

1877.

VICTORIA.

T W E L F T H R E P O R T

OF THE

BOARD OF VISITORS

TO THE

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

TOGETHER WITH THE

ANNUAL REPORT OF THE GOVERNMENT ASTRONOMER.

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

By Authority:

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TWELFTH 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 made its annual inspection on the 22nd of May, and was gratified at finding everything going on efficiently and satisfactorily. The instruments are doing their work well, although the anemograph is showing tokens of wearing out. The buildings are in the main in good order, the only exception is the magnetic-house. This building, owing to its originally imperfect construction, has never been of much service. It became, therefore, a question whether to give up this branch of observation altogether or to have a new house constructed with proper underground chambers and requisite appliances. Before recommending such further expense, which would amount to about £500, the Government Astronomer, with his usual caution, made enquiries in Europe whether its probable utility would justify the cost. The replies received from the principal physical observatories in Europe not only insist on the desirableness of continuing magnetic observations here, but speak of the great value of the Melbourne institution from its position relative to the southern magnetic pole. The Board is glad to learn that there is a fair prospect of this work being carried out. The Board wishes to add one other recommendation, viz., that additional accommodation should be provided for the Government Astronomer in his private residence.

The permanent staff continues the same as last year, and it would be difficult to find men more exactly fitted for their work. A probationary assistant has been met with to fill the vacancy mentioned in last year's report; and so satisfactorily has he discharged his duties that the Government Astronomer has strongly recommended his being placed in the position of junior assistant, it being so essential to the value of physical observations that there should be a uniform continuity in the exactitude with which they are taken, and this result can only be secured by having specially trained workers.

The Board referred in its last report to the effort Mr. Ellery was making to have the drawings, taken at the great Melbourne telescope, published. In furtherance of this object the services of Mr. Morris, of the Mining Department, have been called in requisition and very valuable have they proved to be. Several copies of these drawings, now in preparation, were submitted to the inspector of the Board, and they give an admirable representation of the different nebulae on a dark ground exactly as they appear in the heavens.

On inspecting the transit circle the Board came to the conclusion that it is too small for the present requirements of science, and, although a good instrument, is hardly worthy of the great reputation of the Melbourne Observatory. The Board would recommend, therefore, that a transit circle of at least seven inches aperture should at no distant time be obtained to replace that at present in use. The principal work to be done for some years by this instrument will consist in observing stars lying between 30° and 50° south declination; the accurate position of these stars being urgently required for the geodetic surveys now in progress in Australia and New Zealand.

The Board wishes in the last place to call attention to the strenuous effort recently made to bring weather telegraphy into practical use. This can only be done by the prompt and steady co-operation of the other colonies. Hitherto this work has been so little understood, or treated as matter of such secondary importance, that observations, though correctly taken at many distant stations, have been left unforwarded till they became of no practical use. It is not that any great time or labor is required, but that the observations should be transmitted at once, without loss of time, to the central stations for immediate and systematic publication.

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

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

(*Read at the Annual Visitation, 22nd May 1877.*)

GENTLEMEN,

The report which I have now the honor to submit to the Board of Visitors at this, their twelfth, annual visitation has reference to the present state of the Observatory in its several details, the work accomplished since the last visitation on 20th June 1876, as well as to the work in progress and in prospective.

In the first place, I shall refer to the present state of the staff, appliances, buildings, &c.

PERSONAL ESTABLISHMENT.

In my last report I referred to the resignation of Mr. Hay, who had been appointed by the Government on probation to acquire the technical knowledge necessary to fit him for a junior assistant at the Observatory. This vacancy remained unfilled until the beginning of December, when Mr. Lilly, a young gentleman who took an honorable position at Cambridge, was nominated to the vacancy as a probationer without pay. There can be no doubt of the desirability of training a junior for Observatory work, more especially as the staff is generally pretty hardly pressed for assistance, especially in the mathematical work. Mr. Lilly is in all respects eligible for the post, and has already proved of great service. In other respects the staff is the same as at the date of the last visitation, and consists of—

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

In addition there are a messenger and a workman (principally engaged in connection with the great telescope) on the permanent staff, and a clerical assistant and a mechanic temporarily engaged.

