

1878.

VICTORIA.

THIRTEENTH 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.

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THIRTEENTH REPORT OF THE BOARD OF VISITORS TO THE OBSERVATORY.

TO HIS EXCELLENCY SIR GEORGE FERGUSON BOWEN, *Knight Grand Cross of the Most Distinguished Order of Saint Michael and Saint George, Governor and Commander-in-Chief of the Colony of Victoria, and Vice-Admiral of the same, &c., &c., &c.*

MAY IT PLEASE YOUR EXCELLENCY—

The Board of Visitors to the Observatory has the honour to report that the annual inspection of the Observatory was made on the 29th August, at which the report of the Government Astronomer was read and received. The Board finds that the instruments are in good order, and are performing satisfactorily, and that the Observatory during the year under review has maintained the high standard of astronomical and physical work for which it has been distinguished from its establishment. The valuable instruments which have been liberally provided have been steadily employed in that class of research for which they are severally intended, and the reduction and publication of results are kept up as closely as the means at the disposal of the Government Astronomer will allow.

The transit circle, as has been stated in previous reports, is insufficient for the work required of it. In nearly all of the Observatories in correspondence with Melbourne, instruments of greater optical power are used, and the Government Astronomer is therefore precluded from affording the co-operation frequently sought for by European and American observers, which, from the high position our Observatory holds, it should be able to give, and the Board would urge most strongly the importance of obtaining as soon as possible a transit circle of not less than (7") seven inches aperture in place of that now in use. The Sydney Observatory is already in possession of an instrument of this class, and it is understood that one is about to be obtained for Adelaide. The Board has ascertained that the cost of a new transit circle, mounted in the transit room, would not exceed £1,200, and, as it would take (2) two years to complete it, the expense might be met by two annual votes.

The Board regrets to be obliged to report that the large and valuable series of drawings of nebulae obtained with the Great Telescope has not yet been published. This is mainly due to the removal to another colony of the lithographer to whom the work had been entrusted. The Government Astronomer has been requested to complete the publication of these—the first results of the Great Melbourne Reflector, long looked for by astronomers in other parts of the world—as soon as possible.

The attention of the Board has been again directed by the Astronomer to the importance of securing precedence for weather telegrams, and the Board desires to urge the necessity of this concession, in order to make the meteorological information collected throughout the colonies more promptly available, and therefore more useful to the public. The Press has always shown the utmost readiness to publish, in the best form, these observations, and it is to be hoped that this, the chief difficulty now impeding the improvement of intercolonial weather telegraphy, may soon be removed, as it has been in Europe and America.

M. H. IRVING, M.A.,
H. AMSINCK, Commander R.N.,
GEO. VERDON, F.R.S.,
JAMES MOORE, M.A.,
G. V. SMITH,
J. E. BROMBY, Hon. Sec.

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

GENTLEMEN,—The last visitation of the Board of Visitors took place on the 22nd May 1877; the Report which I have now the honour to submit to you, therefore, refers to the history of the establishment between that date and the 30th June of the present year, and its state at the latter date. The different subjects to which I shall have to refer will now be taken in order.

BUILDING AND GROUNDS.

The main building is in a moderately good condition, but the usual periodical painting and trivial repairs will soon be necessary. The trouble that arose in connection with the movable roof of the great telescope, and to which I directed the attention of the Board at the last visitation, increased after the resetting of the mechanism then referred to, and it ultimately became necessary to put additional gearing so as to give greater power by diminished speed, and to avoid unequal torsion of the driving shaft, which, it was found, might have originated the difficulty. The driving winch, therefore, was placed exactly in the centre, instead of, as formerly, at one end of the shaft. The roof now works as well as can be desired. The great telescope house itself has lately become so leaky in the roof, gutters, and even through the walls themselves, that I have had to ask for an inspection by an officer of the Public Works Department. It is found that considerable repairs will be required to render the building weather-tight. The necessary outlay has been authorized, and it is probable the repairs will soon be effected.

In my last report, I referred to the necessity of erecting a new magnetic house, and stated that plans had been prepared for a small building to accommodate not only the magnetographs, but all the meteorological instruments which register continuously by photography. This building has now been completed, and is found a very great improvement upon the former arrangement, not only as regards the more even temperature which is now secured for the magnet room, but also as regards the greater convenience and saving of time, which results from having all the photographically-recording apparatus together under one roof.

