

1882.  
VICTORIA.

---

SEVENTEENTH REPORT

OF THE

BOARD OF VISITORS

TO

THE OBSERVATORY;

TOGETHER WITH THE

*Annual Report of the Government Astronomer.*

---

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

---

By Authority:

JOHN FERRES, GOVERNMENT PRINTER, MELBOURNE.

APPROXIMATE COST OF REPORT.

	£	s.	d.
Preparation—Not given.			
Printing (360 copies) .. .. .	13	0	0

## SEVENTEENTH REPORT

OF THE

## BOARD OF VISITORS TO THE OBSERVATORY.

TO HIS EXCELLENCY THE MOST HONORABLE THE MARQUIS OF NORMANBY,  
G.C.M.G., *Governor and Commander-in-Chief of the Colony of  
Victoria, &c., &c., &c.*

We have the honor to inform Your Excellency that we have visited the Observatory, and have seen the instruments and appliances, all of which were in perfect order.

The records of the observations made since our last Report were also submitted to us, and we were glad to find that the arrears of calculations and reductions of observations are being gradually overtaken. To prevent the recurrence of the delay which we have noticed in former visitations, it is absolutely necessary that the Astronomer should have the assistance of computers to be employed from time to time as the work may require. In this connection it gives us much pleasure to report that, in accordance with our recommendations, a junior assistant has been appointed, and that he is assiduous in the performance of his duties and in acquiring a knowledge of the general work of the Observatory. Having regard to the age and long service of the staff, it is apparent that provision should be made for supplying the places of the superior officers as they become vacant, and it would, in our opinion, be better to train up young men of capacity and promise for these appointments than to obtain them from England, as must otherwise be done.

The high price of building has delayed the preparation of the foundations of the new transit circle, but we are glad to know that the work will be done in good time to secure the steadiness of the piers before the instrument is mounted.

We have again to notice the condition of the grounds about the Observatory. No fund is provided for improving them, nor even for keeping them in order; and we beg leave to repeat our recommendation that they be put under the general supervision of the Director of the Botanical Gardens, and that he be requested to plant them largely in the spring, to check the dust, which, rising on the St. Kilda road, enters the buildings and injures the instruments.

We are glad to notice that the Government Astronomer proposes to form extra stations for observing the approaching transit of Venus more east and south than Melbourne, and we trust that the funds required for the purpose may be provided. This is the more important, because it appears from recent advices received from the English Committee of the International Conference on the Transit of Venus that the work of observing the transit in this part of the world is to be left to the Australian Observatories.

We append the Annual Report of the Government Astronomer, which contains full and interesting information concerning the work of the Observatory during the past year.

Since our last Report, the following gentlemen have been appointed members of the Board:—

His Honor the Chief Justice, Sir William F. Stawell, M.A., LL.D.  
 The Honorable F. Stanley Dobson, LL.D., M.L.C.  
 W. C. Kernot, Esq., M.A., C.E.

GEORGE VERDON, F.R.S.,  
 JAMES MOORE, M.A.,  
 M. H. IRVING, M.A.,  
 WILLIAM F. STAWELL,  
 F. STANLEY DOBSON, M.A., LL.D.,  
 W. C. KERNOT, M.A., C.E.,  
 G. V. SMITH,  
 J. E. BROMBY, D.D., Hon. Sec.

Melbourne Observatory, 15th August 1882.

---

## REPORT OF THE GOVERNMENT ASTRONOMER TO THE BOARD OF VISITORS TO THE OBSERVATORY, 15TH AUGUST 1882.

The Report which I have now the honor to submit to the Board refers to the year commencing 1st July 1881 and terminating 30th June in the present year.

### I.—PERSONAL ESTABLISHMENT.

The permanent staff of the Observatory is the same as at the date of my last Report, except that Mr. Pringle has been appointed to the 5th class as a junior assistant; it therefore now consists of the following:—

Mr. ELLERY, Director, Government Astronomer ;  
Mr. WHITE, Chief Assistant ;  
Mr. MOERLIN, Assistant ;  
Mr. TURNER,            "  
Mr. GILBERT,           "  
Mr. PRINGLE,            "  
J. BURLEY, Messenger.

Messrs. Lilly and Kemp are still employed as heretofore on the temporary staff—the first as mathematical and the second as clerical and photographic assistant. There are also a mechanic and a workman—the latter for the most part occupied in connection with the great telescope.

The very great increase of work, chiefly telegraphic and clerical, in connection with the growing system of intercolonial weather telegraphy, has rendered it imperative to obtain extra temporary assistance in receiving and transmitting weather telegrams. I have therefore lately employed a young telegraphist, thus relieving other officers from this duty, and enabling them to overtake the arrears of work which had accumulated in their several branches consequent on the increasing demands made on their time since inaugurating the intercolonial weather system.