There has been but little change in the apportionment of the various duties of the establishment among the staff during the past twelve months. The general direction, supervision, correspondence, and special observations have devolved on me, while all the work in connection with the transit circle and meridional observations has been, as before, in Mr. White's charge, assisted by Mr. Gilbert; Mr. Moerlin has been almost exclusively occupied with the meteorological and magnetic work, in the clerical portion of which he is assisted by Mr. Kemp, the clerical assistant; and Mr. Turner has charge of the great telescope work and the heliography. On each officer devolves other matters of detail generally more or less allied to his special duties. The accounts, storekeeping, &c., are allotted to Mr. Gilbert.

BUILDINGS.

The buildings generally, with the exception of the magnetic-house, are in a good state of repair. I have in former reports referred to the unsatisfactory condition of this building, more especially with respect to its unfitness for the purposes for which it was intended, owing to its exposure to great variations of temperature. I hoped that better conditions for the magnetic instruments might be obtained by some modification of the present building; experiment, however, has shown it impossible to do so to the extent necessary, and nothing short of a new building with an underground chamber seems likely to meet the requirements. As such a building would cost nearly £500, I hesitated to ask the Government for the expenditure until I had obtained expressions of opinions from the highest authorities on the value and desirability of continuing the automatic records of variations of terrestrial magnetism. Some months ago I received copies of a pamphlet from the Meteorological Committee of England containing the opinions of many of the most eminent men in Europe the best fitted to express an opinion on this subject (a copy of this correspondence is attached), which is so unmistakably in favor of a continuance of this work that I wrote to the Minister of my department, the Honorable the Chief Secretary, requesting that a new building should be erected. Plans have been prepared by the Public Works department, and I have no doubt the work will soon be carried out. The new building has been designed to accommodate the magnetographs and electograph in a basement room about eight feet below the surface of the ground, with chambers above for the thermograph and barograph, as well as for the requisite photographic work. This arrangement will not only bring all the photographic apparatus under one roof, but will also enable me to do away with some of the temporary buildings in the grounds which, besides being to a great extent unfitted for the purposes for which they are used, are in no small degree unsightly.

The movable roof which covers the great telescope, after having worked easily and satisfactorily for eight years, became suddenly very stiff some months ago, requiring two men instead of one to move it off and on the telescope. The cause of this could not be discovered, but the machinery was overhauled and reset, and some auxiliary moving gear added; it is much improved, and can now be managed with moderate facility, but not so satisfactorily as formerly.

The new entrance and approaches to the Observatory, which were in progress at the date of the last visitation, have been completed, and the grounds have been partially planted by Mr. Guilfoyle, the curator of the Botanical Gardens.

INSTRUMENTS.

The principal instruments of the Observatory, including the transit circle, north equatorial, south equatorial, east transit instrument, and the photoheliograph are in excellent working order. The same may be said of all the graphic apparatus, and other minor instruments. Last July a defect in the mechanism of the great telescope became apparent; it was very stiff and unsteady when moved on the declination axis; on careful examination I found one of the exterior friction rollers fixed, with a groove worn in it; after a good deal of trouble this was removed, turned up anew, replaced, and means provided for oiling the pivots of these rollers, which before could not be done satisfactorily. Since these repairs the motion of the telescope is all that can be desired. The mirrors retain their polish as well as ever, and the telescope generally is in a satisfactory condition and in good working order. After repeated trials and modifications of the apparatus I have at length succeeded in getting satisfactory performance with the electrograph; a new electrometer has been constructed in our workshop very similar to Sir William Thomson's quadrant electrometer, with bifilar suspension, furnished also with an electric replenisher. This apparatus has been temporarily erected in the east transit room, pending the completion of the new magnetic house. The requisite insulation of the collector has also been satisfactorily secured, and the curves showing the electric condition of the atmosphere near the earth's surface are now obtained as regularly and as perfectly as the barographic and other curves.

A new evaporation gauge has been erected in the grounds; it consists of a slate tank 10 inches deep and 3 feet square, sunk nearly to the level of the ground. The gauge consists of a float in a tube which is in communication with the tank. The height of the float is measured with a delicate pointer scale and mirror, by help of which all parallax in reading is avoided.