The other buildings, including the south equatorial, heliograph, absolute magnet house, &c., are in good condition and state of repair.

There has not been much change in the grounds or approaches during the year. Mr. Guilfoyle has, however, done some planting in furtherance of a general scheme for gradually improving the Observatory enclosure.

PERSONAL ESTABLISHMENT.

This remains precisely as it was at the date of my last report, and consists of—

MR. ELLERY (Director), Government Astronomer,
MR. WHITE, Chief Assistant,
MR. MOERLIN, Assistant,
MR. TURNER, Assistant,
MR. GILBERT, Assistant.

Messrs. Lilly and Kemp have also been employed as clerical assistants as heretofore.

There has been no change in the distribution of the duties of the establishment.

The general direction and supervision, correspondence, and special observational work, devolves upon me. Mr. White takes charge of all work in connection with the transit circle, meridional observations, and computations connected therewith, in which he is assisted by Mr. Moerlin and Mr. Gilbert. The meteorological and magnetic work is in charge of Mr. Moerlin, in which he is assisted by Mr. Kemp and Mr. Lilly; the latter gentleman also assists in mathematical work, requiring special knowledge. The observations with the great telescope, as well as the photoheliography, still devolve upon Mr. Turner. The accounts, storekeeping, &c., are in charge of Mr. Gilbert.

INSTRUMENTS.

The transit circle continues to work satisfactorily, and is in good order. The more modern requirements of this class of instrument, however, are frequently beyond its scope, as its dimensions, and, therefore, optical power, are much below those now generally possessed by first-class Observatories. The other principal astronomical instruments are in excellent condition. The great telescope continues to do its work in a satisfactory manner, and is now in very good order, although occasionally trifling derangements in the mechanism occur—the inevitable effects of use—which have been hitherto easily rectified as they arise. The mirrors still retain an excellent polish, and no marked signs of deterioration are visible.

The graphic apparatus is all in good order, and in continual use.

The anemograph, which I reported at the last visitation as nearly worn out, has, by dint of frequent repairs, continued to keep its record of wind movements correctly, but it will soon be absolutely necessary to replace it.

Since the last visitation, two new rain-gauges have been erected in the grounds, one of which is adopted as a standard, the other being self-registering, and furnishing not only the amount of rainfall, but also the times and rate at which it fell. It consists of a vessel, holding a quarter of an inch of rain, suspended on delicately-made spiral springs, and furnished with a glass intermittent syphon. As rain falls it accumulates in the vessel, which stretches the suspending spiral springs, and descends in proportion to the amount accumulated, and until exactly a quarter of an inch has fallen. At this point the syphon acts, and empties the vessel, which immediately rises to its first position. These movements are recorded in coloured ink on a drum covered with paper, and revolving once in twenty-four hours. [*A specimen paper is on the table.*] The instrument acts most satisfactorily.

The clocks used at the great telescope and at the south equatorial are now electrically controlled, and kept synchronous with an astronomical clock (by Cook, of York), which is placed in the east basement room of the Observatory.

The spectroscope for solar work, which was ordered from Messrs. Troughton and Simms, to be ready at the time of the Transit of Venus in 1874, did not arrive with the other instruments for the observation of that phenomenon; it was received in July 1877, and, in a letter accompanying it, Mr. Simms said that, as the instrument had been so long delayed, he hoped it might be accepted by the Observatory for what it was worth. The instrument is a good one, and very serviceable for many purposes. It has been much used in connection with the south equatorial, and I have duly thanked Mr. Simms for his valuable donation.

LIBRARY.

This part of the establishment has been largely increased, principally by valuable donations from other Observatories and scientific bodies. (*See List appended.*)

PUBLICATIONS.

The publication of the work done with the great telescope, which was in progress at the date of the last visitation, and which I then hoped would be soon in print, has been unfortunately delayed by the loss of the assistance of the gentleman who copied the drawings on stone. The drawings now only require printing, and for this I hope to be able soon to make arrangements, and when this is done the publication will be no longer delayed.

There has been no publication of Results of Astronomical Observations since my last report, but the Mars Observations are now in the press, and will soon be ready for distribution.