The distribution of the duties of the Observatory among the members of the staff has been somewhat modified during the year. As heretofore, the general supervision, correspondence, &c., devolves upon me; Mr. White continues in charge of the meridional work, in which he is assisted by Mr. Gilbert. The magnetic and meteorological work, as well as a considerable portion of the new duties in connection with the intercolonial weather telegraphy, devolves on Mr. Moerlin, who has Mr. Kemp to assist him. Mr. Turner has been occupied with the work in connection with the great telescope, and with sun photography with the photo-heliograph.

Mr. Gilbert has charge of all matters connected with time signals, ships' chronometers, &c., and assists Mr. White with the transit circle observations and computations; he also acts as accountant for the Department. A few months ago he was relieved from some minor duties, such as issue of stores, &c., so as to give him more time for preparation of the meridian work for the press, which has got considerably in arrears.

### II.—GROUNDS AND BUILDINGS.

Some few changes have been made in the grounds immediately surrounding the main building by the formation of shrubberies, which have been planted under Mr. Guilfoyle's supervision. It is intended to form several other clumps of low-growing trees and shrubs about the ground, with the view not only of improving the appearance of the place but also for giving some check to the dust which blows over from the St. Kilda road, and now gets very troublesome in the summer months.

The fence has been thoroughly repaired and re-painted, and the alterations on the eastern boundaries referred to in my last Report have been carried out, so that our eastern boundary is now the fence of the grounds around Government House.

The main building has been also thoroughly renovated and painted outside. The painting has been done in a somewhat novel manner: prior to the last coat getting dry, clean sand was blown over it, the effect of which is very good, giving the appearance of a clean warm sandstone. The presence of the sand is said to render the paint much more durable.

The buildings are now all in a good state of repair. No steps have been yet taken towards the erection of the room for the new transit circle, except in the fixing upon the site and general arrangement of the building.

## III.—INSTRUMENTS.

1. *Astronomical Instruments*.—All these are in excellent condition. The transit circle was dismantled and thoroughly cleaned about a month since, and, considering its twenty years' service, is in capital order, for although the pivots show signs of wear, no defect in their form or equality has appeared.

The *South Equatorial (8-inch Telescope)* has also undergone a careful overhaul and some additions. A new driving clock has been constructed in the Observatory workshop, to which Mr. Grubb's electrical pendulum is applied. This work is only just completed. It turns out very satisfactory, and the telescope moves so accurately that it will keep a star bisected by the micrometer web for two hours (the length of the time the clock will run without winding up). Some additional arrangements for central illumination of the webs of the micrometers have also been made, chiefly with the view of very careful measures of the declinations of the small planets Victoria and Sappho during the present and two following months, according to a pre-arranged programme with several European and American and other Southern Observatories. The instrument is now in excellent working order.

The great telescope also continues to give satisfaction. One or two repairs of minor importance were effected, but, as a rule, everything has worked well throughout the year. The north equatorial and photo-heliograph are in a satisfactory condition.

All the minor astronomical instruments and accessories remain as at the date of my last Report, and no changes of sufficient importance to refer to have been made in their arrangement or use.

## IV.—MAGNETIC AND METEOROLOGICAL INSTRUMENTS.

No important additions or changes have been made in this part of the establishment, and everything is working well.

The new anemograph referred to and described in my last Report has proved a great success; it has given scarcely any trouble, and furnishes very satisfactory registry of the direction and force of the wind. The Hagemann vacuum anemograph, also described in my last Report, has continued in operation since it was put up in April last year, and has during that time given an almost uninterrupted record of the force of every gust of wind by its delicate tracings on smoked paper. These tracings have on several occasions proved of great service in furnishing the absolute pressures exerted by sudden gusts which cannot possibly be obtained from the Robinson anemograph, where great pressures for short periods are lost in the trace of average velocity which the latter instrument furnishes. The mechanical barograph continues to work well, and is found very useful, inasmuch as all the barometric fluctuations in 24 hours are marked in ink, and can be seen at a glance. The several instruments which record continuously by photography work satisfactorily, and supply their traces of the variations in terrestrial magnetism, atmospheric pressure, and temperature with the usual precision and regularity.

## V.—THE LIBRARY.

This continues to increase so rapidly that difficulty as to shelf room continually presents itself. I have devoted the old prime vertical room to the purpose, and have had most of the books for which there is no room in the Library proper arranged in this room. The growth of our Library is almost entirely due to the liberal contributions from other Observatories and from scientific societies and individuals. A list of the donations received since my last Report is given in the Appendix.