The anemograph is wearing out rapidly in some of its parts, and it will soon become a question whether to repair and alter it, or obtain another of more modern construction.

LIBRARY.

I append a list of the numerous and valuable donations to the Observatory during the past year.—(See Appendix.)

PUBLICATION.

I am glad to be able to report that the publication of the work done with the great Melbourne telescope is in progress. The services of the lithographic artist I referred to in my last report have been temporarily obtained from the Mining Department, and he is now engaged in copying on stone the drawings made at the telescope by Messrs. Le Sueur, McGeorge, and Turner. Out of ninety-three drawings which it is intended to publish, sixty-one are already lithographed, and proof copies obtained, which are under revision (samples on the table). These are representations of the nebulae on a black ground, and represent them as seen by aid of the telescope in a most effective and truthful style. Should the lithographic printers succeed in obtaining the requisite number of copies as clearly representing Mr. Morris' (the lithographer's) exquisite work as the proof copies do, the whole difficulty of economically and satisfactorily reproducing these astronomical drawings will be surmounted. The work, so far as it is done, is highly creditable to both the draughtsman and the printer.

I have not yet commenced the descriptive letter-press, but intend doing so very shortly, so as to be ready for publication as soon as the lithography is finished, and I hope long before the next annual inspection this, our first instalment of the results furnished by our giant reflector, will have been distributed over the colonies, and throughout Europe and America.

An additional publication, in connection with the new system of weather telegraphy, has just been commenced, which is styled the Weather Bulletin; it is a simple sheet for posting up at the Telegraph, Customs, and Shipping Offices, Chambers of Commerce, &c., containing the substance of the morning weather telegrams from the coast line and interior of Australia, so far as the system is at present extended. These sheets are lithographed at the Observatory each day (except Sundays) about noon, and distributed in town as soon after as possible. It is intended to issue a weather chart of Australia as soon as a workable method of doing it has been decided upon, either in place of or in addition to the Bulletin.

The results of the meteorological and magnetic observations are printed, and only await the completion of a map to be bound up with them. The monthly record is behind-hand; it has been printed and issued only up to October 1876. The numbers for November and December are still in the printer's hands, and the materials for the first four months of the current year are ready for publication.

TIME SIGNALS AND DISTRIBUTION OF OBSERVATORY TIME.

The time-ball on the old light-house tower at Williamstown, though almost worn out, continues to do good service; it must, however, soon be replaced by a new one, and provision will be made for this purpose in next year's Estimates. The failures in the signal during the past year have been 25 out of 290, all but three owing to derangement of the telegraph lines through which the signal for the drop of the ball is transmitted; this is the largest number of failures that has occurred as yet in one year, and has given rise to much disappointment to mariners bound to sea, and elicited numerous complaints. The regularity of this signal is of the utmost importance, as it is the only trustworthy means furnished in the port for enabling captains to obtain errors, &c., of their chronometers, without removing them from the ship; in view, therefore, of the late frequent failures, I have urged on the telegraph authorities the desirability of a special wire to the time-ball tower at Williamstown, as the only means I can suggest of obviating this. The matter is now under consideration, and I trust that either a special wire, or some equally secure method for obtaining the requisite regularity, will be supplied.

The clock-controlling current furnished by the Observatory for public and private clocks in Melbourne continues to work satisfactorily; fewer interruptions have occurred than in former years, and these can, I believe, be still further reduced by the adoption of one uniform method of connecting the clocks with the electric central line. I have recommended a plan to the Telegraph Department, which, I believe, it is

intended to carry into effect at once; this plan will comprise a simple contrivance (a switch or commutator) by which, when there is any failure of current and therefore loss of control on the line, as shown by the galvanometer which is attached to each clock, the person in charge can at once ascertain whether the fault is in connection with his particular clock, or in that portion of the line coming in to, or that going out from it. By this means the interruption on the line can be rapidly localized and remedied and the current re-established; as it is, when an interruption occurs it can only as a rule be discovered after a tedious search. There are at the present eight clocks controlled by the Observatory current, and a ninth in the Long Room of the Custom House is to be added very shortly.

