



REPORT

OF THE

METEOROLOGICAL COUNCIL

TO THE

ROYAL SOCIETY,

For the Year ending 31st of March 1894.

Presented to both Houses of Parliament by Command of Her Majesty.



LONDON :

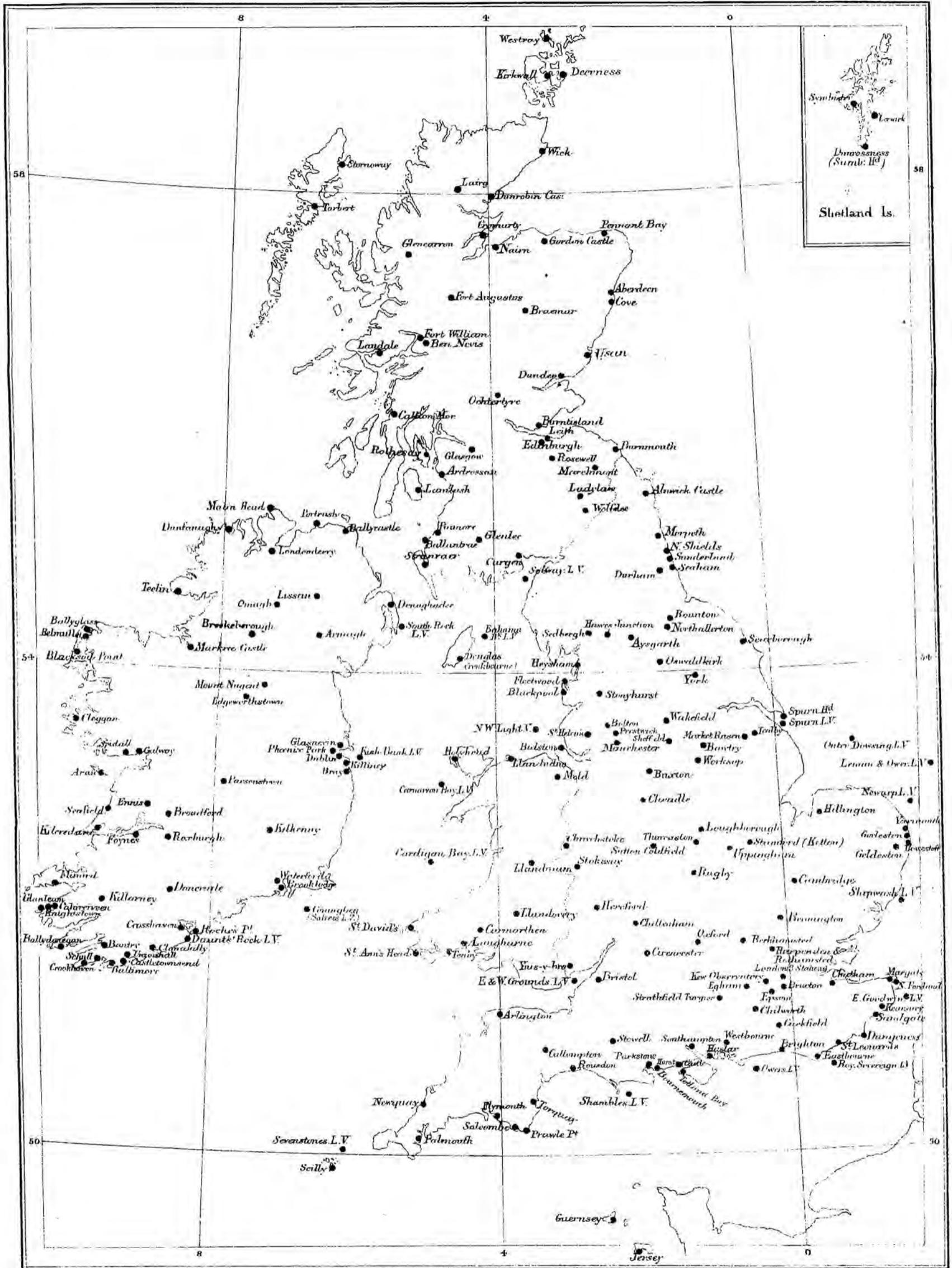
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1894.

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MAP SHOWING THE POSITIONS OF THE STATIONS FROM WHICH OBSERVATIONS ARE RECEIVED.



For details of Information Received. See Appendix XI.

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THE METEOROLOGICAL COUNCIL,

1893-94.

Lieutenant-General RICHARD STRACHEY, R.E., C.S.I., LL.D.,
F.R.S., Chairman.

MR. ALEXANDER BUCHAN, M.A., LL.D., F.R.S.E.

Professor GEORGE HOWARD DARWIN, M.A., LL.D., F.R.S.

MR. FRANCIS GALTON, M.A., D.C.L., F.R.S.

MR. EDWARD J. STONE, M.A., F.R.S.

Captain WILLIAM J. L. WHARTON, R.N., F.R.S., Hydrographer of
the Admiralty.

R E P O R T
OF THE
M E T E O R O L O G I C A L C O U N C I L

TO THE
ROYAL SOCIETY,
For the Year ending March 31, 1894.

THERE has been no change in the Council during the year. Introductory.
The executive officers are, as stated in the last Report :—

Mr. R. H. Scott, M.A., F.R.S., Secretary.
Nav.-Lieut. C. W. Baillie, R.N., F.R.A.S., Marine Superintendent.

The Report is, as usual, divided into four sections or parts :

- I. OCEAN METEOROLOGY.
- II. WEATHER TELEGRAPHY.
- III. LAND METEOROLOGY.
- IV. MISCELLANEOUS.

PART I.

OCEAN METEOROLOGY.

Collection of Information.—The practice followed by the Office in the collection of information has been to supply observers with a complete outfit of verified instruments, on the condition of their returning the instruments, and the log of observations made with them, to the Office at the completion of the voyage. Collection of information.

The instruments supplied are :—

One barometer ; six thermometers, with a screen ; four hydrometers.

The first record of observations is made in a rough book supplied for the purpose, which is retained by the Captain, who copies the observations into a regular form of log kept for the Office. As regards the Royal Navy, Her Majesty's ships are supplied by the Office with the meteorological instruments used in the Service, and the Council are glad to say that they receive from time to time meteorological logs of high value from this source.

In order to facilitate the communications between the Office and the observers, agencies are established at some of the principal ports, and instruments are supplied direct from them to the ships.

Collection of
information.

The following is a list of the agents at present in connexion with the Office :—

Aberdeen, J. R. Jones, Navigation School.
Cardiff, T. S. Ainsley, Bute Docks.
Dundee, Capt. A. Wood, Navigation School.
Glasgow, Messrs. D. McGregor and Co., Clyde Place.
Greenock, Messrs. D. McGregor and Co., Brymner Street.
Hull, Z. Scaping, Trinity House.
Liverpool, J. Gill, Nautical College.
Southampton, Capt. D. Forbes, High Street.

Occasionally captains are supplied at ports where there are no agencies, and in these cases the instruments are sent direct from the Office in London.

A set of instruments is kept in working order at the Office in London, and at each agency, for the purpose of instructing observers in the handling and reading of all the instruments. A notice to captains is frequently distributed to vessels lying in the various London docks, and copies of it are also supplied to each agent for circulation.

Various publications (see pp. 94–99) are presented by the Council to observers who supply the Meteorological Office with thoroughly well kept logs, in recognition of their co-operation in a work which is calculated to be of very great advantage to navigators and to science generally.

Recognition of
"excellent"
observers.

Appendix I. (p. 23) contains a list of all the observers who during the past year have contributed logs classed as "excellent." Several of these observers have regularly co-operated with the Office for many years. The names which appear in the list for the first time are as follow :—

Observer's Name.	Ship.
Alford, F. - - -	S.S. "Monarch."
Campbell, J. J. W. (Surgeon) -	S.S. "Diana."
Cheshire, G. H. - - -	S.S. "Aldgate."
Cust, H. E. P., R.N. - - -	H.M.S. "Dart."
Davidson, D. C. - - -	"Loch Rannoch."
Davidson, R. - - -	S.S. "Diana."
Davis, G. W. - - -	S.S. "Alberta."
Elliott, C. - - -	S.S. "Wilcannia."
Fraser, C. - - -	S.S. "Massilia."
Lewes, P. V., R.N. - - -	H.M.S. "Blanche."
Lindley, G. R., R.N. - - -	H.M.S. "Blanche."
McKinstry, E. R., R.N.R. - -	S.S. "Germanic."
Marescaux, A. E. H., R.N. - -	H.M.S. "Dart."
Margesson, W. H. D., R.N. - -	H.M.S. "Egeria."
Murray, R. G., R.N.R. - - -	S.S. "Britannia."
Nicol, R. - - -	S.S. "Germanic."
Pentin, W. - - -	S.S. "Wilcannia."
Philip, W., Junr. - - -	"Salamis."
Robertson, T. - - -	S.S. "Active."
Smith, J. - - -	S.S. "Dunera."

The total number of Meteorological logs received in the year ending March 31, 1894, was 151, of which 139, or 87 per cent., have been classed as either "excellent" or "very good."

Characters of logs received.

The Council have also received, through the Ocean Steamship Company of Liverpool, a considerable number of ships logs, mostly from voyages to and from the China Seas, viâ Suez.

The Council take this opportunity of expressing their best thanks to the observers who have assisted them during the past year.

They regret to have to announce the deaths of two of their observers; Captain John Gray, who had supplied most valuable information in the logs of his numerous whaling and sealing voyages, and Captain J. E. Thompson of the "Monarch," H.M. Cable Ship.

Appendix II. (p. 25) gives a list of the meteorological logs and of meteorological reports from stations abroad, received at the Office during the year.

The following summary of the voyages of the ships observing for the Office shows the districts from which observations were received during the year:—

Districts from which observations are obtained.

To Baffin's Bay or Greenland	-	-	-	-	3
„ North America, East Coast	-	-	-	-	16
„ „ „ West „	-	-	-	-	9
Off East Coast of North America	-	-	-	-	3
To West Indies	-	-	-	-	5
„ South America, East Coast	-	-	-	-	11
„ „ „ West „	-	-	-	-	5
„ Australia and New Zealand, viâ Cape of Good Hope	-	-	-	-	32
„ „ „ „ viâ Suez	-	-	-	-	9
At Australian stations	-	-	-	-	2
To India, viâ Suez	-	-	-	-	12
„ India, viâ Cape of Good Hope	-	-	-	-	14
„ China, viâ Suez	-	-	-	-	5
In China Seas	-	-	-	-	2
To Cape of Good Hope and East Coast of Africa	-	-	-	-	7
Off East Coast of Africa	-	-	-	-	3
To Antarctic Seas	-	-	-	-	4
To Mediterranean Ports	-	-	-	-	3
Between British Ports	-	-	-	-	4
To Continental Ports	-	-	-	-	2

Red Sea Charts.—These charts have now been all completed, and the work will be issued in the course of the year.