## VI.—PUBLICATIONS.

I regret to say we are sadly behind in the publication of our work. This is in part due to the increasing demands upon the time of the officers in initiating and carrying out the intercolonial weather telegraphy, as well as to the frequent requisitions from abroad for co-operation in general astronomical and physical work. By a partial re-arrangement of duties, and with the extra assistance now afforded us, I hope these arrears will soon be overtaken.

As regards astronomical publication, the last work issued was Vol. V., containing Results of Astronomical Observations from 1871 to 1875 inclusive. The Results and Annual Catalogues for the years 1876 to 1880 inclusive are ready for the printer, and the second *General Ten Year Catalogue* is also in a forward state of preparation.

The *Monthly Record of Meteorology and Terrestrial Magnetism* has been issued up to August 1881 only. September to December are now in the press, and four months—January to April 1882—are now ready for the printer.

A *Daily Weather Chart and Bulletin* is issued about one o'clock, and distributed to several public places. A weather chart, combined with synopsis and prospective, is also made up each day after three o'clock. The daily papers get this for the next morning's issue, and from it the weather chart in the *Argus* is constructed.

The *Planisphere of the Southern Stars*, referred to in former Reports, has been published in two editions. The first, for public sale, soon ran out, and there is a demand for another edition. The Education Department published a special edition for the schools, arranged in an excellent form; and now a special edition for the Board of Education of Tasmania is being prepared. Of course, in this case, the horizon is arranged for the latitude of Hobart, instead of Melbourne.

## VII.—THE WORK OF THE OBSERVATORY.

*Transit Circle Observations.*—The meridian work with the transit circle during the past year has been for the most part limited to observations of standard stars for determination of clock error and instrumental azimuth, and to the determination of places of stars used in measures of the positions of comets. The numbers of observations of the several kinds made with the transit circle have been as follows :—

1881—1882.			
Right Ascension Observations	...	...	1346
Polar Distance ditto	...	...	47
Observations for Collimation Error	...	...	142
Ditto for Level	...	...	155
Ditto for Nadir	...	...	154
Ditto for Micrometer Runs	...	...	3
Ditto for Flexure of Telescope	...	...	1

The whole of these are reduced up to June 30, 1882.

*Great Telescope Observations.*—During the year, observing or celestial photography was done on 82 nights only, and unsuccessful attempts to obtain observations were made on 36 nights; 57 nights were taken up with visitors; and on 108 nights the telescope was not used, on account of cloudy weather or bright moonlight.

The work done comprises the observation and sketching of 55 of Sir John Herschel's smaller nebulae, viz., 50, 58, 57, 73, 163, 555, 588, 1401, 1423, 1443, 1632, 1643, 1648, 1652, 1655, 1663, 1793, 2076, 2085, 2086, 2126, 2127, 2138, 2130, 2181, 2186, 2188, 2457, 2459, 2661, 2720, 2721, 2709, 2780, 3250, 3251, 3293, 3294, 3378, 3792, 4101, 4108, 4166, 4173, 4175, 4357, 4314, 4364, 4469, 4549, 4553, 4554, 4556, 4743, 4745; observations and drawings of Comet *c* 1881, 4 drawings of Jupiter at opposition; observations of Wells' Comet (Comet *b* 1882), and obtaining thirty-four photographs of the moon. The nebulae in  $\gamma$  Argus was examined on three evenings, and compared with drawing of 1875, with which it still appears to agree very closely. A new nebula about 1' N. of H. 4549 was observed and sketched.

With regard to the revisions of the small nebulae of Herschel's catalogue, the majority were found to agree well with Herschel's descriptions. Nos. 57 and 1423 are, however, decidedly much fainter than Herschel indicated, and Nos. 1655 and 2181 differ considerably from his description.

*Solar Photography.*—The photo-heliograph has been used on every fine day possible, and 217 pictures were obtained during the year.

*Occasional Observations.*—Measures of position of Schaeberle's Comet were made in September and October. A comet, remarkable for its small perihelion distance, was discovered by Mr. Wells, an American astronomer, in March last. Intelligence of its discovery, and the determination of its approximate orbit, reached here before its perihelion. It was first observed here on the third day after perihelion, and still very low on the western horizon. Measures have been made from this date up to the present time whenever the weather permitted.

*The Transit of Mercury* was observed on 8th November 1881, in the early morning. The observations were only partially successful, in consequence of thin clouds intervening.