The going of the Post Office clock is still as remarkably good as ever; the greatest errors have been forty-two seconds fast, nineteen seconds slow, and the pendulum regulation made only seven times throughout the year. I propose by means of more frequent regulation to keep the maximum error within from two to five seconds.

THE WORK OF THE OBSERVATORY.

The work done with the transit circle has consisted of observing:—first, the ordinary fundamental stars for finding instrumental and clock errors; second, the close circumpolar stars contained in our standard catalogue for azimuth determination; third, stars observed by some of the American Transit of Venus parties in the Southern hemisphere when obtaining their latitudes with the zenith telescope; and fourth, stars situated in the zone between 30 and 50 degrees of south declination; these last are urgently required for the prosecution of the higher class surveys in progress in Australia and New Zealand, and a working catalogue has been formed of all the stars of the British Association catalogue contained between the above limits, the observation of which will form the principal work of the transit circle for some years to come.

During the 11 months that have elapsed since the last inspection the numbers of the recorded observations are as follows:—

R.A. observations	...	...	...	...	...	1710
P.D. observations	...	...	...	...	...	950
Observations of error of collimation	...	...	...	...	...	128
" " level and nadir	...	...	...	...	...	136
" " runs of microscope	...	...	...	...	...	45
" " flexure of telescope	...	...	...	...	...	10

The state of the reductions is as follows:—The separate results of R.A. and P.D. are reduced up to date; the results for the year 1876 are nearly formed into the annual catalogue, which will soon be ready for the printer.

The question of the existence of the intra-mercurial planet Vulcan was revived again last year, in consequence of a report that a planet-like body had been again seen to transit the sun's disc. Mons. Leverrier took up the subject afresh, and issued a circular inviting astronomers to watch the sun's disc on 20th, 21st, and 22nd March, as it was quite possible the supposed planet would cross the sun about that time. Sir George Airy sent a circular telegram to Indian and Australian observers, requesting that a watch might be kept, and photographs obtained, if possible. The weather was beautifully fine here on the days named, and a careful watch was kept from sunrise to sunset each day; a series of sun-pictures was obtained with the heliograph, but no trace of the planet was observed.

With the great telescope Mr. Turner has continued the observation and drawing of Sir John Herschel's figured nebulae. Out of about 130 nights fit for observing, thirty-nine were given up to visitors, while nearly thirty were lost through necessary repairs to the roof and declination axis already referred to.

The work done comprises a finished drawing of the Horse-Shoe Nebula for the epoch 1877; the observation, comparison, and measurements, of 57 of the smaller nebulae figured in Sir John Herschel's work, most of which, as I have already stated, are in course of publication. The nebula about η Argus was examined in February and March last, and carefully compared with the drawing of 1875.23, which was the last made. Mr. Turner found that its appearance was so well represented by that drawing that it was not then thought desirable to obtain another. The system of obtaining photographic pictures of the sun with the heliograph on every fine day has been continued, and during the year 168 heliograms have been secured; these, like those of last year, indicate a somewhat remarkable absence of sun-spots.

The south equatorial has been used almost exclusively by myself in the observation of the position and distances of southern double stars, especially those suspected to be binary, and which have been observed by the late Sir John Herschel, as well as other objects out of reach of northern observers, concerning which enquiries have been made or to which some special interest may attach; and I hope to be able to gradually revise all the more important of Sir John Herschel's observations obtained at the Cape of Good Hope in the years 1834-5-6-7 and 8 of this class of objects, in which work I am promised the co-operation of my friend C. Todd, Esq., C.M.G., Government Astronomer, of Adelaide.

During the year 466 measures of distances and positions of various double stars have been secured with this instrument. It was intended to use this equatorial a good deal for spectroscopic work, and a powerful spectroscope was ordered at the same time as the telescope itself, which is supplied with the requisite fittings; the spectroscope was nearly complete when I left England in January 1876, but for some reason or other it has not reached us yet, although the maker has been repeatedly written to and urged to send it to us with all despatch.

