

REPORT

OF THE

TWENTY-EIGHTH MEETING

OF THE



BRITISH ASSOCIATION

FOR THE

ADVANCEMENT OF SCIENCE;

HELD AT LEEDS IN SEPTEMBER 1858.

LONDON:

JOHN MURRAY, ALBEMARLE STREET.

1859.

to be nominated as President of the Meeting which it is proposed to hold at Aberdeen in 1859.

“ His Royal Highness cannot but feel gratified at the wish thus expressed by the Committee, though he is sensible that his own proficiency in scientific subjects is scarcely such as to entitle him to such a distinction. If, therefore, he expresses his readiness to comply with the wishes of the Committee, he begs that it may be considered merely as an expression of the deep interest which he takes in the advancement of science in this country, and as a mark of the high sense which he entertains of the importance and usefulness of the Association.

“ His acceptance of the Presidency must also be considered, to a certain degree, conditional—depending upon his being in Scotland at the time proposed for the Meeting.

“ His Royal Highness’s time is not his own, and it is impossible for him, at this distance of time, to say whether the call of other duties may not be such as to prevent his attendance.

“ I have the honour to be, Sir,

“ Your most obedient Servant,

“ C. GREY.”

“ To Major-General Sabine.”

6. The Report of the Parliamentary Committee of the British Association for the Advancement of Science has been received by the Council, and is herewith presented.

Report of the Kew Committee of the British Association for the Advancement of Science, for 1857-58.

Since the last Meeting of the Association, a set of Magnetical Instruments have been prepared, at the request of the Council of the Royal Society, and the constants determined for the Expedition of Dr. Livingstone to South Africa. Capt. Bedingfield, R.N. and Messrs. Livingstone and Baines, who accompany Dr. Livingstone in this Expedition, received instructions at the Observatory in the use of the instruments.

At the request of Capt. Washington, R.N., Hydrographer of the Admiralty, similar instruments were prepared for the Oregon Boundary Commission, and instructions in their use were given at the Observatory to Capt. Haig, R.A., and Lieut. Darrah, R.E.

Detailed written instructions for both Expeditions, supplementary to those contained in the Admiralty Manual, were furnished by Mr. Welsh. Such instructions necessarily occupied the time and attention of Mr. Welsh and his assistants; but as, in the opinion of the Committee, instructions for the correctly manipulating with instruments with which gentlemen appointed to a particular service are not often previously acquainted, is an essential feature in the practical working of a physical observatory, the Committee have considered it desirable that such assistance should be afforded; and it will be in the recollection of the Council that, in their last Report, the Committee stated that several gentlemen, some of whom were connected with foreign Governments, had received similar instruction.

An application having been received from M. Secchi of the Collegio Romano, on the part of the Roman Government, for Magnetical Instruments, these instruments have been prepared at the Observatory and forwarded to Rome. They consist of an Observatory Bifilar Magnetometer and Balance

Magnetometer, similar to those employed in the British Colonial Observatories, a Unifilar Magnetometer, and a Dip Circle.

Application has also been received from the Rev. Alfred Weld for Magnetical and Electrical apparatus for the Stonyhurst College; these are in course of preparation, and Mr. Weld has received instructions in the use of the magnetical instruments.

Two Dip Circles by Barrow, furnished with Dr. Lloyd's apparatus for the total force, which were sent to the Observatory preparatory to their being forwarded to the Austrian and Russian Governments, were carefully examined and adjusted.

An extensive series of observations made with various dipping-needles and circles, have confirmed the results previously obtained at the Observatory as to the value of the Magnetic dip.

The Self-recording Magnetometers have been in regular action since the 1st of January, and have performed satisfactorily; some difficulty arose in the manipulation of the Balance-magnet, but this has been surmounted, and this instrument now performs with as much accuracy and delicacy in its action as either the Declinometer or Bifilar Magnet.

The Photoheliograph erected in the dome of the Observatory was fully described in the last Annual Report; it has been repeatedly at work since the beginning of last March, and excellent photographic pictures of the solar spots and faculæ were obtained. Certain alterations have been made by Mr. Welsh in order to regulate the time of exposure of the collodion plate to the sun's action; with these alterations the instrument gives very good results, but certain improvements in the arrangements of the secondary magnifying lens are under consideration, with the view of avoiding the depiction on the collodion negative of the inequalities in the glasses which compose it.

The Committee recommend that arrangements should be made for the appointment of a competent Assistant, who will undertake the taking of the photographs and the preparing of a certain number of copies for distribution to some of the principal British and Foreign observatories.

George Whipple has been engaged to assist in the general work of the Observatory at a weekly pay of ten shillings.