*Magnetic and Meteorological Work.*—The magnetic observatory has continued in operation without any noteworthy change, on the same basis as in former years. The monthly determination of the absolute force of the three elements of terrestrial magnetism, and, with the exception of a break of a few hours for the annual cleaning of the magnetographic apparatus, the photographic registration of the variations in the declination, horizontal and vertical force, have continued uninterrupted. Cyanotype copies of the traces for disturbed periods have been sent to St. Petersburg, Greenwich, Kew, Canada, and Batavia.

The barograph and thermograph have been in continuous operation.

The anemograph (Robinson's) with the new registering apparatus referred to in my last Report has worked well, and furnished uninterrupted records. The Hagemann's vacuum anemometer has been in continuous action, and has proved very satisfactory. The *smoked paper* traces, after being carefully removed from the barrel, are *fixed* by wetting the unsmoked side of the paper with a solution of shellac in methylated spirits, and are subsequently bound together in monthly and tri-monthly packets, in which form they can be easily referred to. These records have proved very useful for answering numerous questions which have arisen as to the maximum pressures in gusts during high winds.

*Hours of Sunshine.*—The sunshine recorder has been kept in operation, and has furnished a satisfactory record of the times and duration of sunshine on each day.

*Ombrograph.*—The record sheets of this instrument also have supplied an unbroken and precise record of the times, intensity, and quantity of every fall of rain throughout the year.

There has been no noteworthy change in the country meteorological work, which has gone on very satisfactorily. The number of rain-gauge stations has been considerably increased, and records are now received monthly from 133 stations, 49 of which furnish observations from private gauges, and 84 from gauges the property of the Government.

A further extension of rainfall observation is now being made in accordance with a proposition of Mr. Langdon, M.L.A., to the effect that rain-gauges should be supplied to each post town, and rainfall registered by the postmasters. A vote of £200, to commence this work, is on the current year's Estimates, and a number of gauges are being made for distribution in accordance with this suggestion. It is found best, however, not to have them under the postmaster in all cases, as sometimes there is no suitable site contiguous to that official's residence on which to place a gauge, and in such case it is placed in charge of the resident police or other Government officer.

*Special Work.*—The rating of chronometers, testing and adjusting instruments for mariners and for the public generally, has gone on as usual, and now forms no inconsiderable part of the Observatory duties. During the past year, in addition to other matters of the same kind, 48 marine chronometers and watches were received for rating, &c., and 35 aneroid barometers for testing under the air-pump.

*Time Signals and Distribution of Time.*—The new time-ball apparatus on the old lighthouse tower at Williamstown has continued to work satisfactorily, and the ball has been dropped successfully 272 times out of 297, the failures being 25, principally owing to interruptions on line.

The ball sends automatically a return signal to the Observatory announcing the instant of drop; besides this, as often as the state of the weather permits, the drop is also observed by means of a telescope from one of the Observatory windows.

Since my last Report, a special telegraph wire for the time-ball has been erected, which has reduced the chance of interruption from the ordinary telegraphic works to a minimum.

*The Clock Control System* continues in successful operation. The increase of wires on the telegraph poles in the city, due to the extension of the telephonic system, is, however, a source of frequent interruption and interference with the controlling current.

*The Post Office Clock* has been going as well as usual except between January 20th and 27th, when it was discovered that some of the quicksilver was escaping through a minute pore in the pendulum bob; this was at once remedied, and the clock resumed its former rate.

*The Hobson's Bay Tide Gauge* has worked well during the year, and furnished satisfactory tidal records, which are tabulated, and then filed away for reference.

#### VIII.—INTERCOLONIAL WEATHER TELEGRAPHY.

The system of *Intercolonial Weather Telegraphy* has progressed towards a far more complete system since my last Report, chiefly through the active co-operation of Tasmania and Queensland.

In January last, at the invitation of the Colonial Secretary of Tasmania, and by the desire of my Minister (the Honorable the Chief Secretary), I visited Hobart for the purpose of making arrangements with the Tasmanian Government for the establishment of a system of meteorological observation in that colony similar to that adopted in the other Australian colonies, and also with the view of securing its co-operation in the intercolonial weather system. The Government of the colony gave me every facility and assistance, and, after becoming acquainted with the requirements of the Conference, cordially offered to co-operate with the other colonies. An officer (Commander Short, R.N.) was appointed to carry out the necessary arrangement and superintend meteorological observations. This officer subsequently came to Melbourne, in order to make himself fully acquainted with the various instruments and modes of observation adopted at this Observatory before commencing operation in Hobart. He is now establishing a complete meteorological observatory at Hobart and observing stations in several parts of Tasmania. For some time past, weather telegrams have been regularly received from Hobart and Southport, in addition to those from George Town, which have come to us for some time past through the valuable and voluntary assistance of Mr. Warren, the cable superintendent at that place. In January last, Queensland also entered into co-operation, and contributes telegrams from five coast stations with great regularity. Western Australia has established another observing station at Geraldton, 200 miles N. of Perth.