Current Charts for all Oceans.—In the Council's Report for the year 1892 it was stated that a considerable amount of information, some 25,000 observations in all, had been obtained from foreign authorities in order to supplement the records of currents derived from English sources of information. During the year now under review a further instalment of some 2,000 observations for the Pacific Ocean has been obtained from Germany, exhausting their data, and the Council are of opinion that they have now procured nearly all the trustworthy current observations in existence, at least in the archives of the various meteorological

Current charts for all oceans.

Current charts. bureaus in Europe. The somewhat difficult task of preparing the data thus collected for publication is now being undertaken, for which purpose generalised results, indicating the most probable set of the currents, have to be obtained from a multitude of separate and often divergent observations, an operation requiring the exercise of much care and judgment.

The Meteorology of the South Sea.—This investigation has made steady progress during the year, but none of the final charts have as yet been placed in the engraver's hands.

The South Atlantic and West Coast of South America.—The preparation of logs and extraction of data for this district, extending from 10° E. to 100° W. Longitude, is being actively prosecuted. In the South Sea, the southern limit of the area to be discussed is given by the northern limit of the South Polar Ice.

Stock of instruments belonging to the Office.

Supply and Stock of Instruments.—In Appendix III. (p. 31) is given a list of the meteorological instruments supplied by the Office to ships in the Royal Navy during the year, with a statement for the 31st March 1894 of the stock and distribution of the instruments standing on the books to the account of the Admiralty. The recent augmentation of the number of ships in commission and in reserve has led to the necessity of providing a considerably larger stock of instruments than had been required in former years.

Appendix IV. (p. 32) gives similar information with regard to the disposal of the other instruments belonging to the Office, remaining in store, or which have been supplied to the Mercantile Marine, and to observatories, telegraph stations, &c.

PART II.

WEATHER TELEGRAPHY AND FORECASTS.

Administrative.

There have been no serious interruptions of telegraphic communication during the year, excepting that the cable to Jersey broke down in January, and communication was not restored for a fortnight.

Among the observers the changes have been numerous. At Holyhead Mr. T. Chope has succeeded Captain S. Richards, at Hurst Castle Mr. E. T. Tremble has succeeded Mr. G. G. Appleton, at Parsonstown Mr. J. Perry has succeeded his brother Mr. W. J. Perry, at Pembroke Mr. S. Blake has been succeeded by Mr. Knott, and at Prawle Point Mr. W. Hewitt by Mr. Michael Holmes.

Daily and Weekly Weather Reports.

A list of the British telegraphic reporting stations is given in Appendix XI (p. 64), and Foreign stations in Appendix XI. (p. 68).

An important addition has been made during the year to the information received from foreign stations, the Portuguese Meteorological Office having commenced the daily transmission of reports from two stations in the Azores.

The work in this branch of the Office continues to increase. The Daily and Weekly Weather Reports, in particular, have been extended and improved.

Inspection of the Telegraphic Reporting Stations.—The telegraphic reporting stations have been inspected during the year, in England by Mr. Ley, in Scotland by Mr. Buchan, and in Ireland and Wales by Mr. Scott. The reports submitted by the Inspectors to the Council, which are printed in Appendix V. (p. 33), show that the efficiency of the service continues to be satisfactorily maintained. Inspection of the Stations.

Discussion and Publication of the Information received.—The practice of the Office in collecting, discussing, and disseminating the meteorological information received by telegraph is described in Appendix X. of the Report for 1891. The Daily Weather Report has appeared regularly during the year; for details see that Appendix. It is distributed free of cost as follows:—To newspapers, seven copies; to seaports, for public exhibition, 71 copies; to Government offices and public institutions, 79 copies; to correspondents of the Office, 61 copies; and to foreign meteorological establishments, 35 copies. Nearly 200 copies are issued regularly to subscribers. Discussion of the reports.

The Weekly Weather Report, with its Monthly Appendices, has also appeared regularly; for particulars of this publication see Appendix VI. (p. 52). Distribution of reports.

Public display at the Meteorological Office in London of the State of the Weather on British Coasts.—This arrangement, which was made with a view to the earliest possible supply to the public of the latest information as to the weather received from the principal points on the eastern, southern, and western coasts, has been regularly carried out, and it is believed with general public approval. It supplies at 9.30 a.m. and 3 p.m. every week day the substance of the reports received by telegraph, of the state of the weather and sea at the following stations: Yarmouth, Dungeness, the Needles (Hurst Castle), Scilly, Holyhead, and Valencia, and this is displayed in a conspicuous manner on the front of the Office, 63, Victoria Street, S.W. Display of information in front of the Office.

Supply of Forecasts to the Fleet.—At the request of the Admiralty daily forecasts were supplied to the Commander-in-Chief of the "A" Fleet during the continuance of the Manœuvres, as in previous years, and also to the Commander-in-Chief, Devonport. This latter service is continued throughout the year. It commenced at the end of 1890. Forecasts for the Fleet.

Weather Forecasts.—Forecasts are prepared three times a day, namely, at 11 a.m., at 3.30 p.m., and 8.30 p.m. The Forecasts prepared at 11 a.m., on the information derived from the 8 a.m. reports, refer to the probable weather between noon on the day of issue and noon on the following day. They are publicly Forecasts.

exhibited in several places in London,* and are supplied to the afternoon editions of the newspapers. The 3.30 p.m. Forecasts are employed for storm warnings only, excepting in the hay harvest season, when they are issued as subsequently explained. The forecasts at 8.30 p.m. are specially prepared for publication in the morning newspapers, but all the forecasts are available for the information of anyone who applies for them at the Office.

Inquiries at the Office.

The inquiries received through the Post Office for special forecasts during the year amounted to 75, and the personal applications to 74. The rules of the Office relating to such inquiries are stated in Appendix VI., p. 55.

Results of Forecasts.

The results of a comparison of the Forecasts issued at 8.30 p.m. during the year, with the weather actually experienced, are given in Appendix VII. (p. 56). The following summary shows the successes and failures over the whole United Kingdom, estimated as explained in that Appendix.

SUMMARY of RESULTS of 8.30 p.m. FORECASTS, 1893-94.

Districts.	Per-centages.				Total per-centage of Success.
	Complete Success.	Partial* Success.	Partial* Failure.	Total Failure.	
SCOTLAND, N. - -	59	26	10	5	85
" E. - -	57	27	10	6	84
ENGLAND, N.E. - -	59	26	12	3	85
" E. - -	61	26	10	3	87
MIDLAND COUNTIES -	60	24	12	4	84
ENGLAND, S. - -	65	24	9	2	89
SCOTLAND, W. - -	57	23	13	7	80
ENGLAND, N.W. - -	59	24	11	6	83
" S.W. - -	60	23	11	6	83
IRELAND, N. - -	57	26	9	8	83
" S. - -	55	27	10	8	82
Summary - -	59	25	11	5	84

* Note "partial" implies "more than half."

Testing of Forecasts.

The following table shows for each year from 1884 to 1893, inclusive, the per-centages of complete and partial success of the Forecasts issued at 8.30 p.m. for the whole year. It will be seen that the total for "complete success" was highest in 1893.

* Viz., in the City at the Mansion House, Lloyd's Rooms, Messrs. R. & J. Beck's Cornhill, and Messrs. de la Rue & Co.'s, Bunhill Row; in the West End, in the Libraries of the House of Lords and the House of Commons, at Messrs. Elliot's, St. Martin's Lane; Messrs. Stanford's, Charing Cross; Messrs. Negretti & Zambra's, Regent Street; and Messrs. Pastorelli's, New Bond Street; and at the Office, 63, Victoria Street.

PER-CENTAGES of RESULTS of FORECASTS for the whole of the BRITISH ISLES.

Year.	Complete Success.	Partial, <i>i.e.</i> , more than Half Success.	Total Success.
1884	50	31	81
1885	50	34	84
1886	49	31	80
1887	52	32	84
1888	51	31	82
1889	49	32	81
1890	50	32	82
1891	50	30	80
1892	46	33	79
1893	59	25	84
Average	51	31	82

Hay Harvest Forecasts.—The Council renewed in 1893 the offer made in previous years to the Royal Agricultural Society, the Royal Dublin Society, and the Highland and Agricultural Society to send Daily Forecasts *gratis* during the haymaking season to a number of observers selected by those Societies, on two conditions, viz., that the information should be made known as widely as possible, and a record of the weather actually experienced sent weekly to the Office. The Societies accepted the proposal, and the Forecasts were issued as shown in the following table:—

Hay Harvest Forecasts.

LIST of those who received HAY HARVEST FORECASTS in 1893.

Districts.	To whom sent.	Address.
0. SCOTLAND, N.	Rev. Dr. Joass -	Golspie.
	Major Smith -	Munloch, Inverness.
1. SCOTLAND, E.	T. Wilson -	Glamis Castle, by Forfar.
	C. Pirrie -	Rothiemay, Huntly.
	T. Bett -	Dalnaline, Aberfeldy.
2. ENGLAND, N.E.	Sir J. Wilson -	Chillingham Barns, Chatton, Northumberland.
	J. Turner -	The Grange, Ulceby.
3. ENGLAND, E.	W. Birkbeck -	High House, Thorpe, Norwich.
	Sir J. B. Lawes, Bt., and Sir J. H. Gilbert, Ph.D.	Rothamsted, Harpenden.
4. MIDLAND COUNTIES	Royal Agricultural College.	Cirencester.
	Major Fosbery -	Warwick.
	T. H. Thursfield -	Barrow, Broseley, Salop.
	E. E. Harcourt-Vernon -	Grove Hall, East Retford.
5. ENGLAND, S.	C. Whitehead -	Barming House, Maidstone.
	E. P. Squarey -	The Moot, Downton, Wilts.
	M. J. Sutton -	Kidmore Grange, Caversham.
	W. Calder -	Castle Hill, Dalreoch, Dum-barton.
6. SCOTLAND, W.	Sir M. J. Stewart, Bt., M.P.	Ardwell, Stranraer.
	J. S. R. Ballingal -	Eallabus House, Islay.
7. ENGLAND, N.W.	G. W. Wray -	Leyburn, Yorkshire.

Hay Harvest
Forecasts.

Districts.	To whom sent.	Address.
8. ENGLAND, S.W.	The Earl of Ducie -	Tortworth, Gloucestershire.
	T. Dyke -	Long Ashton, Clifton, Bristol.
	R. Neville Grenville -	Butleigh Court, Glastonbury.
9. IRELAND, N.	E. F. Farrell -	Moynalty, Co. Meath.
	J. M. Wilson, J.P. -	Currygrane, Edgeworthstown.
10. IRELAND, S.	D. A. Milward -	Lavistown, Kilkenny.
	W. Talbot Crosbie, D.L. -	Ardfert Abbey, Tralee, Co. Kerry.