The Monthly Records of Meteorology and Terrestrial Magnetism have been published up to the end of June this year, and the volume of Results for the Year 1876 is printed, and will shortly be distributed.

The Daily Weather Bulletin, based upon the weather telegrams received from the meteorological stations of South Australia, Victoria, and New South Wales, have been regularly published, and distributed daily to the Press, public offices, and other places in Melbourne. It would appear, from numerous suggestions and requests which I have received, that the meteorological information gathered from our weather telegrams would be most effectually placed at the disposal of the public if published in the form of a *Weather Chart*. I have considered various methods of doing this economically, and although, up to the present time, nothing has been done, it is my intention to try the experiment as soon as a promising method is hit upon.

TIME SIGNALS AND DISTRIBUTION OF OBSERVATORY TIME.

The Time Signal Service is in exactly the same state as at the date of the last visitation. The one o'clock time signals, as given by the Williamstown time-ball, have been much more satisfactory, for the failures have been only 15 out of 328, two only depending on defects in the mechanism, while the others were due to interruptions or bad working of the telegraph lines. The time-ball apparatus itself still continues to work fairly; nevertheless, I think it will be quite necessary to replace it by a new one before long, and a sum of money has been placed on this year's Estimates for the purpose. The system of clock-controlling, by means of currents from the Observatory, continues to work well, and has proved satisfactory. There are now ten public clocks controlled, and some of these act as control-clocks for another series, as at Parliament House, where a clock controlled from the Observatory governs the going of most of the other clocks in the building.

The interruptions on the Telegraph line used for this service have diminished, and will, no doubt, be further reduced as those using the current become more alive to the necessity of watchfulness over the commutators and connections under their charge.

The Post Office clock maintains its character as an excellent timekeeper. It sends signals automatically to the Observatory every day, by means of which its error and rate are exactly determined; and were it not for the occasional derangement of its mechanism, the going of the clock since the mercurial pendulum was finally adjusted could scarcely be excelled.

The distribution of Observatory time has been carried a step further by an invention of Joseph Brothers, whereby numerous clocks in banks and offices in the city are set right every hour, by means of an electric current transmitted by a clock which is controlled from the Observatory.

THE WORK OF THE OBSERVATORY.

During the thirteen months now under revision, the work done includes, besides the ordinary meridional observations and other work of a regular and routine character, several series of special observations, some of which have been undertaken in conjunction with other National Observatories in Europe and America. Amongst these must be mentioned observations of D'Arrest's comet, observations for determining the parallax in declination of the planet Mars, search for the Satellites of Mars, and observations of the Transit of Mercury across the Sun's disc.

As regards the ordinary astronomical work, I have to report that the transit circle has been busily employed in observing, besides the usual fundamental clock and circumpolar stars, the stars which culminate near the zenith of the Observatory; the stars used by Mr. Gill at the Island of Ascension for comparing the positions of Ariadne and Mars, in order to obtain the solar parallax; and lastly, Mars during his opposition and the Washington comparison stars, also for ultimately finding a value of the Sun's parallax. In this last work we were very successful, obtaining observations of the planet on 67 nights out of the 94 contained in the period selected for this purpose.

During the thirteen months now under review, the numbers of the recorded observations are as follows:—

R. A. observations	...	...	...	...	1,634
P. D. observations	...	...	...	...	1,490
Observations of error of collimation				...	132
" " level and nadir				...	159
" " runs of micrometer			...		53
" " flexure of telescope			...		14

Of these, the separate results of R.A. and N.P.D. are reduced up to date, and the annual catalogue for 1877 will soon be completed.

The work with the transit circle has been considerably relaxed lately, so as to allow of further progress being made with the reductions of the zones, which are already well advanced; considerable time, however, must elapse before their completion, as there still remain many thousands of stars completely unreduced.

I will now refer to the extra-meridional observations made with the north and south equatorials. In June last year, observations of D'Arrest's comet were taken on five occasions, and a drawing of it was also made at the great telescope. The partial eclipse of the Sun on February 2, as well as the eclipse of the Moon on the 17th of the same month, were also observed.