The meteorological and magnetic work has gone on as usual. The measurements of the absolute force of the elements of terrestrial magnetism have been rigidly made by Mr. Moerlin every month, and the continuous records of the magnetographs secured without intermission. The ordinary meteorological work of the observatory has been continued as heretofore, the results of which, as well as of the observations of absolute magnetic force, and the results of meteorological observations made at the country stations, are published in the monthly record of meteorology and terrestrial magnetism.

The state of the records of this portion of the Observatory work is as follows:—The anemograph curves are tabulated up to date. The results of the observations for absolute force of the magnetic elements are also reduced to date. The photographic curves of the barograph, thermograph, magnetographs, and electrograph have only been tabulated so far as necessary to furnish special information, as no definite and uniform plan for finally dealing with them has yet been adopted by the European congress, and until that is the case all the requirements will be fully served by keeping the sheets in proper order of date, &c.

In my last report I referred to the desirability of remodelling our system of meteorological work, with the view of obtaining more general and prompt information from other parts of Australia outside our own colony. I am glad to report that this has to some extent been accomplished with the approval of the various Governments, and the assistance of Mr. Todd, of Adelaide, Mr. Russell of Sydney, and the valuable co-operation of the several Telegraph departments. At the present time, although the system can scarcely be said to be in perfect working order, we receive twice daily reports of pressure and temperature of air, wind, state of weather, state of sea, &c., from thirteen coast stations extending from Cape Borda to Port Macquarrie on the east coast, and from seven selected inland stations. These reports are transmitted by telegraph in cypher early every morning, and about 4 p.m., each colony exchanging with the others. Although this system has been in partial operation since January last, it is only within the last week or so that the exchanges have been made with sufficient punctuality to enable me to adopt any course for publishing the results. I have commenced lithographing *Daily Bulletins*, which it is intended shall be published, by posting in public places; these show the state of the weather and sea all around our coast line, as well as the predominating weather in the interior. It is intended to either supplement or replace this *Bulletin* by a weather chart, so soon as the necessary arrangements can be made.

It is not intended to attempt much in the way of forecasting except in cases of the most marked movement or approach of violent storms along our coast; and it is, I believe, intended by the Harbor authorities to establish, in connection with such forecasts, a system of storm warnings like those adopted on the English coast. I hope we shall be able to gradually extend this system along our coasts from Cape Leuwin around Tasmania to the northernmost of the Queensland ports.

There has been a considerable increase in the work done for the public in the shape of rating chronometers, testing and adjusting barometers and other meteorological instruments, during the last year or two. Since the last visitation 56 chronometers have been received for rating, and 43 issued with rates; in the same period 43 aneroids have been tested under various pressures by means of the air-pump, and the corrections for numerous compasses, thermometers, and other instruments obtained.

The tide-gauge at Williamstown has been for several years past an appanage of the Observatory, and a continuous series of tide curves have been obtained during the whole period; the instrument is self-recording, but requires daily attendance; for this, as well as for attendance on the time-ball, I, some years ago, fortunately obtained the services of a very careful man who is in charge of the batteries at Williamstown, and does this work in a most satisfactory manner. The duties occupy a very short time every day, for which we pay him from our votes at the rate of 1s. 3d. per day. The tide curves are forwarded to the Observatory every week, where they are regularly tabulated by Mr. Turner. This gauge was first erected in 1857, but it is to be regretted that, in consequence of its having been taken out of the charge of the Observatory, to which it at first pertained, there have been many and serious breaks in the registers, and it is only since our resuming charge that a really continuous record of our tides upon one datum has been obtained.

One of the most favorable oppositions of Mars that can occur from which to determine the solar parallax will take place next September, and it is intended that this Observatory shall co-operate with the northern ones in the necessary observations; but as no final plan of operations has reached us yet, I am not in a position to inform the Board what method of observation will be adopted on this occasion.

I do not propose to make any change in the method of carrying on the work of the establishment, nor, as far as I know at present, in the subjects which shall occupy the attention of the staff. The transit circle observations, our most valuable astronomical work, will be zealously continued. The great telescope has its work cut out for years to come in revising Sir John Herschel's observations, to which I propose it shall be almost solely devoted. The revision of Sir John Herschel's multiple stars with the south equatorial and photography of the sun's surface will go on as before.