In addition to the above names the forecasts were sent to six other gentlemen at their own cost.

The issue commenced over the Southern districts of England on the 13th June, and ended 16th July; but commenced and ended about a fortnight later in the more Western and Northern parts of the country.

The general result of the issue of these forecasts, shown by the subjoined table, has been prepared solely from the reports of the above-mentioned gentlemen, and is entirely independent of any estimate formed within the Office itself:—

SUMMARY of RESULTS.—HAY HARVEST FORECASTS, 1893.

Districts.	Names of Stations.	Per-centages.				Total per-centage of Success.
		Complete Success.	Partial Success.	Partial Failure.	Total Failure.	
SCOTLAND, N.	Munlochy and Golspie - - -	61	32	7	—	93
" E.	Aberfeldy, Glamis, and Rothiemay -	58	37	4	1	95
ENGLAND, N.E.	Chatton and Uleeby - - -	68	22	10	—	90
" E.	Rothamsted and Thorpe - - -	90	7	3	—	97
MIDLAND COUNTIES	Cirencester, East Retford, Warwick, and Broseley.	66	26	6	2	92
ENGLAND, S.	Caversham, Maidstone, and Downton -	72	23	5	—	95
SCOTLAND, W.	Stranraer, Islay, and Dumbarton -	59	31	8	2	90
ENGLAND, N.W.	Leyburn - - - - -	57	27	13	3	84
" S.W.	Tortworth, Clifton, and Glastonbury -	62	30	8	—	92
IRELAND, N.	Moynalty and Edgeworthstown -	49	38	8	5	87
" S.	Tralee and Kilkenny - - -	62	25	11	2	87
	Mean for all districts - - -	64	27	8	1	91

These figures show that the results for the forecasts for 1893 reached a total per-centage of success of 91, being the highest yet recorded.

Forecasts to H.M. Board of Agriculture.—As stated in previous reports, the Council had been in communication with the Board of Agriculture on the subject of giving greater publicity during the harvest season to the weather forecasts prepared in the Meteorological Office, and at the beginning of August a letter was received from the Board, requesting that the afternoon forecasts,

the same as those supplied for hay harvest purposes, should be sent to them daily for transmission to selected stations in Essex and Northumberland. This service was at once commenced and continued for two months. The following report has been received by the Council as to the results of this experiment:—

Forecasts to
Board of
Agriculture.

Board of Agriculture,
4, Whitehall Place, London, S.W.,

April 21, 1894.

SIR,

I AM directed by the Board of Agriculture to transmit a memorandum on the subject of the experimental issue of weather forecasts in the course of last autumn.

I am, &c.

(Signed)

RICHARD DAWSON,
Assistant Secretary.

Robert H. Scott, Esq., Secretary,
Meteorological Office,
63, Victoria Street, S.W.,

WEATHER FORECASTS during HARVEST, 1893.

The Board of Agriculture, with a view to test the value of the weather forecasts issued by the Meteorological Council, and the disposition of Agriculturists to make use of these warnings during harvest, arranged for an experimental transmission of the forecasts issued every afternoon during the months of August and September 1893. These were sent by telegraph to nearly two hundred selected telegraph offices in the rural districts of the counties of Essex and Northumberland.

The Post Office Authorities undertook to facilitate the despatch of these messages, the local postmaster being instructed to have them posted up in a conspicuous position in the window of the post office immediately on arrival. The time of receipt was about 4.30 p.m. daily, and such reports as have been received by the Board of Agriculture from the districts to which messages were sent, dispose them to believe that considerable reference in arranging their next day's work was made to the forecasts thus exhibited by farmers resident within short distances of the several offices, and by others who, by means of messengers, were in communication with the towns and villages.

Specific observations made daily at Morpeth in Northumberland were very favourable to the approximate accuracy of the forecasts, the direction of the wind being the item in which the warnings were occasionally in error. In the Allendale district of the same county a material saving of money by the economising of labour, by pre-arrangements made on reliance in the forecasts, was reported by one of the vice-presidents of the Newcastle Farmers Club.

The comparative steadiness of the weather conditions during the harvest months of last year, however, prevented a thorough test of the use of these weather warnings in furnishing reliable advice to agriculturists as to the meteorological conditions to be expected in the twenty-four hours covered by the forecasts, and the applicability of the system at different seasons and to more varied districts has yet to be determined.

Forecasts to
Board of
Agriculture.

With this view the Board of Agriculture have applied for the sanction of Her Majesty's Treasury to the repetition of the experiment in 1894 over a wider area and under weather conditions likely to be less uniform, selecting three eastern and three western counties, and varying the period for supplying the forecasts so as to cover the time of hay harvest in some cases, and that of grain harvest in others.

Storm
Warnings.

Storm Warnings for the Coasts of the United Kingdom.—In Appendix VIII., p. 57, are given the names of the stations furnished with signals for Storm Warnings, in accordance with Circular 717 of the Board of Trade, issued in February 1874.

These stations were, at the end of March 1894, 175 in number, situated :—

85 in England, 16 in Wales, 47 in Scotland, 21 in Ireland, 3 in the Isle of Man, and 3 in the Channel Islands.

A comparison has been made in the Office between the warnings issued during the year and the weather experienced on our coasts, the warnings being tested by the method explained in Appendix VI., p. 55. The results of this comparison are shown in the following tables :—

RETURN of the RESULT of the COMPARISON between the WARNINGS ISSUED and the WEATHER EXPERIENCED in 1893.

Coasts.	Total No. of Orders to hoist and repetitions.	Warnings justified by subsequent Gales. Force 8 and upwards.	Warnings justified by subsequent strong Winds. Forces 6 and 7.	Warnings not justified by subsequent Weather.	Warnings late. Force 9 reached at two Stations before issue.	Warnings partially late. Force 9 reached at one Station before issue.	Warnings issued unnecessarily owing to Telegraphic Errors.	Storms for which no Warning was issued.
Scotland, N.E.	43	33	6	2	—	2	—	Feb. 14, March 15, Sept. 21.
„ E.	29	12	12	5	—	—	—	Aug. 21.
„ N.W.	42	27	10	2	1	2	—	March 15, Oct. 25, Dec. 8.
„ W.	38	21	14	3	—	—	—	
Ireland, S.W.	41	22	12	5	1	1	—	Aug. 21, Oct. 25.
„ N.W.	43	26	13	2	1	1	—	March 15, Oct. 25, Dec. 20-21.
Irish Sea	37	36	1	—	—	—	—	Feb. 26, March 15, Aug. 21, Oct. 25, Dec. 20-21.
St. George's Channel	32	14	12	4	—	1	1	
Bristol Channel	35	22	10	1	—	1	1	Dec. 20-21.
England, S.W.	35	22	8	4	—	—	1	Dec. 20-21.
„ S.	28	17	10	—	—	1	—	Feb. 26.
„ S.E.	29	13	14	2	—	—	—	Feb. 26.
„ E.	25	14	8	3	—	—	—	
„ N.E.	23	13	7	1	—	2	—	Oct. 25, Dec. 15-16.
Totals -	480	292	137	34	3	11	3	
Per-centages -		60·8	28·6	7·1	0·6	2·3	0·6	

NOTES as to GALES EXPERIENCED but for which no
WARNING was issued.Storm
Warnings.

February 14th.—A strong South-Easterly gale over the N.E. of Scotland. Our W. and N.W. coasts had been warned, but on the night of February 13th–14th a new depression—both larger and deeper than the one which preceded it—advanced more rapidly than was anticipated, and unexpectedly caused South-Easterly gales in Scotland. On the morning of the 14th it was too late to remedy the defect.

February 26th.—A Southerly gale over the S. and E. of England, and a North-Westerly gale in the Irish Sea.

Force 8 was exceeded at a few stations only; the wind blowing as a gale in zones or bands. The appearance of the map for 6 p.m. on 25th was not at all threatening—the wind was, in fact, then decreasing in force.

March 15th.—A Westerly gale over Scotland, the N.W. of Ireland, and the Irish Sea.

The 6 p.m. chart of March 14th showed a depression advancing towards Norway from the Westward, which did not appear dangerous, but its intensity increased later. At 8 a.m. on 15th it was altogether too late to do anything.

August 21st.—A South-Westerly gale in Ireland and some parts of Scotland. There was evidently a depression approaching Ireland at 6 p.m. on 20th, but the Irish reports were so faulty that we could make nothing of them. The actual changes were also very complex.

October 25th.—A Westerly gale over the Irish Sea and N.E. of England. A large, but not deep, depression lay over the northern parts of our area on the 24th, and was moving eastwards. A "V" shaped depression subsequently appeared in the west. It is remarkable that the observations we received by wire showed no general gale nor anything of a really stormy character in the conditions.

December 8th, Scotland N.W.—A South-Westerly gale.

There is no indication in the map for 6 p.m., 7th, that the depression which caused this gale (over one district only) was approaching.

December 20th–21st.—A South-Westerly gale over the N. of Ireland, Irish Sea, and Bristol Channel.

This was caused by a deep secondary depression, of which the reports for the 19th gave no indication.

On September 21st and December 15th to 16th.—Gales were felt on our N.E. coasts. In these cases warnings had been duly sent to adjacent coasts, but the gale spread further than was anticipated.

The following table contains a comparative statement of the storm warnings and their results in 1893, and in the nine preceding years. It will be seen that the total per-centage of warnings justified was nearly the same as in 1892.

Comparison of
results for
1893 with
previous years.

Years.	Total No. of Warnings issued.	Warnings justified by subsequent Gales.	Warnings justified by subsequent strong Winds.	Total Warnings justified.	Warnings not justified by subsequent Weather.
		p.c.	p.c.	p.c.	p.c.
1884	461	66·4	20·0	86·4	12·1
1885	591	55·3	24·0	79·3	19·5
1886	542	55·3	26·9	82·2	15·9
1887	472	55·5	26·1	81·6	16·4
1888	539	55·3	28·6	83·9	14·3
1889	373	47·7	33·5	81·2	16·9
1890	525	61·0	25·5	86·5	9·3
1891	522	62·3	24·5	86·8	7·5
1892	488	59·4	31·2	90·6	6·8
1893	480	60·8	28·6	89·4	7·1

Fishery
Barometers.

Fishery Barometers.—To add to the means available to the sea-going population for obtaining warnings of stormy weather barometers have for many years been supplied by the Office on loan to fishing villages and other places on the coast, to be set up for public information. The whole number of stations provided by the Office with these instruments is 198. Of these 63 are in England, 7 in Wales, 57 in Ireland, 66 in Scotland, 4 in the Isle of Man, and 1 in Jersey. The list is given in Appendix IX., p. 60.

PART III.

LAND METEOROLOGY OF THE BRITISH ISLES.

Observatories and Stations.—The observations of the climate of the British Isles, which are received by the Office from certain stations, may be arranged in five classes, according to the degree of completeness with which they are made.