The weather telegrams now cover a very large portion of the Australian coast line and a considerable area of the interior, as well as Tasmania and New Zealand. This extension of the system has rendered the preparation of the weather charts and forecasts much more satisfactory and complete, and, there can be little doubt, will also tend materially to increase year by year our knowledge of the meteorology of Australia, the climatic and seasonable changes, as well as the movement and extent of atmospheric disturbances.

#### IX.—NEW TRANSIT CIRCLE, ETC.

The necessary funds have been voted for a new transit circle of modern form and of dimensions sufficient to cope with the present requirements in meridian work. In April last, a contract for its construction was made by the Agent-General with Messrs. Troughton and Simms, and it is now being made. Some little delay in the completion of the contract occurred, occasioned, I believe, by some practical difficulty with regard to the form of the axis, suggested by the Astronomer Royal of England (Mr. Christie), who had been invited to modify the specification sent home, if he saw room for doing so, with the view of minimizing some of the inevitable defects of such instruments, more especially as regards rigidity.



The form of axis will be different from most of the large circles extant, inasmuch as, in place of a central cube, the axis is either cylindrical or conical in all its parts. It is not expected that this instrument will arrive here in less than six or eight months from the present time.

An arrangement has been made between the principal national Observatories in Europe, North and South America, the Cape, and Melbourne, to co-operate in the measurement of the declinations of the planetoids Victoria and Sappho during their favorable opposition in July, August, and September this year, with the view of determination of the parallax of these bodies, and hence the distance of the sun. I have made all the necessary preparations for the work with the South Equatorial, and have, at the present date, actually commenced the observations.

The transit of Venus, the last for 125 years, will take place on December 7th next. Only the last phases will be visible here, the earlier ones occurring before the sun rises. It is intended to arrange for observing the phenomenon at the Observatory, and also at one or two other stations to be selected as far east and south as possible. The choice of stations will lie between Hobart, or some other point on the east or south-east coast of Tasmania, and some point in South-East Gippsland—probably Lakes Entrance or Cape Howe. There is a provision of £100 on the Estimates of the current year to cover the cost of one extra observing station, but, as it now appears that observations in Australia and Tasmania will be left to Australian observers, I consider it desirable that we should arrange for an observing point in Tasmania. The funds necessary to carry out this extra undertaking will, I have no doubt, be given by the Government.

ROBT. L. J. ELLERY,

Government Astronomer.

Melbourne Observatory, 15th August 1882.