The Transit of Mercury across the Sun's disc, which took place on May 7, had passed through the first phases before it rose above our horizon; the latter phases were, however, well observed, and a careful watch was kept at egress for the peculiar phenomena of the "thread" or "ligament" usually seen at the internal contacts of the planet with the Sun's limb, and to which considerable interest is attached in connection with similar appearances observed in the Transit of Venus. The phase of internal contact was observed under very favourable circumstances, and a faint "thread" connecting the planet with the Sun's limb was distinctly observed with the south equatorial (of 8 in. aperture) a few seconds before internal contact. Observers of former transits of Mercury had recorded the appearance of a bright spot on the centre of the planet during transit. Such an appearance was carefully looked for, but not seen. Several photographs were obtained with the heliograph during the transit.

With the south equatorial, I have continued the observations of southern double stars, and several hundred measures have been secured. A fine series of measures of the polar and equatorial diameters of Mars during opposition were also obtained, as well as numerous measures of Saturn's ring.

The observations of the nebulae, &c., with the great telescope have been steadily proceeded with, but the number of nights in the year that can be devoted to this work are somewhat too limited. Out of 326 available nights, 150 were unfitted for observation from unfavorable weather, bright moonlight interfered on 32, while 49 were occupied with visitors, which, together with about 20 nights during which the telescope was under repair, or which were unavailable from other causes, left only 75 nights upon which observations could be made.

The work done is as follows:—Seventy-seven of the smaller nebulae contained in Sir John Herschel's general catalogue have been observed, and compared with his measurements and description. From these observations it may be gathered that, while the present aspect of many of these nebulae agree almost exactly with Herschel's description, others are considerably changed, and some appear so completely altered as to be only recognized by their position. These changes have all been carefully noted, and finished drawings made of them for future reference. Two nebulae, H 4223 and H 1561, widely separated from each other, and described by Herschel as prominent objects, cannot now be found, although careful search has been made for them. The nebula round η Argûs has been, on six evenings, compared with the drawing of March 1875. The only change detected is a break or separation in one of the branches on the preceding side. This has been clearly established. The other parts remaining unaltered, it was not considered necessary to make a fresh drawing. Observations of the Satellites of Uranus were obtained on

sixteen occasions, and a diligent, but unsuccessful, search was made for the Satellites of Mars on sixteen nights. Mr. Turner has also made several fine colored drawings of Mars and Jupiter at their oppositions.

One hundred and seventy-three photographs of the Sun have been taken by the heliograph. Spots are shown on thirty-two of these plates, representing fourteen spots and groups. They are all, with one exception, of very small dimensions. Only five small groups and spots have been seen since the 1st December 1877.

The meteorological and magnetical observations have been carried on as usual. The determination of the absolute force of terrestrial magnetism has been made every month by Mr. Moerlin, and the meteorological statistics of the colony collected and dealt with as heretofore. I have been enabled to largely increase the number of rainfall stations, by furnishing rain-gauges to individuals, who undertake to furnish returns regularly, and I propose to still further augment the number of points of observation. I may mention here that I receive great assistance in this direction from various gentlemen in the country, who possess rain-gauges of their own, and who regularly send me copies of the rainfall in their respective localities.

It became necessary to suspend the magnetographic records from 27th August to 28th November 1877, in consequence of the erection of the new building already referred to; and as the thermographs, electrograph, and barograph were also removed to the same building, a few days' interruption in these records also was inevitable. Regarding the state of the records of the magnetic and meteorological observations, I have to report that the anemograph curves are tabulated to date, the absolute magnetic observations are reduced to date, and the photographic and other curves of the various self-registering instruments are filed away in proper order for reference. Sixty-two aneroid barometers have been tested in vacuo, and forty-seven chronometers rated for the public, in the period now referred to.

On the 24th September last year, I received a telegram from Sir George Airy, requesting us "to watch Mars for suspected satellites," but unfavourable weather prevented more than a partial compliance with this request. On the 11th October, however, a telegram announced that two satellites had actually been discovered by means of the great refractor at Washington. At this time our great telescope was crippled by the breaking of the declination clamp, and it was not until the 16th that we could commence our search for the newly-discovered bodies. Mars had by this time increased his distance from the earth so much, that our failure to find them might be thus accounted for. There can be no doubt that the smaller of the two satellites was seen on one occasion, but clouds interfered before its identity could be verified. Although we were so late in the field, our failure to find these bodies with certainty and ease is somewhat unaccountable.