Self-recording
observatories.

1. Seven Observatories, furnished with self-registering instruments by which all the principal meteorological phenomena are recorded continuously. These alone afford the materials necessary for the study of the periodic variations of the meteorological elements.

Anemographic
stations.

2. Nine Anemographic stations furnished with instruments registering the wind only. The records from these stations relate rather to weather as distinguished from climate, and are especially important in connexion with storms. They are often useful in affording evidence available in courts of law with respect to collisions at sea, and to damage done by wind.

Stations of
Second Order.

3. Seventy-four stations of the Second Order, furnishing climatological information from eye observations taken twice a day. The observers at these stations are all volunteers.

Telegraphic
Reporting
Stations.

4. Thirty-two Telegraphic Reporting Stations, at which the observations are taken by eye, but supplemented in some cases by self-recording aneroids, &c., and supply the material upon which the daily weather reports and forecasts are based. The hours of observation at these stations are determined by the requirements of the telegraphic system, as explained in Part II., but the data which they furnish are also utilized to afford climatological information for parts of the country where Stations of the Second Order do not exist.

5. Extra stations furnishing returns with less completeness and detail than those of Class 3. Extra stations.

A continuous record of the amount of bright sunshine is received from 46 stations in the British Isles, of which some are First or Second Order stations, whilst from others the sunshine record alone is received. A return of the daily duration of sunshine is also received. See Appendix XI. (p. 64). Sunshine stations.

A fuller account of the methods employed by the Office in dealing with these records will be found in Appendix X. (p. 63).

Appendix XI. (p. 64) contains a list of the stations furnishing information relating to the land meteorology of the British Isles during the year. Documents received.

Inspection of the Stations.—The self-recording observatories and the anemographic stations (Classes 1 and 2), as well as the Telegraphic Reporting Stations (Class 4), are regularly visited each year by the Inspectors of the Office. The extra stations (Class 5) are inspected as opportunity offers. Of the Stations of the Second Order (Class 3), some belong to the Royal Meteorological Society, and these are visited by an Inspector appointed by that Society, an allowance being made by the Office toward the cost of the inspection, in accordance with the recommendation of the Treasury Committee (1877). The remaining Stations of the Second Order, including those belonging to the Scottish Meteorological Society, are visited, most of them annually, by the Inspectors of the Office. The inspection of the self-recording observatories was carried on by Mr. T. W. Baker and Mr. E. G. Constable from the Kew Observatory. Inspection of stations.

Extracts from the reports of the Inspectors are given in Appendix V. p. 33.

Information supplied to the General Register Office, Dublin.—Reports from the Irish stations of the Office have been regularly supplied to the Registrar General for Ireland, for his Weekly and Quarterly Returns. Reports supplied to Registrar General for Ireland.

The Weekly Weather Report, which is prepared in the Telegraphic Branch of the Office (see Appendix VI., p. 52), supplies, by its synchronous charts and Monthly Summaries, a very complete and instructive view of the chief meteorological changes, day by day, over the greater part of Europe, such as is not believed to be found in the similar publications issued by any other office. Publications.

Appendix I. to the Weekly Weather Report for 1893 gives a summary for each quarter, and for the whole year, of the Rainfall and Temperature for each district, for the 28 years 1866–1893, and also the Monthly and Progressive values of Accumulated Heat, Rainfall, and Bright Sunshine for all the districts in each month of 1893. Appendix II. to the same Report gives the Weekly and Progressive values for the same elements during the year 1893 (in continuation of Appendix II. for the year 1892).

Hourly Readings of Meteorological Instruments—The Volume of Hourly Means for 1891 is ready for press, and that for 1892 has been commenced. Hourly Readings of Meteorological Observations.

The volume for 1891 contains, in addition to what has appeared in previous volumes, results for Fort William Observatory, and also hourly records of sunshine for all the observatories.

There is further a special appendix giving the results of ten years hourly tabulation of the sunshine recorded in the ten years 1881-90, at the seven observatories, as announced in last Report.

Stations for
publication.

Observations at Stations of the Second Order.—The volume for 1890 is now issued.

As regards the detailed publication on Form A., the list of stations is the same as that for 1889 with the exception of the Orkney Station, which was removed in 1890 from Swanbister to Stenness, 4 miles to the N.W. With regard to the B. Stations (monthly means and summaries) the list has been increased by three, viz.,

Edinburgh—R. Mossman, F.R.S.E., F.R. Met. Soc.

Ladylaw (Hawick)—W. R. Wilson, Esq.

Parkstone (near Bournemouth)—R. Hawkesworth Barnes, B.A., F.R. Met. Soc.

And reduced by one, Cramlington.

MISCELLANEOUS.

Anemometer
Experiments.

Anemometer Experiments.—Experiments have been in progress during the year with the Dines' pressure-tube anemometer, erected on the roof of the Office in Victoria Street to test its indications. The result of these experiments are more fully dealt with in Note A., p. 20, but the Council are about to erect a second instrument by the side of the first in order to make some comparative experiments during the coming winter, with a view to testing the effect of varying the length of the tube, contracting its bore, and possibly some other points which it is considered desirable to further elucidate, before arriving at a definite opinion concerning the merits of this instrument and the best form to give to it.

Sunshine
Values.

Sunshine of the British Isles.—The tabulation of the hourly values of sunshine for the seven observatories from the year 1881 has been completed, and the mean values for the years 1881-90 will, as mentioned above, be published in the volume of "Hourly Means" for 1891.

Hourly Mean
Values.

Hourly Mean Values of Pressure and Temperature.—The calculations of the mean hourly values of these elements for the seven observatories for the 15 years 1869-1893, and for four of the observatories for the further period of three years 1884-1886, has been completed, and are now ready for discussion preparatory to publication.

Rain Tables
for the British
Isles.

Rainfall Means for the British Islands.—Considerable progress has been made with this work during the year. The stations for which the monthly and annual values are to be published have been very carefully selected—so that the general distribution of rainfall over our Islands—for the 10 years 1881-90—is well represented, and for a large number of the stations values for the decade 1871-80, or for the lustrum 1876-80, will also be published.

The total number of stations for which the values for 1881-90 will be furnished is, approximately, as follows:—

England and Wales	-	-	-	250
Scotland	-	-	-	140
Ireland	-	-	-	36

The greater part of the values have already been received, many of them are in type, and the checking and arrangement of the remainder are being proceeded with as quickly as possible.

LIBRARY.

The library contains standard works on Meteorology and the allied Sciences, and is, besides, particularly rich in Transactions, Proceedings, Reports, and other Publications which give a large mass of Meteorological observational data from all parts of the world, extending over many years. It consists at present of about 12,500 volumes and pamphlets, exclusive of charts and MS. records of observations. The books and other documents are accessible to scientific men for reference at the Office. Library.

Appendix XII., p. 69, contains a list of the additions to the library during the year, which have been catalogued upon cards, and are entered in the reference catalogues under (1) Authors, and (2) Subjects.

EXPENDITURE.

Appendix XIII., p. 93, shows the total receipts and payments of the Council during the year ending 31st March 1894. The amount voted by Parliament was 15,300*l.*, as in the previous year, in addition to which extra receipts from various sources amounting to 836*l.* 14*s.* 10*d.* also became available. Financial

The following abstract of expenditure shows the amount properly chargeable against the Parliamentary grant of the year in question, and its distribution under the various heads, together with the increase or decrease in 1893-94 as compared with the previous year :

NET EXPENDITURE.	1892-93.	1893-94.	Increase.	Decrease.
GENERAL ADMINISTRATION:	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Payment of Council -	993 15 0	991 5 0	—	2 10 0
Secretary -	800 0 0	800 0 0	—	—
Office -	793 0 0	903 18 8	110 18 8	—
Rent, fuel, and lighting -	720 18 2	703 7 1	—	17 11 1
Alterations to premises, attendance, and contingencies -	476 10 1	387 13 1	—	88 17 0
Expenses incidental to International Meteorological Congress -	2 8 0	—	—	2 8 0
Pensions -	186 16 4	186 16 4	—	—
SPECIAL RESEARCHES -	882 13 2	1,052 9 5	169 16 3	—
LAND METEOROLOGY -	3,671 8 0	3,657 2 3	—	14 5 9
WEATHER INFORMATION -	3,847 8 6	3,804 6 4	—	43 2 2
INSPECTIONS -	487 7 1	589 6 7	101 19 6	—
OCEAN METEOROLOGY -	2,360 6 0	2,893 2 9	532 16 9	—
Total -	£ 15,222 10 4	15,969 7 6	915 11 2	168 14 0

In the year 1893-94 the sum of 1,475*l.* 3*s.* 10*d.* was paid to the Post Office on account of inland and foreign telegrams, allowances to telegraph clerks, and rental of private wires.

(Signed) R. STRACHEY,
Chairman.

NOTE A.

REPORT on the PERFORMANCE of the PRESSURE-TUBE ANEMOMETER on the ROOF of the METEOROLOGICAL OFFICE; by Mr. R. H. CURTIS.

DURING the past 13 months experiments have been carried on at the Meteorological Office with one of the Dines' pressure-tube anemometers described in the report for last year.

The vane of the instrument is placed upon an iron post, erected upon the roof of the Office, at a height of 24 feet above it and 93 feet above the ground; the recording portion being placed in a room on the third floor of the building and connected with the vane by about 70 feet of metal tube.

Apart from the eddies caused by the building on which the anemometer is erected, and which, there is reason to think, are not entirely surmounted at the height at which the vane is placed, the force of the wind is more or less interfered with in different directions by groups of buildings surrounding the Office. From about S.E. through south to S.W., and also from about N.W. to north, the exposure is best, the buildings in those directions being comparatively low or else well removed from the Office. But from north to S.E. the vane is dominated by high buildings close at hand, whilst from about S.W. to N.W., the wind-force is broken by other high buildings, distant only about 50 to 70 yards. The site is, therefore, by no means an ideal one for anemometrical experiments, although perhaps, taking all things into consideration, it fairly represents the conditions which might be looked for in the centre of any large town.

As soon as the instrument was got into operation it was found that modifications were needed in various directions; and, indeed, the chief result which has been obtained thus far has been to suggest improvements in details, the necessity for which could only be ascertained by actual experience, obtained under the conditions in which the instrument was designed to act. None of these alterations affect, in any way, the principle of the instrument, but they have facilitated its adjustment in various directions, and especially have they improved the trace yielded by the recording portion. This has been done by introducing a fine pen which gives a line at once delicate and distinct, and free from any danger of becoming merged in those immediately adjoining it. The importance of this will be understood when it is remembered that every individual gust of wind is recorded by this instrument.