---

## APPENDIX

TO THE

## REPORT OF THE GOVERNMENT ASTRONOMER TO THE BOARD OF VISITORS.

## BOOKS, ETC., PRESENTED TO THE OBSERVATORY.

Title and Author of Book.	By whom Presented.	
Greenwich Observations, Astronomical, Magnetical, and Meteorological, for the Year 1879	Greenwich Observatory	England.
Greenwich Astronomical Results for the Year 1879 ... ..	Ditto ... ..	"
Greenwich Meteorological and Magnetic Results for the Year 1879 ...	Ditto ... ..	"
Greenwich Spectroscopic Results for the Year 1880 ... ..	Ditto ... ..	"
Description of the Greenwich Time Signal Service ... ..	Ditto ... ..	"
Cape Catalogue of 12,441 Stars, for the Year 1880 ... ..	...	"
Cape Catalogue of Stars observed from 1834 to 1840 ... ..	...	"
Hourly Readings from the Self-Recording Instruments at the Seven Observatories in connection with the Meteorological Office for the Year 1880	Meteorological Office, London	"
Daily Weather Reports of the Meteorological Office; June 1880 to January 1881	Ditto ... ..	"
Report of the Meteorological Council to the Royal Society for the Year 1880-1881	Ditto ... ..	"
Report of the International Meteorological Committee, Meeting at Berne, 1880	Ditto ... ..	"
The Influence of Height on Thermometer Readings ... ..	Ditto ... ..	"
Memoirs of the Royal Astronomical Society; Vol. XLVI. (1880-1881)	Royal Astronomical Society	"
Monthly Notices of the Royal Astronomical Society (April 1880 to April 1881)	Ditto ... ..	"
Report of the Fifteenth Meeting of the British Association for the Advancement of Science; Swansea, 1880	British Association	"
Proceedings of the Royal Society of London. Nos. 197 to 210.	Royal Society ... ..	"
Quarterly Journal of the Meteorological Society. Nos. 38, 39, 40, 41...	Meteorological Society ... ..	"
Hints to Meteorological Observers, with Instructions for Taking Observations. By W. Marriott, F.M.S.	Ditto ... ..	"
The Meteorological Record of Results obtained at Stations of the Meteorological Society. Nos. 1, 2, 3	Ditto ... ..	"
Index to the Publications of the English Meteorological Societies, 1839 to 1881	Ditto ... ..	"
Report of the Kew Committee for the Year 1881 ... ..	Kew Observatory	"
Results of Meteorological and Magnetical Observations at Stonyhurst College Observatory; 1880	Stonyhurst Observatory	"
The Selenographical Journal for 1881 ... ..	Selenographical Society	"
The Annual Range of Temperature over the Globe. By A. Keith Johnston, F.R.S.	A. Keith Johnston, F.R.S.	"
The Scientific Proceedings of the Royal Dublin Society. Vols. I, II. New Series.	Royal Dublin Society	Ireland.
The Scientific Transactions of the Royal Dublin Society. Vols. I, II. New Series.	Ditto ... ..	"
The Great Telescopes of the Future. By Howard Grubb ... ..	Howard Grubb	"
Proceedings of the Philosophical Society of Glasgow, 1880-1881 ...	Philosophical Society of Glasgow	Scotland.
The Great Trigonometrical Survey of India; Vol. VI. ... ..	India Office	India.
Indian Daily Meteorological Observations; April 1881 to April 1882	Indian Meteorological Department	"
Indian Meteorological Memoirs; Vol. I., Part V. By H. F. Blanford	Ditto ... ..	"
Report on the Administration of the Meteorological Department of the Government of India, 1880-1881	Ditto ... ..	"
Meteorological Observations recorded at Six Stations in India in the Year 1880; Corrected and Reduced	Ditto ... ..	"
Magnetical and Meteorological Observations made at the Government Observatory, Bombay, 1871-1878	Bombay Meteorological Department	"
Results of the Meteorological Observations for 1880 at the Vizagapatam Observatory	Vizagapatam Observatory	"
The Victorian Year Book for 1880-81. By H. H. Hayter, C.M.G. ...	The Government Statist	Victoria.
Sydney Observatory Weather Maps; July 1881 to July 1882	Sydney Observatory	New South Wales.
Results of Rain and River Observations made in New South Wales in 1881	Ditto ... ..	"
Journal and Proceedings of the Royal Society of New South Wales for 1880. Vol. XIV.	Royal Society of N.S. Wales	"
The Transit of Mercury, Nov. 8, 1881. By H. C. Russell, B.A., F.R.A.S.	H. C. Russell, B.A., F.R.A.S.	"
Meteorological Observations made at the Adelaide Observatory during the Year 1879	Adelaide Observatory	South Australia.
Meteorological Report for Western Australia for the Year 1880 ...	The Surveyor-General	Western Australia.
Statistics of the Colony of Tasmania for the Year 1880 ... ..	The Government Statist	Tasmania.
New Zealand Meteorological Observations for the Year 1881 ... ..	Dr. Hector	New Zealand.
Report of the Meteorological Commission, Cape of Good Hope, for the Year 1880	Meteorological Department	Cape of Good Hope.
Weather Charts and Storm Atlas of the Indian Ocean, for February 1861	Meteorological Society of Mauritius	Mauritius.
Report of the Meteorological Service of the Dominion of Canada for the Year 1879. By G. T. Kingston, M.A.	Meteorological Department	Canada.
Monthly Weather Review of the Meteorological Service of the Dominion of Canada; September 1881 to April 1882	Ditto ... ..	"
Daily Bulletin of International Meteorological Observations; August 1880 to January 1881. Washington, U.S.	Chief Signal Officer, U.S. Army Department, Washington	United States.
Monthly Weather Review; March 1881 to March 1882. Washington, U.S.	Ditto ... ..	"