I do not propose to make any alteration in the work of the establishment during the current year, as I believe the usefulness of the Observatory to our community, and the interests of science, will be best conserved by pursuing the course now followed. There is undoubtedly great room for improvement, especially in our meteorological work. I have lately furnished the Melbourne papers with a monthly abstract of rainfall in the various parts of the colony, and last month fifty-seven localities were represented. The table is at present constructed in the order of amount of rainfall, but I am now trying to arrange the colony in climatic regions, and when this is done I propose to alter the rainfall-table accordingly.

As regards our weather telegrams, it is highly desirable that they should be accorded in these colonies the precedence of transmission given to them in England, America, and generally throughout Europe.

I have already referred to the inadequate power of our transit circle for the modern requirements of a State Observatory, and I think the time has arrived for replacing it with an instrument of larger dimensions, and more commensurate with others of the same class, with which most European and American Observatories are now furnished, and such as has lately been erected at the Sydney Observatory. The cost of such an instrument would be about £1,200, and its construction would occupy about two years. Should the Board endorse my views on this subject, I have little doubt that the Government, with the liberality it has always shown towards the requirements of our Observatory, will grant the requisite means.

ROBT. L. J. ELLERY,
Government Astronomer.

Melbourne Observatory, 29th August 1878.

APPENDIX.

BOOKS, ETC., PRESENTED TO THE OBSERVATORY.

Name of Book.	By whom Presented.
Greenwich Observations, 1874, 1875	Greenwich Observatory
Greenwich Astronomical Results, 1874, 1875	Ditto
Greenwich Magnetic and Meteorological Results, 1874, 1875	Ditto
Report of the Astronomer Royal to the Greenwich Board of Visitors, June 1877	Ditto
Quarterly Weather Reports, from June 1874 to June 1875	Meteorological Office, London
Hourly Readings from the Self-recording Instruments at the Seven Observatories in connection with the Meteorological Office, July 1876 to May 1877	Ditto
Charts of Meteorological Data for Nine Ten-degree Squares, with Remarks to accompany the same, 2 vols.	Ditto
Meteorological Observations at Stations of the Second Order, from June 1875 to June 1876	Ditto
Supplement to the Report of the Permanent Committee of the First International Congress at Vienna	Ditto
Report of the Treasury Committee on the Administration of the Annual Meteorological Grant	Ditto
Report of the Meteorological Committee of the Royal Society, May 1877	Ditto
Report of the Kew Meteorological Committee for 1877	Kew Committee
Monthly Notices of the Royal Astronomical Society, vol. xxxvii., 4-9, and vol. xxxviii., 1-4	Royal Astronomical Society
Memoirs of the Royal Astronomical Society, vol. xliii., 1875-77	Ditto
Radcliffe Observations, vol. xxxv., 1875	Radcliffe Observatory, Oxford
Reports of the British Association for the Advancement of Science for 1875 and 1876	British Association
Quarterly Journal of the Meteorological Society, Nos. 21 to 24	Meteorological Society
Proceedings of the Royal Society, vol. xxv.	Royal Society
Papers Reprinted from the Proceedings of the Royal Society, by Rev. S. J. Perry	Rev. S. J. Perry
Paper on the Magnifying Power of the Half Prism, by W. H. M. Christie	W. H. M. Christie, Esq.
Papers Reprinted from the Monthly Notices of the Royal Astronomical Society, by David Gill	David Gill, Esq.
Paper on the Vertical Pressure on the Barometer, by Robt. Tennent	Robert Tennent, Esq.
Dunecht Observatory Publications, vol. ii. Mauritius Expedition, 1874	Lord Lindsay
Indian Meteorological Memoirs, by H. F. Blanford	Indian Meteorological Department, Calcutta
Indian Daily Meteorological Observations, by H. F. Blanford and J. Eliot, from January 1877 to March 1878	Ditto
Abstract of the Bengal Meteorological Statistics for 1875, by J. Eliot	Ditto
Report on the Vizagapatam and Backergunge Cyclones of October 1876, by J. Eliot	Ditto
Report on the Meteorology of India for 1875, by H. F. Blanford	Ditto
Report on the Administration of the Meteorological Department of India	Ditto
The Indian Meteorologist's Vade Mecum, by H. F. Blanford	Ditto
Tables for Reduction of Meteorological Observations for India, by H. F. Blanford	Ditto
Brief Sketch of the Meteorology of the Bombay Presidency in 1876, by F. Chambers	Ditto
Report on the Administration of the Meteorological Department in Western India for 1876-7, by F. Chambers	Ditto
Report on the Preparations for, and Observations of, the Transit of Venus, 1874, as seen at Roorkee and Lahore	Colonel Tennant
The Vizagapatam Meteorological Observations, 1876	A. V. Nursingrow, Esq.
Results of the Astronomical Observations made at the Royal Observatory, Cape of Good Hope, 1871-74, 2 vols., by E. J. Stone	Royal Observatory, Cape of Good Hope
Mauritius, Annual Report of Observatory for 1876	C. Meldrum, Esq., Mauritius
Mauritius, Meteorological Results for 1876	Ditto