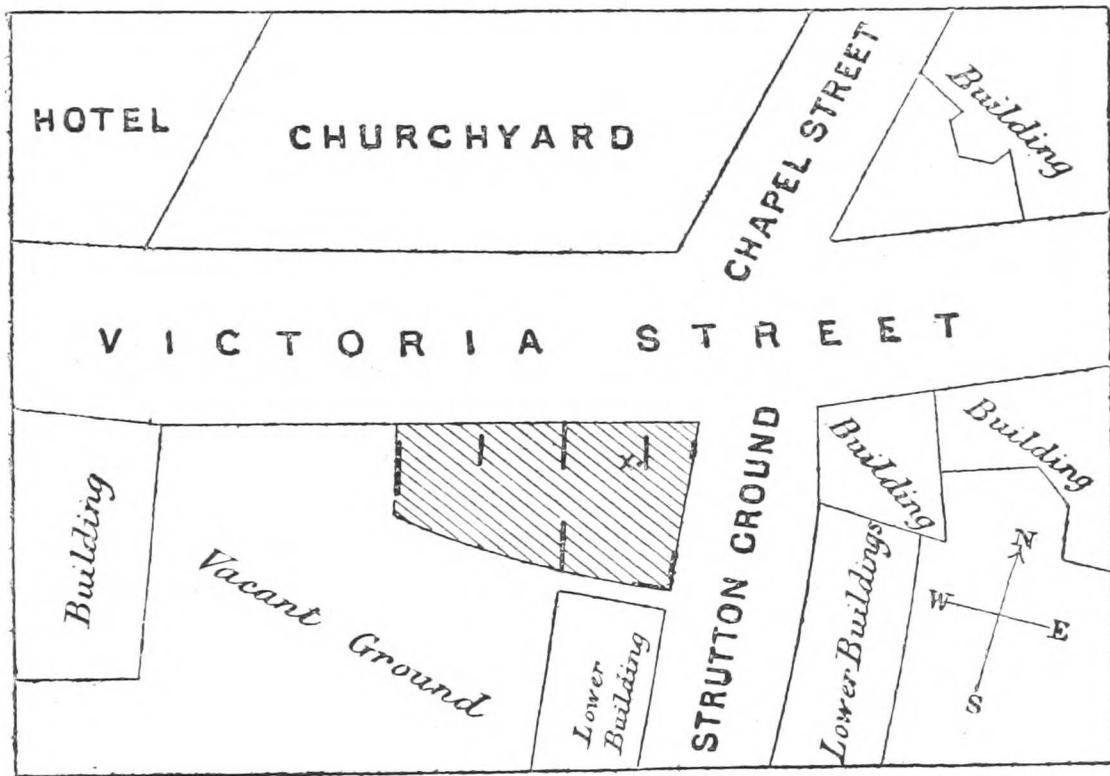
The carrying out of these alterations and improvements, as they suggested themselves, has necessitated dismounting portions of the instrument on several occasions, involving a loss of record extending on the whole over many weeks.

In order to obtain a general idea of the working of the instrument a comparison has been made between the mean hourly velocities obtained from its record at Westminster, and those recorded by the Robinson cup anemometer at the Kew Observatory.

For this purpose it was first necessary to reduce the latter to the equivalent values which would have been obtained had the factor 2·2 been used instead of 3, for the relation between the movement of the cups and of the wind. This was necessary, since the scale of the pressure-tube anemometer is based on the results obtained by Mr. Dines from the experiments made by him with a whirling apparatus, and which led him to conclude that 2·2 was the proper factor for a Robinson cup anemometer of the size and pattern used at Kew. The mean velocities were obtained from the pressure-tube records by estimation.

Of course, the agreement which was looked for between the two records was only of a very general character, considering that the instruments are eight miles apart, in a straight line, and that much of the intervening space is covered with houses. As a matter of fact, it proved to be much closer than was anticipated.

The observations were all grouped under eight points for direction, and the mean velocity was obtained for each point; a reference to the accompanying plan of the Office and its immediate vicinity will fully explain the results obtained and which are shown in the following table:—



x Anemometer.

Direction of Wind - -	N.		N.E.		E.		S.E.	
	K.	M.O.	K.	M.O.	K.	M.O.	K.	M.O.
Average Velocity -	9·5	9·8	8·5	6·2	8·3	6·1	5·6	6·4
Per centage M.O. \pm K.	103		73		73		114	
No. of Observations -	(263)		(184)		(223)		(121)	

Direction of Wind -	S.		S.W.		W.		N.W.	
	K.	M.O.	K.	M.O.	K.	M.O.	K.	M.O.
Average Velocity -	11·7	11·7	11·5	10·2	8·0	6·8	7·0	6·5
Per centage M.O. \pm K.	100		89		85		93	
No. of Observations -	(267)		(1115)		(628)		(306)	

Mean of Means (velocity), Kew 8·8 miles per hour. M.O. 8·0 miles per hour.
Total No. of Observations used 3107.

The slightly higher mean velocity shown by the Meteorological Office instrument with northerly winds is probably due to the fact that the large block of lofty buildings, bearing slightly to the east of north from the Office, deflects the wind when blowing from a little to the west of north along the line of Chapel Street upon the Office, and thus gives it rather more than its due share. On the north-east and east, as already stated, the Office is greatly sheltered by houses from 30 to 40 feet higher, at a very short distance off, and this sufficiently accounts for the low per centages shown by the Office instrument when the wind blows from those points. To the south eastward, and thence round to nearly south-west, the aspect is fairly open, and the buildings adjoining the Office are all comparatively low, and under these points, therefore, the Office per centage rises; the excess over Kew shown under south-east, is most probably due to the fact that while the Office is open in that direction the Kew Observatory is not so, but is considerably sheltered by the town of Richmond, and by the high land which rises steeply up to the park behind it. To the south-west the high building shown in the plan again begins to affect the Office instrument, and the per centage falls still lower with the west winds, in which direction the yet higher hotel buildings stand. To the north-west, however, the buildings are less lofty and are also more remote, and, consequently, the per centage of the velocity at the Office again rises to within 7 per cent. of that yielded by the Kew instrument.

Upon the whole, the comparison is a striking one, and, if it be accepted, it speaks strongly in favour both of the trustworthiness of the pressure-tube instrument and, also, of the mean record yielded by the Robinson cup instrument.

During the ensuing year it is proposed to make some comparative experiments with two pressure-tube instruments, erected under precisely similar conditions as to exposure, but varying the lengths of the tubes connecting the float with the vane, and also the bore of the tubes at certain places. The precise details of the experiments have not, however, as yet been settled.

APPENDIX.

APPENDIX I.

LIST of CAPTAINS and OFFICERS who have sent in Logs classed as "Excellent" during the year ending March 31, 1894. The figures opposite to each show the total number of such Logs which they have returned to the Office during the period that they have been observing.

Name of Captain or Officer.	Number of "Excellent" Logs.	Ship.
Alford, F. - - -	1	S.S. "Monarch."
Andersen, O. E. - - -	10	S.S. "Longhirst."
Angus, T. S. - - -	8	S.S. "Ballarat."
Armstrong, B. G. - - -	4	S.S. "Pará."
Atkinson, G. W. - - -	8	S.S. "Ganges."
— S. P. H. - - -	7	"Osborne."
Bett, Dr. W., R.N. - - -	3	H.M.S. "Stork."
Blackburne, H. S. - - -	12	S.S. "Bombay."
Bolton, S. H. - - -	16	S.S. "El Dorado."
Bourke, Capt. E. G., R.N. - - -	9	H.M.S. "Ringarooma."
Bright, H. - - -	8	Barque "Beltana."
Buchan, J. - - -	23	S.S. "Deramore."
Cameron, J. G., R.N.R. - - -	10	S.S. "Germanic."
Campbell, J. - - -	9	"Balmoral."
— J. J. W. (Surgeon) - - -	1	S.S. "Diana."
Cheshire, G. H. - - -	2	S.S. "Aldgate."
Crowley, C. - - -	7	"Verajean."
Cust, Lieut. and Comr. H.E.P., R.N. - - -	1	H.M.S. "Dart."
Dart, L. C. - - -	14	Barque "Alcides."
Davidson, D. C. - - -	1	"Loch Rannoch."
— R. - - -	1	S.S. "Diana."
Davis, G. W. - - -	1	S.S. "Alberta."
De Horne, M. - - -	4	S.S. "Carthage."
Docherty, H. - - -	5	Barque "Tinto Hill."
Elliott, Mr. C. - - -	2	S.S. "Wilcannia."
England, T. - - -	14	Barque "Glen Grant."
Exham, T. K., F.R.A.S. - - -	15	S.S. "Tamar."
Field, Comr. A. M., R.N. - - -	12	H.M.S. "Egeria."
Fraser, C. - - -	1	S.S. "Massilia."
— W. D. - - -	7	"Corolla."
Hepworth, M.C.W. - - -	11	S.S. "Port Denison" and S.S. "Port Victor."
Jamieson, D. E. - - -	2	S.S. "Port Adelaide."
Kemp, A. H. - - -	6	Barque "Hudson."

Name of Captain or Officer.	Number of "Excellent" Logs.	Ship.
Lelman, C. - - -	4	"Loch Sloy."
Lewes, Lieut. P. V., R.N. - -	1	H.M.S. "Blanche."
Lindley, G. R., R.N. - - -	1	H.M.S. "Blanche."
McKinstry, E. R., R.N.R. - -	1	S.S. "Germanic."
Marescaux, Lieut. A. E. H., R.N. - - -	1	H.M.S. "Dart."
Margesson, Lieut. W. H. D., R.N. - - -	2	H.M.S. "Egeria."
Martin, Walter, R.N.R. - - -	6	S.S. "German."
Millican, J. W. - - -	8	S.S. "Loughrigg Holme"
Milne, W. F. - - -	10	S.S. "Eclipse."
Milner, W. H. - - -	17	S.S. "Trent."
Mitchell, George - - -	5	S.S. "California."
— J. - - -	3	Barque "Cape York."
Moignard, P. - - -	7	"Garsdale."
Molony, E. J. - - -	11	"British Merchant."
Murdoch, Peter - - -	14	"Sierra Lucena."
Murray, A., junr. - - -	2	Barque "Perseverance."
— R. G., R.N.R. - - -	1	S.S. "Britannia."
Nicol, R. - - -	2	S.S. "Germanic."
Parry, M. - - -	18	S.S. "Prydain."
Parson, G. F. - - -	12	"Earnock."
Pentin, W. - - -	2	S.S. "Wilcannia."
Philip, W., junr. - - -	1	"Salamis."
Pope, J. - - -	9	S.S. "Essequibo."
Price, J. H. - - -	7	"Othello."
Randall, W. - - -	14	"Laomene."
Robertson, T. - - -	1	S.S. "Active."
Rosseter, W. L. - - -	16	"Brenda."
Sargent, A. H. - - -	7	"Pleione."
Scott, G. P. - - -	10	"Crompton."
Simpson, Alexander - - -	16	S.S. "Thermopylæ."
— Alexander - - -	23	S.S. "Traveller."
Smith, J. - - -	2	S.S. "Dunera."
Smyth, Comr. M. H., R.N. - -	3	H.M.S. "Stork."
Spalding, T. F. - - -	5	S.S. "Australasian."
Streater, R. - - -	4	"Euterpe."
Thompson, J. E. (the late) - -	5	S.S. "Monarch."
Trott, S., F.R.Met.Soc. - - -	25	S.S. "Mimia."
Tyson, J. - - -	2	S.S. "Arab."
Walker, H., R.N.R. - - -	18	S.S. "Aurania" and S.S. "Etruria."
Warden, W. - - -	6	S.S. "Pembroke Castle."
White, W. E., R.N.R. - - -	9	S.S. "Ormuz."
Wilson, J., R.N.R. - - -	10	S.S. "Circassia."