In the meteorological and magnetic work it may be necessary to make some trivial changes, but the same general system will be carried out. Questions often arise as to the amount of rainfall in short periods, more especially in connection with drainage and disposal of storm waters, also with respect to the pressure of wind in gusts, neither of which are we now able to answer so definitely as I could wish; I therefore intend to establish both a self-recording rain-gauge and a wind pressure-gauge, which will give the desired information with accuracy and certainty.

It will be necessary to discontinue the magnetographic work for a short time during the completion of the new magnetic-house, but matters can be so arranged that only a few hours' curves need be lost.

I anticipate that the satisfactory establishment of the weather telegram system, and the best method of publishing the results, will occupy many months yet; but from the experience of the last week or so, it is apparent that many of the difficulties and delays which beset us at first are fast disappearing. Before very long Western Australia will be connected telegraphically with South Australia, when I think we may count on telegrams from Encla and King George's Sound, which will complete the meteorological grasp of the entire south coast of Australia.

I propose to re-model, as far as possible, our system of meteorological observation at country stations, with the view of obtaining data more representative of the various localities climatically different throughout the colony; the requisite change, however, can only be accomplished by degrees. I also wish to establish a meteorological station above the 3,000 feet level, and I think this can be done in connection with the State nurseries on the summit of Mount Macedon.

ROB. L. J. ELLERY,
Government Astronomer.

Melbourne Observatory, 22nd May, 1877.

APPENDIX.

BOOKS, ETC., PRESENTED TO THE OBSERVATORY.