## APPENDIX—continued.

Title and Author of Book.	By whom Presented.	
Daily Bulletin of Weather Reports of the U.S. Army Signal Service for the Months of April, May, June, July, and August 1877	Chief Signal Officer, U. S. Army Department, Washington	United States.
Annual Report of the Chief Signal Officer, U.S. Army Department, for 1879	Ditto ... ..	"
Catalogue of the Library of the United States Naval Observatory. Part I.	Washington Naval Observatory...	"
Subject Index of the Publications of the United States Naval Observatory; 1845 to 1875	Ditto ... ..	"
Note on the Observations of Comet <i>b</i> 1881, made at the U.S. Naval Observatory	Ditto ... ..	"
Catalogue of 1,098 Standard Clock and Zodiacal Stars. By Professor Newcomb	Ditto ... ..	"
On the Relative Accuracy of the Different Methods of Determining the Solar Parallax. By Professor Harkness	Ditto ... ..	"
On Gauss's Method of Computing Secular Perturbations ... ..	Ditto ... ..	"
Astronomical and Meteorological Observations for the Year 1876. Parts I. and II.	Ditto ... ..	"
Report on the Total Solar Eclipses of July 29, 1878, and January 11, 1880	Ditto ... ..	"
Observations of Double Stars. By Professor Hall ... ..	Ditto ... ..	"
On the Multiple Star $\Sigma$ 748. By Professor Holden ... ..	Ditto ... ..	"
Observations of the Transit of Venus, 1874. By Professor Newcomb	Ditto ... ..	"
Photometric Measurements of the Variable Stars $\beta$ Persei and D. M. 81° 25', made at the Harvard College Observatory	Harvard College Observatory ...	"
The Declinations of Fixed Stars. By Lewis Boss, Dudley Observatory, Albany	Dudley Observatory ... ..	"
The Smithsonian Reports for 1878 and 1879 ... ..	Smithsonian Institution ... ..	"
Journal of the American Geographical Society of New York. Vols. X. and XII.	American Geographical Society ...	"
Bulletin of the American Geographical Society of New York, for the Year 1881	Ditto ... ..	"
Contributions to Meteorology. By Professor Loomis ... ..	Professor Loomis ... ..	"
Theory of the Moon's Motion. By J. N. Stockwell ... ..	J. N. Stockwell ... ..	"
Report of the Comptroller of the Currency, Washington, for the Year 1880	The Comptroller of the Currency, Washington	"
Anuario del Observatorio Astronómico de Chapultepec. Para el Año de 1882	Chapultepec Observatory ... ..	Mexico.
Boletín del Ministerio de Fomento Mexico; April 1881 to January 1882	Central Meteorological Observatory	"
Revista Científica Mexicana: for the Year 1881 ... ..	Ditto ... ..	"
Revista Mensual Climatológica: for the Year 1881 ... ..	Ditto ... ..	"
Anales del Ministerio de Fomento de la República Mexicana. Vols. IV., V.	Ditto ... ..	"
Guatemala Meteorological Observations for the Year 1881 ... ..	Guatemala Meteorological Observatory	Guatemala.
Anales de la Oficina Meteorológica Argentina. Vol. II. By Dr. B. A. Gould	Cordova Observatory ... ..	Argentine Confederation.
Connaissance des Temps, pour l'An 1883 ... ..	Bureau des Longitudes ... ..	France.
Annuaire pour l'An 1882 ... ..	Ditto ... ..	"
Éphémérides des Étoiles de Culmination Lunaire et de Longitudes. Par M. Loewy	Ditto ... ..	"
Observatoires Astronomiques de Province. Année 1880 ... ..	Ditto ... ..	"
Études des Flexions du Grand Cercle Méridien. Par M. Loewy et Perigaud	Ditto ... ..	"
Annuaire de l'Observatoire de Montsouris, pour l'An 1882 ... ..	Montsouris Meteorological Observatory, near Paris	"
Travaux et Mémoires du Bureau International des Poids et Mesures	Bureau International des Poids et Mesures	"
Anales de l'Observatoire de Toulouse. Vol. I. ... ..	Toulouse Observatory ... ..	"
Recherches sur Saturne, ses Anneaux et ses Satellites. By M. Wilhelm Meyer	Geneva Observatory ... ..	Switzerland.
La Comète de 1881; Étude d'Astronomie Physique. By M. Wilhelm Meyer	Ditto ... ..	"
Anales del Institut y Observatorio de Marina de San Fernando ... ..	San Fernando Observatory, Madrid	Spain.
Bulletin de la Société de Géographie d'Anvers. Vol. VI. ... ..	Société de Géographie d'Anvers...	Belgium.
Brussels Meteorological Observations for the Year 1879 ... ..	Brussels Royal Observatory ... ..	"
Annuaire de l'Observatoire Royal de Bruxelles; 1880-1881 ... ..	Ditto ... ..	"
Annales de l'Observatoire Royal de Bruxelles; Meteorologiques. Vol. I.	Ditto ... ..	"
Annales de l'Observatoire Royal de Bruxelles; Astronomiques. Vol. III.	Ditto ... ..	"
Mémoires de la Société Royale des Sciences du Liège. Vol. IX. ... ..	Société Royale du Liège ... ..	"
Mémoires et Publications de la Société des Sciences, des Arts, et des Lettres du Hainaut. Series IV.	Société des Sciences du Hainaut	"
Nederlandsch Meteorologisch Jaarboek voor 1880 ... ..	Utrecht Meteorological Observatory	Holland.
Regenwaarnemingen in Nederlandsch-Indië, voor 1880. By Dr. P. A. Bergsma	Dr. P. A. Bergsma ... ..	"
Observations made at the Magnetical and Meteorological Observatory at Batavia. Vol. V.	Ditto ... ..	"
Bollettino Mensuale dell' Osservatorio Centrale in Moncalieri ... ..	Moncalieri Observatory, Turin ...	Italy.
Bollettino Meteorologico dell' Osservatorio del R. Collegio Carlo Alberto in Moncalieri. Vol. I., New Series. For the Year 1881	Ditto ... ..	"
Catalogue Général des Objets Exposés, compilé par les Soins du Comité Executif du Troisième Congrès International de Géographie. Vol. I.	Congrès International de Géographie, Venice	"
Bollettino dell' Osservatorio della Regia Università di Torino, 1881 ... ..	Turin University Observatory ...	"
Effemeridi del Sole, della Luna, e dei Principali Pianeti ... ..	Ditto ... ..	"
Bollettino Meteorologico del Reale Osservatorio di Palermo. Vol. XV. 1879	Palermo Observatory ... ..	"
Rendiconti di Reale Institute Lombardo di Scienze e Lettere. Series II. Vols. XI. and XII.	Lombardy Institute of Science and Literature	"
Sopra Alcuni Eclissi di Sole Antichi. By Professor Celoria... ..	Professor Celoria ... ..	"
Jahrbücher der K.K. Central Anstalt für Meteorologie und Erdmagnetismus. Band XVII. Vienna.	Vienna Meteorological Observatory	Austria.
Zeitschrift der Österreichischen Gesellschaft der Meteorologie. Band XVII. Vienna	Ditto ... ..	"