APPENDIX II.—SHIPS supplied and DOCUMENTS returned during the year ending 31st March 1894.

The number of merchant ships supplied with standard instruments and meteorological logs during the above period was 111.

The number of logs and documents from Foreign Stations, received during the same period, and registered in the Office, amounted altogether to 371, of which 183 were returned from ships, and the remainder from land stations, outside the British Isles.

LIST of DOCUMENTS received from FOREIGN LAND STATIONS.

Place.	Observer.	No. of Documents.	Nature of Observations.
Abaco (Bahamas)	Lightkeepers	2	Lighthouse Register, 1893, January to December.
Aburi (Gold Coast)	F. E. Willey	1	Two observations daily, 1893, October.
Accra (Gold Coast)	J. F. Easmon, M.D.	1	Rainfall for April 1893 and monthly totals for 1888-93.
"	"	1	Two observations daily, 1893, October.
Antigua	Francis Watts	10	" " 1893, March, May to December; 1894, January, February.
Beyrout (Lee Observatory)	R. H. West, M.A.	12	Two observations daily, 1893, March to December; 1894, January, February.
Breaksea Island (King George's Sound).	J. A. Symonds	2	Lighthouse Register, 1893, January to December.
Cape Juby (N.W. Africa)	W. B. Silverwood and F. S. Zaytoun.	11	Two observations daily, 1893, March to December; 1894, January.
Cape Pembroke (Falkland Islands)	G. K. Broom, Lightkeeper	2	Lighthouse Register, 1893, January to December.
Cape Spartel (Tangier)	E. C. Hathaway, Lloyd's Signalman.	5	Two observations daily, 1893, May to December; 1894, January, February.
Cay Lobos (Bahamas)	Byron N. Jones, Lightkeeper	3	Lighthouse Register, 1892, July to December; 1893, January to December.
Cay Sal (Bahamas)	T. R. Thompson, Sen., Light-keeper.	2	" " 1892, " " " " June.
Famagusta (Cyprus)	G. Eliades	4	Two observations daily, 1893, February to May.
Futuna (New Hebrides)	Rev. W. Gunn, L.R.C.P.	3	Notes of Cyclones on 28th, 29th January 1889, 15th January 1893, and 20th and 21st February 1893.
"	"	2	Three observations daily, 1888, August, October to December; 1889, January.
"	"	4	Two observations daily, 1892, October to December; 1893, January to July.
George Town (British Guiana)	Robert Ward	5	" " 1893, January to December.
Gibraltar	Staff-Sergeant R. Scott, Med. Staff Corps.	11	" " 1893, March to December; 1894, January, February.

LIST of DOCUMENTS—continued.

Place.	Observer.	No. of Documents.	Nature of Observations.
Inagua (Bahamas)	J. W. Roberts, Lightkeeper	2	Lighthouse Register, 1893, January to December.
Kaneohē (Oahu)	H. Cobb-Adams	3	Two observations daily, 1893, January to June, September to November.
Kyrenia (Cyprus)	M. Fuleiham and P. Michaelides.	4	" " " " 1893, February to May.
Lagos	Wm. A. Cole	12	" " " " 1893, February to December; 1894, January.
Larnaca (Cyprus)	C. Perini	4	" " " " 1893, " " May.
Limassol (Cyprus)	Luigi Béraud	4	" " " " " " " "
Mojanga (Madagascar)	Stratton C. Knott, Vice-Consul.	11	" " " " " " " " December.
Malden Island	"	1	Three " " " " 1892, May to December; 1893, January, February.
Nicosia (Cyprus)	G. Stephen	4	Two " " " " 1893, February to May.
Papho (Cyprus)	E. A. Malliotis	4	" " " " " " " " " "
Point King (King George's Sound).	S. Mitchell	2	Lighthouse Register, 1892, November to December; 1893, January to November.
Principe Island (West Africa)	G. R. Scovell	6	Two observations daily, 1893, February to December; 1894, January.
St. Helena	H. S. Hands	10	One observation daily, 1893, February to December.
"	"	7	Continuous record of wind (direction and velocity), 1893, February, April, May, July to September; 1894, January.
Sultan Tehair (Asia Minor)	C. Z. Bunning	3	Two observations daily, 1893, December; 1894, January, February.
Suva (Fiji)	J. D. W. Vaughan, F.R.Met. Soc., F.R.G.S.	8	One observation daily, 1893, January to October.
Teneriffe (Sitio de Cullen)	A. F. Perry	11	Two observations " " 1893, March to December; 1894, January, February.
Tobago	J. P. Tulloch, M.A., M.D.	2	" " " " 1893, February to June.
Tonga (New Hebrides)	A. Cronstedt	2	" " " " 1893, October to December.
Trinidad	J. H. Hart, Supt. Botanic Gardens.	6	" " " " 1892, July to December; 1893, January to November.
Watling Island (Bahamas)	T. R. Thompson, jun., Lightkeeper.	1	Lighthouse Register, 1893, January to June.

LIST of DOCUMENTS received from SHIPS.

Captain's Name.	Ship.	Voyage.	Year.
¹ Adamson, A. W.	S.S. Victoria	Sydney, viâ Suez	1893
² " " "	" "	Australia, viâ Suez	1893-94
Alford, F.	S.S. Monarch	Off coasts of British Isles	1893
Andersen, O. E.	S.S. Longhirst	New York and Continental Ports	1893
" " "	" "	Quebec, Continental Ports, &c.	1893-94
³ Angus, T. S.	S.S. Ballarat	Australia, viâ Suez	1893
⁴ " " "	" "	" " " "	1893
⁴ " " "	" "	Bombay	1893-94
⁵ Armstrong, B. G.	S.S. Pará	West Indies	1893
⁶ " " "	" "	" " " "	1893
Asquith, W.	S.S. Deucalion	Batavia	1891-92
⁷ Atkinson, G. W.	S.S. Ganges	Calcutta, viâ Suez	1893
" " "	" "	" " " "	1893
⁸ " " "	" "	China, viâ Suez	1893-94
" S. P. H.	Osborne	Calcutta	1892-93
⁹ Barker, D. W., R.N.R.	Training ship Worcester	Off Greenhithe	1893
Barr, J.	S.S. Orestes	Batavia, viâ Suez	1891
Bartlett, T.	S.S. Laertes	China, viâ Suez	1891
Barwise, J.	S.S. Sarpedon	China, viâ Suez, and Java, viâ Suez	1890-91
Batt, H. E.	S.S. Hector	" " " "	1890-91
Beeching, C.	Barque Ellesmere	San Francisco	1893-94
¹⁰ Blackburne, H. S.	S.S. Bombay	Bombay, viâ Suez	1893
¹¹ " " "	S.S. Brindisi	" " " "	1893
¹² " " "	S.S. Malwa	Bombay and Shanghai, viâ Suez	1893
Bolton, S. H.	S.S. El Dorado	Continental Ports	1893
Bourke, E. G., R.N.	H.M.S. Ringarooma	New Zealand	1892-93
Bright, H.	Barque Beltana	Adelaide	1893-94
Brown, R. J.	S.S. Titan	China, viâ Suez	1891
¹³ Buchan, James	S.S. Deramore	New York, Algoa Bay, Rangoon, and Suez	1893
¹⁴ Cameron, J. G., R.N.R.	R.M.S. Germanic	New York	1892
¹⁵ " " "	R.M.S. Teutonic	" " " "	1893
Campbell, James	Balmoral	Calcutta	1892-93
¹⁶ Chesshire, G. H.	S.S. Aldgate	Bombay, viâ Suez	1893
¹⁶ " " "	" "	Karachi	1893
¹⁷ " " "	" "	Bombay, viâ Suez	1893-94
¹⁸ Clunie, James	S.S. Transvaal	Cape Town, Bombay, viâ Suez, and Calcutta	1893
Crowley, C.	Verajeau	Lyttleton	1892-93
¹⁹ Crutchley, W. C., R.N.R.	S.S. Kaikoura	New Zealand, viâ Cape Town, and Rio Janeiro	1893
²⁰ Cust, Lieut. and Comr. H. E. P., R.N.	H.M.S. Dart	New Hebrides and New Caledonia	1892
Dart, L. C.	Barque Alcides	San Francisco	1892-93
Davidson, D. C.	Loch Rannoch	Melbourne	1892-93
²¹ " James	Barque Polar Star	Antarctic Seas	1892-93
²² " Robert	S.S. Diana	" " " "	1892-93
Davies, Llewellyn	Barque Lady Wolseley	Iquique	1892-93
Davis, G. W.	S.S. Alberta	Bombay, viâ Suez	1893
²³ De Horne, Morris	S.S. Carthage	China, viâ Suez	1893
²⁴ " " "	" "	Bombay, viâ Suez	1893
Dermody, W. J.	Highland Forest	Calcutta, Lyttleton (N. Z.)	1892-93
Dickens, E. G.	S.S. Diomed	China and Japan, viâ Suez	1891
" " "	S.S. Stentor	Liverpool and Glasgow	1891
²⁵ Dickinson, L. R.	S.S. Medway	Barbados	1892-93
²⁶ " " "	" "	" " " "	1893-94
Docherty, Hugh	Barque Tinto Hill	Chittagong	1893-94
²⁷ Dulling, George	S.S. Port Pirie	Australia viâ Cape of Good Hope	1893
Elder, William	S.S. Nestor	China and Japan, viâ Suez	1890
England, Thomas	Barque Glen Grant	Apalachicola	1892-93