Name of Book.	By whom Presented.
Reports on the Meteorological, Magnetic, and other Observatories of the Dominion of Canada, 1876	Marine Department, Ottawa, Canada
Meteorological Observations made at the Government Observatory, Sydney, for the Year 1877, in monthly parts, by H. C. Russell	Sydney Observatory
The Climate of New South Wales, by H. C. Russell	H. C. Russell, Govrmt. Astronomer
Meteorological Results at Windsor, N.S.W., 1871-76, by J. Tebbutt	J. Tebbutt, Esq.
Journal and Proceedings of the Royal Society of New South Wales, vol. x.	Royal Society of N.S.W.
Annual Report of the Department of Mines, New South Wales, for 1876	Department of Mines, N.S.W.
Adelaide Meteorological Returns, monthly, for Year 1877, C. Todd	Adelaide Observatory
Meteorological Report for Western Australia, 1876, by M. Fraser	M. Fraser, Esq., Surveyor-General
Results of Five Years' Meteorological Observations at Hobart Town, completing a Period of Thirty-five Years	F. Abbott, Esq.
The Surveyor-General's Report on the Surveys of New Zealand, 1877	J. Thomson, Surveyor-General
Geological Map of Australia	Mining Department, Victoria
Patents and Patentees, Victoria, vol. ix.	Registrar-General, Victoria
Victorian Year Book, 1876-77	H. H. Hayter, Esq., Government
Daily Bulletin of International Meteorological Observations, August 1876 to August 1877, Washington, U.S.	Statist, Victoria
Monthly Weather Review, February 1877 to February 1878, Washington, U.S.	General A. J. Myer, Chief Signal Officer, U.S. Army Department
Daily Bulletin of Weather Reports, with the Synopses, Probabilities, and Facts, in monthly parts, from November 1873 to March 1874, Washington, U.S.	Ditto
Instructions to Observer Sergeants, Signal Service, U.S. Army ...	Ditto
Original Record of Meteorological Observations for U. S. Signal Service	Ditto
The Practical Use of Meteorological Reports and Weather Maps, General A. J. Myer	G. C. Levey, Esq., Sec. to Philadelphia Exhibition Commission
Annual Report of the Chief Signal Officer to the Secretary of War (U.S.) for the Year 1875	Ditto
Telegraph Cypher, Signal Service (U.S.), 1875, new edition ...	Ditto
Roll of U. S. Signal Service Maps and Plans	Ditto
International Weather Map	Ditto
Smithsonian Report for 1875	Smithsonian Institution, Washington
The Winds of the Globe. Professor Coffin	Ditto
Tables and Results of the Precipitation in Rain and Snow in the United States, by C. A. Schott	Ditto
Index Catalogue of Books and Memoirs relating to Nebulae and Clusters, &c, by E. S. Holden	Ditto
On the Proper Motion of the Trifid Nebula. E. S. Holden ...	Ditto
Annual Report of the New York Meteorological Observatory. Dr. Draper	New York Meteorological Observatory
Instructions for Observing the Transit of Mercury, 1878 ...	U.S. Naval Observatory
Washington Astronomical and Meteorological Observations, 1874. Admiral C. H. Davis	Washington Observatory
U.S. Arctic Expedition: Steamer <i>Polaris</i> . Physical Observations by Dr. E. Bessels	Ditto
Newcomb's Corrections to Hansen's Tables of the Moon, 1878 ...	Ditto
Annals of Harvard College Observatory, vols. vi., vii., viii., and ix.	Harvard College Observatory
Mitchell's Micrometrical Measurements of Double Stars, Nos. 2 and 3	Cincinnati Observatory
Bulletin of American Geographical Society, Nos. 1, 2, 3, 4, 5. Session of 1876-7	American Geographical Society
Journal of American Geographical Society, vols. ii., iii., iv., v., vi.	Ditto
The Moon's Zodiacal Light. L. Trouvelot	L. Trouvelot, Esq., Washington
Results of Observations on the Satellites of Jupiter, by D. P. Todd	D. P. Todd, Esq., New York
Mexican Meteorological Observations, 1877. M. Bárcena ...	Mexico Central Observatory
Boletín del Ministerio de Fomento, Mexico, 1877. M. Bárcena ...	Ditto
Observaciones Astronomicas de Santiago de Chile, 1856-60, vol. iii.	Dr. Carlos Moesta, Dresden
Connaissance des Temps 1879	Bureau des Longitudes, Paris
Annuaire pour l'An 1878	Ditto
Bulletin International de l'Observatoire de Paris, April 1877 to April 1878	Paris Observatory
Annales de l'Observatoire Royal du Bruxelles, 1876-77 ...	Brussels Observatory
Résumé des Observations sur la Météorologie et sur la Physique du Globe, 1876	Ditto
Brussels Meteorological Reports, 1877	Ditto
Meteorological Observations taken at International Stations in Belgium and the Low Countries, 1877, by J. C. Houzeau	Ditto