## APPENDIX—continued.

Title and Author of Book.	By whom Presented.	
Jahrbücher der Central Anstalt für Meteorologie und Erdmagnetismus. Buda-Pest. 1878-1879	Buda-Pest Observatory...	Austria.
Astronomische, Magnetische, und Meteorologische Beobachtungen an der K.K. Sternwarte zu Prag im Jahre 1880	Prague Observatory ...	"
Circular zum Berliner Astronomischen Jahrbuch. Nos. 161 to 183 ...	Berlin Observatory ...	Germany.
Preussische Statistik von Königlichen Statistischen Bureau in Berlin. Jahre 1880	Prussian Statistical Bureau ...	"
Vierteljahrsschrift der Astronomischen Gesellschaft. Jahre 1881. 16 Jahrgang	Astronomische Gesellschaft ...	"
Schriften der Universität zu Kiel. Band XXVI. ...	Kiel University ...	"
Publicationen des Astrophysikalischen Observatoriums zu Potsdam. Band II.	Potsdam Observatory ...	"
Astronomiska Iakttagelser, och Undersökningar. By Professor Gyl-dén	Stockholm Observatory ...	Sweden.
Bulletin Mensuel de L'Observatoire Météorologique de L'Université D'Upsal. Vol. XII.	Upsala Observatory ...	"
Die Temperatur-Verhältnisse des Russischen Reiches. By Dr. Wild	St. Petersburg Observatory ...	Russia.
Protokolle der III. Internationalen Polar Conferenz im Physikalischen Central Observatorium. St. Petersburg	Ditto ...	"
Repertorium für Meteorologie. Band VII. No. 2. ...	Ditto ...	"
Zur Theorie des Encke'schen Cometen. Von O. Backlund ...	Ditto ..	"
Annales de L'Observatoire de Moscou. Vol. VII. Part II. ...	Moscow Observatory ...	"
Librorum in Bibliotheca Speculæ Pulcovensis Contentorum Catalogus Systematicus	Pulkowa Observatory ...	"
Beobachtungen der Temperatur der Erdbodens im Tifiser Physika-lischen Observatorium im Jahre 1880. By J. Mielberg	Tifis Observatory, Caucasus ...	"
Meteorologische Beobachtungen des Tifiser Physikalischen Observa-toriums. Jahre 1880	Ditto ...	"
Sur d'Inclinaison destents. By M. Decheoreus, S.J. ...	Ti-ka-wei Observatory ...	China.
Memoirs of the Science Department of the University of Tokio ...	Tokio University ...	Japan.
Report on the Meteorology of Tokio for the year 1880. By T. C. Mendenhall	Ditto ...	"