Mr. Beckley's arrangement of the Anemometer described at the Cheltenham Meeting of the Association has been adopted and carried out in an apparatus made by Mr. Adie for the East India Company. This anemometer having been mounted at the Observatory, remained for some time, and was found to perform satisfactorily; it was shown to many persons, and examined by Admiral FitzRoy, General Sabine, and Mr. Osler, members of the Anemometer Committee. Certain modifications since suggested by Mr. Beckley, have been adopted in two instruments constructed by Mr. Adie for Admiral FitzRoy's department in the Board of Trade.

The verification of Meteorological Instruments has been continued on the same plan as in previous years. The following have been verified since the last meeting of the Association to the 1st of July:—

| | Baro- meters. | Thermo- meters. | Hydro- meters. |
|-----------------------------------|------------------|--------------------|-------------------|
| For the Admiralty | 75 | | |
| For the Board of Trade | 60 | 126 | |
| For Opticians and others. | 86 | 142 | 150 |
| | <hr/> | <hr/> | <hr/> |
| Total | 221 | 268 | 150 |

Among the latter are included 50 barometers and 150 hydrometers for

the United States, and 6 barometers and 6 thermometers for the Portuguese Government.

Mr. Welsh is at present completing the Magnetic Survey of Scotland, for the expense of which £200 has been received by the Committee from the Admiralty.

The Committee finding it desirable that the workshop of the Observatory should be furnished with a superior lathe and planing machine, authorized their Chairman to apply to the Council of the Royal Society for the sum of £150; this amount was immediately awarded from the Donation Fund, and a very superior lathe, by Whitworth, and a planing machine have been purchased at a cost of £149 7s.

The present as well as the former Annual Reports of the Committee, show the practical scientific objects for which the Observatory has for so many years been used, and at no former period was it in so effective a state as at present; the valuable tools that have (by the liberality of the Royal Society) been placed in the workshop, enable Mr. Beckley to repair and make apparatus and instruments of the most complex and delicate construction; much of this work would otherwise have been sent to different workshops in the Metropolis, entailing not only great loss of time, but often a want of accuracy in the construction: the value of such arrangements in the Observatory can be easily appreciated by scientific observers.

On the 24th of last April, the Committee presented an estimate of the expenditure for the present year, a copy of which had been previously forwarded by the Chairman to the President, whose reply, addressed to General Sabine, the Committee now present as a part of their Annual Report.

“Trinity College, Dublin, December 7, 1857.

“DEAR SABINE,—I have received from Mr. Gassiot the Financial Report of the Kew Committee, which I hope may soon be laid before the Council. It appears from it that the expenditure of the Observatory is likely to increase with the increased activity of the establishment, while part of the income—that, namely, derived from the verification of meteorological instruments—will probably diminish in future years.

“I am not sufficiently acquainted with the working of the Observatory to say, from my own knowledge, how far an augmentation of the existing staff is necessary. But if the Council should judge that it is—as stated in the Report of the Committee—they will have to consider from what *external* source provision may be made for the increased expenditure; for I presume that it will not be thought prudent, that the Association, with its fluctuating and uncertain income, should augment its grant beyond the present amount.

“Upon this point I may remark, that the President and Council of the Royal Society have already evinced their sense of the value of the Observatory, by making a liberal grant to it for a *special* object; and that it is therefore not improbable that they may be willing to contribute *permanently* to its support. Its objects are at least as clearly allied to those of the Royal Society, as to those of the British Association; and if it should be deemed that those objects have been in great measure attained, and that the establishment has proved itself deserving of permanent maintenance, it would seem expedient to place it on a more fixed basis than the present.

“I will only add, that believing, as I do, that the Observatory has already done much, and is capable of doing more, for the advancement of physical science, I should deplore the restriction of its efficiency, by insufficient pecuniary means, as a *loss to science*.

“Believe me, sincerely yours,
“H. LLOYD.”

“To General Sabine, R.A., &c.”

The following is a Statement showing the expense of the last two years ; an additional Assistant is now indispensable as a Photographer ; and as the work of the Observatory increases, and its capabilities for the purposes of science become further developed, the probable future expenditure cannot be fairly estimated at less than £800 per annum.