Captain's Name.	Ship.	Voyage.	Year.
England, Thomas	Barque Glen Grant	Apalachicola - - -	1892-93
Evans, J. C.	Barque Peri - - -	Brisbane and New Zealand - - -	1892-93
Exham, T. K.	R.M.S. Tamar - - -	East Coast of South America - - -	1892-93
"	"	"	1893
²⁸ Fairweather, Alexander.	S.S. Balaena - - -	Antarctic Seas - " - - -	1892-93
²⁹ Field, Comr. A. M., R.N.	H.M.S. Egeria - - -	Hong Kong and Macclesfield Bank - - -	1893
²⁹ " "	"	Borneo - - - - -	1893
Fordyce, W.	County of Roxburgh - - -	Mauritius and Calcutta - - -	1893-94
³⁰ Fraser, C. - - -	S.S. Massilia - - -	Bombay, via Suez - - -	1893
³⁰ " - - -	" - - -	Australia, via Suez - - -	1893-94
³¹ " Duncan	S.S. Bellenden - - -	East Coast of South America - - -	1893
" W. D.	Corolla - - -	West Coast of South America - - -	1892-93
Goldsmith, O. S.	Barque Ariel - - -	Brisbane and Callao - - -	1892-93
Gregory, T. M.	S.S. Menelaus - - -	Java, via Suez - - -	1891
Hannah, W. T.	S.S. Glaucus - - -	China, via Suez, and Java, via Suez - - -	1891
Hannay, C. E.	Simla - - -	Towards San Francisco - - -	1892
³² Henderson, F. F., R.N.	R.Y.S. Valhalla - - -	Madeira and Mediterranean Ports - - -	1893
² Hepworth, M. C. W.	S.S. Port Denison - - -	Sydney, via Cape, and home, via Suez. - - -	1892-93
³³ " M. C. W.	S.S. Port Victor - - -	Adelaide, via Cape, and home, via Suez. - - -	1893-94
Hutchinson, J. P.	S.S. Stentor - - -	Java, via Suez - - -	1891
Ismay, A. J.	Barossa - - -	Adelaide - - -	1892-93
Jackson, C. - - -	S.S. Palamed - - -	China, via Suez - - -	1891
" M. H. F.	S.S. Telamon - - -	" - - -	1891
" T. S.	S.S. Palinurus - - -	" - - -	1891
Jamieson, D. E.	S.S. Port Adelaide - - -	New York, China, Japan, via Suez - - -	1892-93
³⁴ " "	S.S. Port Pirie - - -	Australia, via Cape, and home, via Suez. - - -	1893-94
Jones, Henry	S.S. Telemachus - - -	China and Japan, via Suez - - -	1891-92
³⁵ " J. H.	Andora - - -	Wilmington (Cal.), San Pedro, and Tacoma (U.S.A.). - - -	1892-93
" P. H.	City of York - - -	Callao and Astoria - - -	1893-94
Kemp, A. H.	Barque, Hudson - - -	Otago - - -	1892-93
Lapage, W. P.	S.S. Anchises - - -	East Indies - - -	1891-92
Lawrison, G. M.	Eaton Hall - - -	San Francisco - - -	1892-93
Lehman, Charles	Loch Sloy - - -	Melbourne - - -	1892-93
³⁶ Lindley, G. R., R.N.	H.M.S. Blanche - - -	Aden, India, and Zanzibar - - -	1891
McGregor, James	S.S. Glenartney - - -	China and Japan, via Suez - - -	1893
³⁷ " "	"	"	1893-94
¹⁴ McKinsty, E. R., R.N.R.	R.M.S. Germanic - - -	New York - - -	1893
³⁷ Marshall, W. H.	Barque Elvira - - -	Fernandina (Florida) and Rosario - - -	1892-93
Martin, T. C.	Loch Tay - - -	Melbourne - - -	1893-94
³⁸ " W., R.N.R.	S.S. German - - -	Mauritius, via Cape Town - - -	1892-93
³⁸ " "	"	Cape Town - - -	1893
⁹ Miller, A. T., R.N.	School Ship Conway - - -	Off Birkenhead - - -	1893
² Millican, J. W.	S.S. Loughrigg Holme - - -	Galveston, Hamburg, New York, and Montreal. - - -	1893
Milne, W. F.	S.S. Eclipse - - -	Davis Straits - - -	1893
Milner, W. H.	R.M.S. Trent - - -	East Coast of South America - - -	1892-93
³⁹ " "	"	"	1893
⁴⁰ " "	"	"	1893-94
Mitchell, George	S.S. California - - -	Venice, New York, and New Orleans. - - -	1892-93
" "	"	New Orleans, Mediterranean Ports, and New York. - - -	1893
" John	Barque Cape York - - -	Newcastle (N.S.W.), San Francisco, and Dunkirk. - - -	1892-94
Moignard, Philip	Garsdale - - -	California, Tacoma (U.S.A.) - - -	1892-93
Molony, E. J.	British Merchant - - -	Melbourne, Newcastle (N.S.W.), Colombo, and Wallaroo. - - -	1892

Captain's Name.	Ship.	Voyage.	Year.
⁴¹ Morton, D. -	S.S. Silvertown -	West Coast of South America -	1893
⁴² Moseley, F. J. -	S.S. Anglian -	Cape Town, Zanzibar, &c. -	1893-94
Murdoch, Peter -	Sierra Lucena -	Chittagong and Akyab -	1892-93
Murray, Alexander, junr.	Barque Perseverance -	Hudson's Bay and Repulse Bay -	1892-93
⁴³ Murray, R. G., R.N.R.	S.S. Britannia -	Australia, viâ Suez -	1892-93
Nelson, R. -	S.S. Myrmidon -	China, viâ Suez -	1891-92
Nicholson, J. I. -	Majestic -	Calcutta -	1892-93
Nicol, Robert -	R.M.S. Germanic -	New York -	1892-93
"	"	"	1893
² Niles, W. H. -	Ben Cruachan -	Buenos Aires and Chile -	1892-93
Nish, H. -	S.S. Cyclops -	East Indies -	1891
Parry, Moses -	S.S. Prydain -	Mediterranean Ports and New York.	1892-93
Parson, G. F. -	Earnock -	New York, Shanghai, and Boston	1892-93
⁴⁴ Patterson, J. A. -	Barque Dunstaffnage -	Calcutta -	1893
" William -	Barque Lindfield -	Melbourne -	1893
Pattman, R. -	Barque Loch Torridon -	" -	1892-93
"	"	"	1893-94
⁴⁵ Payne, C. J. -	S.S. Elton -	Norfolk (U.S.A.), and Bombay, viâ Suez.	1893-94
⁴⁶ Pentin, Walter -	S.S. Wilcannia -	Adelaide, viâ Cape of Good Hope, and home, viâ Suez.	1893
⁴⁶ " Philip, William, junr.	" Salamis -	" " " " -	1893
⁴⁷ Pope, J. -	S.S. Essequibo -	Melbourne -	1893-94
Price, J. H. -	Othello -	West Indies -	1893
Pulford, I. -	S.S. Patroclus -	Melbourne -	1892-93
Purdy, Thomas -	S.S. Dardanus -	China, viâ Suez -	1891
Randall, W. -	Laomene -	" " " " -	1891
Rawlings, E. S. -	S.S. Ajax -	New York, Batavia, and Calcutta -	1892-93
Richards, Comr. G. E., R.N.	H.M.S. Triton -	China, viâ Suez -	1891
⁴⁸ Rigaud, H. C. -	R.M.S. Magdalena -	Off East coast of England -	1893
Riley, J. -	S.S. Teucer -	River Plate, Liston, and Brazils -	1892-93
⁴⁹ Robertson, Lieut. and Comr. C. H., R.N.	H.M.S. Herald -	China, viâ Suez -	1890-91
⁵⁰ Robertson, " Thomas -	S.S. Active -	Shiré and Zambesi Rivers -	1892
Rohde, H. -	Barque Archdale -	" " " " -	1893
Rosseter, W. L. -	Brenda -	Antarctic Seas -	1892-93
"	Ship Sheila -	Port Townsend, Australia, San Diego (Cal.), and Tacoma.	1892-93
² Sargent, A. H. -	Pleione -	Calcutta, Demerara, and New York	1893
Scale, R. F. -	S.S. Laertes -	From West Indies -	1894
⁵¹ Scott, G. P. -	Crompton -	New Zealand -	1892-93
Simpson, Alexander	Barquentine Traveller -	China, viâ Suez -	1890-92
Simpson, Alexander	S.S. Thermopylæ -	Colombo and Rangoon -	1893
"	"	Ivigtut -	1893
⁵² Slade, Albert -	County of Inverness -	Melbourne, viâ Cape Town -	1893
Smith, Alexander -	Barque Carradale -	Australia, viâ Cape Town -	1893-94
" James -	S.S. Dunera -	Calcutta -	1892-93
"	"	Algoa Bay, Bangkok -	1890-91
⁵³ " W. J. -	R.M.S. Tagus -	Calcutta, viâ Suez -	1893
⁵⁴ " " -	"	" " " " -	1893
⁵⁵ " " -	"	Brazil -	1892-93
⁵⁶ Smyth, M. H., R.N. -	H.M.S. Stork -	Buenos Ayres -	1893
⁵⁷ " W. H. -	S.S. Anglian -	Monte Video -	1893
⁵⁸ Spalding, T. F. -	S.S. Australasian -	Malta -	1893
⁵⁸ " " -	"	Mauritius, viâ Cape Town -	1893
Streater, R. -	Euterpe -	Australia, viâ Cape Town -	1892-93
Suffern, R. -	Craigerne -	Melbourne, viâ Cape Town -	1893
"	"	Otago -	1892-93
"	"	Cape Town, Newcastle (N.S.W.), San Diego, and Portland (Oregon).	1892-93

Captain's Name.	Ship.	Voyage.	Year.
Thompson, J.	S.S. Nestor	China, Japan, via Suez	1891
⁵⁹ " J. E.	S.S. Monarch	Off coasts of British Isles	1893
Tree, Thomas, R.N.R.	S.S. Port Chalmers	From Sydney, via Suez	1893
⁶⁰ Trench, F. P., R.N.	H.M.S. Royal Arthur	Rio Janeiro, Callao, &c., and Esquimalt.	1893
⁶¹ Trott, Samuel	S.S. Minia	Halifax, N.S.	1893
⁶¹ " "	"	Halifax	1893
⁶¹ " "	"	North Atlantic, Halifax, and Nova Scotia.	1893
⁶² Tyson, John	S.S. Arab	Cape Town, Mauritius, and Madagascar.	1892-93
⁶³ " "	"	Cape Town	1893-94
Walker, Henry	S.S. Aurania	New York	1892
" "	S.S. Etruria	"	1893
" "	"	"	1893
Warden, William	S.S. Pembroke Castle	Mauritius, via Cape Town	1892-93
Webster, I. K.	S.S. Prometheus	China, via Suez	1891
⁶⁴ White, W. E., R.N.R.	S.S. Ormuz	Australia, via Suez	1893
⁶⁵ " " "	"	" " "	1893
" " "	"	" " "	1893-94
Widdess, A.	S.S. County Down	Genoa, Danube, Antwerp, and Brazil.	1892-93
Wilding, J.	S.S. Priam	China, via Suez	1890-91
⁶⁶ Williams, John	Barque Elissa	Buenos Ayres	1892
" O. P.	S.S. Agamemnon	China, via Suez	1891
Wilson, John, R.N.R.	S.S. Circassia	New York	1893
" W.	Crocodile	Port Pirie	1892-93
Wishart, J. T.	Sierra Parima	San Francisco	1893
⁶⁷ —	Barque Oribe	From Mauritius	1872-73