Name of Book.	By whom Presented.
Washington Astronomical Observations, 1872	Rear-Admiral B. F. Sands, U.S. Navy
Washington Meteorological Observations, 1872	Ditto.
Washington Observations: Appendix i. and ii.	Ditto.
Report on the Difference of Longitude between Washington and St. Louis	Ditto.
Report on the Difference of Longitude between Washington, Detroit, Carlin, Michigan, and Austin Nevada	Ditto.
Daily Bulletin of the U.S.A. Signal Service, with the Synopses, Probabilities, and Facts, December 1872 to November 1873	A. T. Myer, Chief Signal Officer, U.S. Army.
Bulletin of International Meteorological Observations, taken simultaneously from 25th November 1875 to 22nd July 1876, with monthly weather reviews from June 1876 to January 1877	Ditto.
Proposed Legislation for the Signal Service U.S. Army	Ditto.
The Opposition of Mars in 1877	Rear-Admiral C. H. Davis, U.S. Navy.
Smithsonian Reports, 1873, 1874... ..	Smithsonian Institution.
Memoir of C. F. P. von Martius	Ditto.
Report on the Chemistry of the Earth, by Stern Hunt, LL.D.	Ditto.
Contributions to the Ichthyology of the Western Coasts of the United States, by Chas. Girard	Ditto.
Characteristics of some Cartilaginous Fishes of the Pacific Coast of North America, by Charles Girard	Ditto.
Report of Explorations in 1873 of the Colorado of the West and its Tributaries, by Professor Powell	Ditto.
The Theory of the Moon's Motion	J. N. Stockwell.
The American Ephemeris and Nautical Almanac for the Years 1874-1879	Prof. T. H. C. Coffin, U.S. Navy.
Tables of the Satellites of Jupiter	Ditto.
Bulletin of the American Geographical Society, No. 3	American Geographical Society.
Annual Report of the New York, Central Park, Meteorological Observatory, 1874-5	Dr. Daniel Draper.
Transactions of the Connecticut Academy, vol. iii., part i.	Connecticut Academy.
Investigation of Corrections to Hansen's Tables of the Moon	S. Newcomb.
Cincinnati Observatory's Catalogue of New Double Stars	Cincinnati Observatory.
Reports on the Meteorological, Magnetic, and other Observatories of the Dominion of Canada, for 1875	G. J. Kingston.
Schriften der Universität zu Kiel, Aus dem Jahre, 1873, 1874	Dr. von C. F. Mohr.
Repertorium für Meteorologie Herausgegeben von der Kaiserlichen Akademie der Wissenschaften, band iv., v. (1874, 1875)	Dr. von H. Wild.
Annalen des Physikalischen Central-observatoriums, Jahrgang 1874	Ditto.
Instruction für Meteorologische Stationen	Ditto.
Observations de Poulkova, vol. vi.	Pulkowa Observatory.
Die Pulhöhe von Poulkova	Ditto.
Die Zeitbestimmung vermittelst des Tragbaren Durchgangsinstrumentes	Ditto.
Astronomische, Magnetische, und Meteorologische Beobachtungen, 1875	Carl Hornstein.
Beobachtungen der Sonnen flecken ii.	Dr. G. Spörer.
Nederlandsch Meteorologisch Jaarboek, voor 1868... ..	Netherlands Institute.
Bestimmung des Geographischen Langeminterschiedes Zwischen, Leipzig und Munchen	Dr. Carl Bruhns.
Annalen der Sternwarte in Leiden Herausgegeben Von Zone. Obs. 29° 50' to 89° 10'	Dr. H. G. Von Bakhangzen.
Meteorologische Beobachtungen angestellt. Auf der Universitäts-Sternwarte in Leipzig, in Jahre 1875	Dr. Carl Bruhns.
Separatabdruck aus dem Repertorium für Experimentats Physik für Physikalische, Technische, Mathematische, and Astronomische Instrumentelkende	Dr. Von G. Strasser.
Leopoldina Amtliches Organ der Kaiserlich Leopoldinisch-Carolinisch Deutschen Akademie der Naturforscher	Dr. W. F. G. Behn.
Annuaire pour l'an 1876	} Bureau des Longitudes, Paris.
Connaissance des Temps pour l'an 1877	
Annales de l'Observatoire Royal de Bruxelles	Mons. Ern. Quetelet.
La Tempête du 12 Mars 1876	Ditto.
Éléments et Ephéméride de la Comète Périodique D'Arrest: par Mons. M. G. Leveau...	Paris Observatory.
Amphiorama ou La Vue Du Monde Phénomène inconnu pour la première fois observé et décrit	F. W. C. Trafford.
'Annales de l'Observatoire de Moscou, vol. ii., Livraison	Moscow Observatory.
Le Diéthroscope Troisième Communication faite à l'Académie des Sciences de Turin...	Prof. Jean Luvini.
Procès-Verbeaux des Séances de 1875-1876	Paris Committee of Weights and Measures.
La Tempête du 12 Mars 1876. Letter to Mons. E. Quetelet	M. Neumayer.
Observatione Meteorologique et Magnetique a Zi-ka-wei, China. Bulletin Meteorologique et Magnetique, 1875	Zi-ka-wei Observatory.
Bulletino Meteorologico dell' Observatoire del R. Collegio Carlo Alberto in Moncalieri, X. No. 11	Signor P. F. Denza.
Reale Istituto Lombardo de Scienze e Lettere. Rendiconti, series II., vols. vi., vii., viii.	Lombardy Institute.
Magnetic Curves, January 1876 to January 1877	Signor L. Guidi, Pesaro, Italy.
Nederlandsch Meteorologisch Jaarboek voor 1871	Royal Meteorological Institute, Utrecht.
Results of Meteorological Observations made at Juggarowo Observatory, Daba Gardens, Vizagapatam, 1875	A. V. Nursingrow, Esq.
Adelaide Meteorological Observations, 1876	C. Todd, Esq.
Report on the Queensland Telegraph System, by W. T. Cracknell	Brisbane Telegraph Department.

BOOKS, ETC., PRESENTED—*continued.*

Name of Book.	By whom Presented.
Magnetical and Meteorological Observations made at the Cape of Good Hope, vol. ii., 1841-1846	Colonel Sabine.
Results of Meteorological Observations made in New South Wales during 1874	H. C. Russell, Esq.
Contribution to the Meteorology of Japan, by Captain T. H. Tizard, H.M.S. <i>Challenger</i>	Meteor. Office, London.
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