STATEMENT.

| | 1857. | | | 1858. | | |
|---------------------------------|-------|----|----|-------|----|----|
| | £ | s. | d. | £ | s. | d. |
| Salaries..... | 397 | 5 | 0 | 471 | 8 | 0 |
| Apparatus:— | | | | | | |
| Materials, Tools, &c..... | 28 | 10 | 7 | 59 | 6 | 4 |
| Ironmonger, &c..... | 66 | 9 | 4 | 19 | 13 | 5 |
| Stationery, &c..... | 24 | 9 | 8 | 20 | 11 | 0 |
| Coals and Gas..... | 19 | 0 | 2 | 47 | 10 | 8 |
| House Expenses..... | 17 | 10 | 4 | 20 | 11 | 8 |
| Porterage and Petty Expenses .. | 5 | 19 | 3 | 6 | 12 | 4 |
| Rent of Land..... | 21 | 0 | 0 | 21 | 0 | 0 |
| | <hr/> | | | <hr/> | | |
| | £580 | 4 | 4 | 676 | 13 | 5 |

The above is the actual expenditure, but the real annual increase in salaries is about £61: the difference in the above statement arises from the termination of the financial year being one month later than last year. In the detailed statement of receipts and expenditure, it will be observed that the amount received for verification of meteorological instruments has decreased, arising from the circumstance that the Meteorological department of the Government is now well provided with a store of instruments for its use.

As the financial position of the Observatory will probably be brought forward by the Council at the General Meeting of the Association at Leeds, the Committee suggest that the time has now arrived when strenuous efforts should be made to obtain such an amount of pecuniary aid as would ensure the permanent efficient working of this practical physical Observatory ; for although the establishment is conducted with the strictest economy, the necessary work connected with the Observatory unavoidably creates a corresponding increase in the amount of the annual expenditure.

JOHN P. GASSIOT, *Chairman.*

Kew Observatory,
10th September, 1858.

Report of the Parliamentary Committee to the Meeting of the British Association at Leeds, in September 1858.

The Parliamentary Committee have the honour to report as follows:—

That on their representation the late President of the Board of Trade had so far acceded to the suggestions of the President and Council of the Royal Society, supported by the British Association, as to consent to the construction of one Anemometer with Dr. Robinson's Revolving Cups, which would be erected at Bermuda. We believe, however, that another instrument of the same description will be erected at Halifax, at the cost of the Board of Admiralty. These Anemometers are to be constructed on a principle devised by Mr. Welsh of the Kew Observatory, and they will cost about £50 each.

We are happy to be enabled to add, that the late President of the Board of Trade, on a representation made to him by us of the insufficiency of the

Accounts of the New Committee of the British Association from Aug. 26, 1857, till Sept. 22, 1858.

RECEIPTS.

| | £ | s. | d. |
|--|-------|----|----|
| Balance from last account | 171 | 5 | 2 |
| Received from the General Treasurer | 500 | 0 | 0 |
| " for the verification of Instruments— £ s. d. | | | |
| from the Board of Trade | 22 | 0 | 0 |
| from the Admiralty | 37 | 15 | 0 |
| from Opticians | 50 | 5 | 0 |
| | 110 | 0 | 0 |
| | <hr/> | | |
| | £781 | 5 | 2 |
| | <hr/> | | |

PAYMENTS.

| | £ | s. | d. | £ | s. | d. |
|--|-------|----|----|------|----|----|
| Salaries, &c. :— | | | | | | |
| To Mr. Welsh, one year, ending Aug. 27 ... | 200 | 0 | 0 | | | |
| Ditto, allowed for petty travelling } expenses | 10 | 0 | 0 | | | |
| Mr. C. Chambers, five quarters, ending } Oct. 6 | 87 | 10 | 0 | | | |
| Mr. J. V. Magrath, one year, ending } Aug. 14 | 60 | 0 | 0 | | | |
| Mr. Beckley, 56 weeks, ending Sept. 20. | 98 | 0 | 0 | | | |
| Mr. G. Whipple, 37 weeks, ending Sept. 20 | 15 | 18 | 0 | | | |
| | <hr/> | | | 471 | 8 | 0 |
| Apparatus, Materials, Tools, &c. | | | | 59 | 6 | 4 |
| Ironmonger, Carpenter, and Mason | | | | 19 | 13 | 5 |
| Printing, Stationery, Books, Postage | | | | 20 | 11 | 0 |
| Coals and Gas | | | | 47 | 10 | 8 |
| House Expenses, Chandlery, &c. | | | | 20 | 11 | 8 |
| Porterage and petty expenses | | | | 6 | 12 | 4 |
| Rent of Land, one year, ending Oct. 10, 1858 | | | | 21 | 0 | 0 |
| Balance in hand | | | | 114 | 11 | 9 |
| | <hr/> | | | £781 | 5 | 2 |
| | <hr/> | | | | | |

I have examined the above account and compared it with the vouchers presented to me, and find the Balance to be One Hundred and Fourteen Pounds Eleven Shillings and Ninepence.

8th Sept. 1858.

R. HUTTON.