Name of Book.	By whom Presented.
Memoire sur la Température de l'Air à Bruxelles, 1833-72 ...	Brussels Observatory
Notices Extraites de l'Annuaire de l'Observatoire Royal du Bruxelles pour 1875	Ditto
Essai sur la Vie et les Ouvrages de L. A. J. Quetelet ...	Ditto
Extracts from the Proceedings of the Académie Royale de Belgique	Ditto
Études sur la Planète Mars ...	Mons. M. F. Terby, Brussels
Observations de la Planète Saturne ...	Ditto
Aréographie : Sur la Planète Mars ...	Ditto
Société Belge de Géographie : Bulletins Nos. 1, 2, 3, 4, 5, 6. 1877	Société Belge de Géographie
Observations Météorologiques des Stations du Second Ordre dans les Pays-Bas, 1876	Netherlands Institute, Utrecht
Nederlandsch Meteorologisch Jaarboek, 1872, 1875, 1876 ...	Ditto
Marche Annuelle du Thermomètre et du Baromètre en Hollande, 1843 to 1875	Ditto
Zeitschrift der Osterreichischen Gesellschaft für Meteorologie, xi. and xii., bände.	Dr. C. Jelinck, Vienna
Circular zum Berliner Astronomischen Jahrbuch, April 1877 to April 1878	Dr. F. Tietjen, Berlin
Bewegung des Sonnen Systems, Cap, Melbourne, Williamstown, St. Helena, und Madras	Dr. L. de Ball, Bonn
Schriften der Universität zu Kiel, Aus dem Jahre, 1873, band., xxii.	Dr. Von C. F. Mohr, Kiel
Vierteljahrschrift der Astronomischen Gesellschaft, 1877. 12 Jahrgang	Dr. A. Winnecke, Leipzig
Mittlere Orter von Fixsternen. P. G. Strasser ...	Dr. P. G. Strasser, Kremsmünster
Meteorologische Beobachtungen des Leipziger Universität Observatoriums	Dr. Bruhns, Leipzig
Resultate from 1833-1875 at Munich ...	Munich Observatory
Repertorium für Meteorologie. Dr. Vou H. Wild ...	St. Petersburg Observatory
Die Temperatur Verhältnisse des Russischen Reiches. P. A. Waluw	Ditto
Hilfstafeln zur Berechnung der Polaris-Azimute. Eugene Block...	Ditto
Annalen des Physikalischen Central-observatoriums, jahrgang 1875, by Dr. Von H. Wild	Ditto
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