in examining, repairing, and adjusting a considerable number of balances and large weighing apparatus.

Testing of Instruments.—The rating of chronometers for the shipping, and testing meteorological, nautical, and surveying instruments for the public, formed part of the Observatory duties, as in previous years.

The Weather Service.—A new second-order station and 93 rainfall stations were established during the last eighteen months.

This service is now constituted as follows, viz. :—

1 First-order station at the Melbourne Observatory.

33 Second-order stations equipped with barometer, full set of thermometers exposed in Stevenson's screens, or temperature sheds constructed on the model of that in use at the Observatory, wind vane, and raingauge. At these stations three daily observations are made, at 9 a.m., 3 p.m., and 9 p.m.

42 Third-order stations provided only with max. and min. thermometers, exposed as those at second-order stations, and raingauge. Only one daily observation made, at 9 a.m.

872 simple rainfall stations, of which about 120 send daily telegraphic returns.

43 wind and weather stations, without instruments, reporting daily the state of the weather.

119 Inter-State weather stations send complete readings and weather reports daily by telegraph for the compilation of the weather chart on which the daily forecasts now issued by this Observatory are based. The half-yearly MSS. embodying the results of meteorological observations made at all weather stations in Victoria have been prepared for each half-year up to 30th June, 1906.

The Library.—The additions to the Library were as follows:—

Volumes presented	...	...	344	Periodicals presented	...	...	121
Volumes purchased	...	...	30	Periodicals purchased	...	...	34
Memoirs, papers, and pamphlets presented	...	...	572	Regions of the photographic chart of the Heavens presented	...	...	495

Seventy-five volumes were bound for the Observatory at the Government Printer's Office. Several hundreds of very important volumes are still awaiting to be bound.

All books received are now entered in the new Card Catalogue before being put on the Library shelves.

Visitors.—512 visitors were shown over the Observatory on Wednesday afternoon, and 202 visitors were given the opportunity of seeing through some of the telescopes at night.

General Remarks.—An examination of candidates for temporary positions in the Measuring Bureau was held at the Observatory last November.

Professor Lyle and the Surveyor-General (Mr. Reed) assisted me, as on previous occasions, in examining the papers and deciding on the relative merits of the candidate.

Dr. A. Alessio, navigating officer of the Italian man-of-war *Calabria*, who was commissioned to make Pendulum observations and determinations of the magnetic elements round the world, visited the Observatory in November, 1905, and was given every facility to carry on his work here, at the same spot where all Gravity observations have been made by previous investigators.

At the request of Professor Celoria, Director of the Royal Observatory of Brera, and President of the Milan Exhibition, an album containing illustrations of the instruments and work of this Observatory was sent as an exhibit.

Mr. G. Heimbrod, who is commissioned by the Carnegie Institute to take magnetic observations in the islands of the Pacific, visited the Observatory last November, for the purpose of comparing his instruments with ours by independent sets of observations, and the use of our magnetograph records. Every facility was given him to carry out his objects.

In May, 1905, the Directors of the Australian Observatories, on the suggestion of the Premier of South Australia, held a Conference in Adelaide, which I attended on behalf of the Melbourne Observatory, for the purpose of discussing various important matters in connexion with the proposed transfer of the Observatories to the Commonwealth. The results of the Conference were printed in a Parliamentary Paper issued in July, 1905.

Notwithstanding that the majority of my colleagues at the Conference were adverse to the absolute separation and independence of the Departments of Astronomy from those of Meteorology, the Federal Parliament subsequently passed an Act known as the "Meteorology Act 1906," by which the Commonwealth Government is to take over the State weather services, to form a single homogeneous weather organization under Federal control, leaving the Astronomical institutions in the care of their respective States, as hitherto; which is entirely in accordance with the recommendations previously made on this question by the Board of Visitors.

The new Federal Meteorologist is Mr. H. A. Hunt, of the Sydney Observatory. He was appointed last November, and it is expected that this Observatory will be relieved of all its meteorological duties by the end of the year 1907.

P. BARACCHI.

Melbourne Observatory,
December, 1906.