In cases distinguished by marginal numbers the Meteorological Registers were kept chiefly by Officers, as follows:—

- ¹ Kept by C. Kay.
- ² Assisted by Officers.
- ³ Kept by S. B. de Lockyer, 1st Officer, G. Cockman, 2nd Officer, and C. E. Carter, 3rd Officer.
- ⁴ Assisted by S. de B. Lockyer, 1st Officer, — Scott, 2nd Officer, and C. E. Carter, 3rd Officer.
- ⁵ Kept by G. B. M. Eldridge, 4th Officer.
- ⁶ Kept by G. A. Mackenzie, 4th Officer.
- ⁷ Assisted by Messrs. Sweeney and Burroughs.
- ⁸ Assisted by Messrs. Bracken and Uwood.
- ⁹ Kept by the Cadets.
- ¹⁰ Assisted by A. B. Armitage, 2nd Officer, H. R. Hetherington, 3rd Officer, and J. C. W. Stauley, 4th Officer.
- ¹¹ Assisted by T. Summers, 1st Officer, P. MacLean, 2nd Officer, and K. Dixon, 3rd Officer.
- ¹² Assisted by N. P. Pollock, 1st Officer, E. Simmonds, 2nd Officer, and W. Warren, 3rd Officer.
- ¹³ Kept by Henry Ward, 1st Officer, and Henry Monat, 2nd Officer.
- ¹⁴ Kept by J. R. Lay, 3rd Officer.
- ¹⁵ Kept by 4th Officer.
- ¹⁶ Kept by William F. Pollard.
- ¹⁷ Kept by Charles Louis.
- ¹⁸ Kept by W. M. Wright, 2nd Officer.
- ¹⁹ Kept by H. W. Armstrong, 4th Officer.
- ²⁰ Kept by Lieut. A. E. H. Marescaux, R.N.
- ²¹ Kept by Robert Walker, Mate.
- ²² Kept by John J. W. Campbell, Surgeon.
- ²³ Kept by A. E. House and E. A. Forbes.
- ²⁴ Kept by Charles James Fox, 5th Officer.
- ²⁵ Kept by H. G. Warren, 3rd Officer, T. Barrett, and J. V. Fenn, 4th Officers, and J. Brander and E. Simpson, 5th Officers.
- ²⁶ Kept by William Anderson and L. Coxwell.
- ²⁷ Kept by William Lewis, 2nd Officer.
- ²⁸ Kept by William S. Bruce, Surgeon.
- ²⁹ Kept by W. H. D. Margesson, Lieut., R.N.
- ³⁰ Kept by the Officers.
- ³¹ Kept by A. J. Anderson, 3rd Officer.
- ³² Kept by A. Bernard Crosse, R.N.R., 2nd Mate.
- ³³ Assisted by Messrs. R. Walton, G. Patrick, and F. E. Cope.
- ³⁴ Kept by Herbert S. Brading, 2nd Officer.
- ³⁵ Kept by E. G. W. Cummings.
- ³⁶ Kept by Lieut. P. Vaughan Lewes, R.N.
- ³⁷ Kept by C. M. Redhead and W. Johnstone.
- ³⁸ Kept by J. George, R.N.R., 3rd Officer.
- ³⁹ Assisted by H. W. Stump, 3rd Officer.
- ⁴⁰ Assisted by Messrs. Warren, 2nd Officer, Stamp, 3rd Officer, and Cochrane, 4th Officer.
- ⁴¹ Kept by B. C. Coombe, Navigating Officer.
- ⁴² Kept by J. Vessey Lawther, 4th Officer.
- ⁴³ Kept by Sidney G. D. Andrews, Chief Officer.
- ⁴⁴ Kept by T. Gray, Chief Mate.
- ⁴⁵ Kept by J. Sowerby, 1st Mate, and D. Jones, 2nd Mate.
- ⁴⁶ Kept by Coulton Elliott.
- ⁴⁷ Kept by M. Pearson.
- ⁴⁸ Kept by L. W. Bollard, 5th Officer.
- ⁴⁹ Kept by Evan St. Maur Nepean, Surgeon, R.N.
- ⁵⁰ Kept by Elrington S. McKay, Surgeon.
- ⁵¹ Assisted by J. J. Murphy and F. Lampard.
- ⁵² Kept by W. H. Taylor, 1st Officer.
- ⁵³ Kept by W. S. Preedy, 2nd Officer, and F. W. Fooks, 4th Officer.
- ⁵⁴ Kept by George Adams and H. J. Boby.
- ⁵⁵ Kept by H. J. Boby, 2nd Officer, H. V. Lewis, 3rd Officer, and E. Simpson, 4th Officer.
- ⁵⁶ Kept by William Bett, Surgeon, R.N.
- ⁵⁷ Kept by B. C. Alleyne, 2nd Officer.
- ⁵⁸ Kept by Andrew Robb, 2nd Officer.
- ⁵⁹ Kept by Navigating Officers.
- ⁶⁰ Kept by Lieut. A. Y. Moggridge, R.N.
- ⁶¹ Kept by William George Squares, Chief Officer.
- ⁶² Kept by John W. Hague, Chief Officer.
- ⁶³ Kept by E. L. Travers, 2nd Officer.
- ⁶⁴ Assisted by Messrs. Hoare, Gace and Coysh.
- ⁶⁵ Assisted by Messrs. Hoare, Gace, Hepburn and Shirfield.
- ⁶⁶ Kept by John M. Arnaud.
- ⁶⁷ Kept by James Sraith, 1st Mate.

APPENDIX III.

INSTRUMENTS supplied, &c. to the Royal Navy.

Per Account.	Baro- meters.	Ane- roids.	Thermometers.				Hydro- meters.
			Ordinary.	Max.	Min.	Screens.	
April 1st, 1893, afloat -	227	532	1,396	309	313	185	93
Issued since -	80	143	362	80	77	30	28
Returned since -	307	675	1,758	389	390	215	121
April 1st, 1894, afloat -	65	102	315	45	36	18	31
	242	573	1,443	344	354	197	90

INSTRUMENTS supplied, &c. for use at Naval Stations.

April 1st, 1893, in use -	73	65	254	36	38	7	13
Issued since -	7	5	48	4	3	3	1
Returned since -	80	70	302	40	41	10	14
April 1st, 1894, in use -	3	5	66	8	2	1	3
	77	65	236	32	39	9	11

DISPOSITION of ADMIRALTY INSTRUMENTS on April 1st, 1894.

Afloat in Royal Navy -	242	573	1,443	344	354	197	90
In use at stations -	77	65	236	32	39	9	11
In store at M.O. -	24	55	48	45	54	9	28
" Chatham -	16	45	81	5	8	11	15
" Sheerness -	6	6	38	14	14	9	6
" Portsmouth -	23	53	143	33	35	13	8
" Devonport -	20	45	126	40	40	16	16
" Queenstown -	2	2	17	—	—	—	4
" Gibraltar -	2	4	11	3	3	—	4
" Malta -	8	12	33	8	11	3	6
" Bombay -	4	4	11	3	3	1	4
" Halifax -	1	6	20	5	4	—	7
" Bermuda -	13	7	24	4	9	2	4
" Jamaica -	6	3	28	—	—	—	—
" Cape of Good Hope -	5	5	27	4	4	3	4
" Trincomalee -	4	3	14	3	3	—	4
" Hong Kong* -	—	—	—	—	—	—	—
" Coquimbo -	3	6	17	4	3	1	19
" Sydney -	1	5	12	4	3	1	7
" Esquimalt -	6	7	29	5	6	—	—
Total, April 1st, 1894 -	463	906	2,358	556	593	275	237
Lost, &c. since April 1st, 1893 -	4	17	279	46	31	7	10
Under repair -	23	4	—	—	—	—	—

* Returns have not been received for June and September quarters 1893.

APPENDIX IV.

INSTRUMENTS supplied, &c. to Mercantile Marine.

Per Account.	Baro- meters.	Com- passes.	Thermometers.				Hydro- meters.
			Ordinary.	Max.	Min.	Screens.	
April 1st, 1893, afloat -	116	—	667	—	1	113	378
Issued since -	67	—	419	—	—	61	203
	183	—	1,086	—	1	174	581
Returned since -	77	—	459	—	—	68	241
April 1st, 1894, afloat -	106	—	627	—	1	106	340

INSTRUMENTS at Stations, viz., Telegraph Offices, Observatories,
Fishing Villages, &c.

April 1st, 1893, in use -	283	2	258	57	64	55	10
Issued since -	14	—	38	10	12	2	—
	297	2	296	67	76	57	10
Returned since -	12	—	29	8	7	1	—
April 1st, 1894, in use -	285*	2	267	59	69	56	10

DISPOSITION of Board of Trade Instruments on April 1st, 1894.

In merchant ships -	106	—	627	—	1	106	340
In use at stations -	285	2	267	59	69	56	10
In store at M.O. -	39	3	305	20	36	18	123
At Liverpool Agency -	9	—	43	—	—	11	33
„ Aberdeen „ -	5	—	41	—	3	5	30
„ Glasgow „ -	4	—	26	—	—	3	19
„ Dundee „ -	16	—	36	—	—	14	33
„ Hull „ -	2	—	9	—	—	1	4
„ Cardiff „ -	4	—	38	—	—	2	15
„ Southampton „ -	6	—	44	—	—	6	29
Total, April 1st, 1894 -	476	5	1,436	79	109	222	636
Lost, &c. since April 1st, 1893	2	—	114	2	1	33	48
April 1st, 1894	12	—	—	—	—	—	—

* Of these barometers 198 are lent for use of seafaring communities at fishing villages and ports.

APPENDIX V.

REPORT OF INSPECTION OF THE IRISH AND WELSH STATIONS, 1893.

I have the honour to report that I have completed my usual inspections this autumn. The only stations I have omitted have been Foynes and Kilkenny Castle, both of which furnish data for the Weekly Weather Report only.

TELEGRAPHIC REPORTING STATIONS.

Holyhead, visited August 3rd.—The only matter calling for remark here is that the bushes near the rain gauge require to be kept lower, so as not to shelter the gauge from driving rain.

I also inspected the two anemometers, in company with Mr. Galton. Some repairs were needed to the cups of the Robinson instrument, which I ordered to be carried out.

Donaghadee, visited August 8th.—The only change at this station has been that the barometers have been changed to the new Post Office close by the old one. The thermometers have not been changed.

Malin Head, visited August 14th.—I took to this station, where the observer is very careful, the self-recording aneroid formerly at Mullaghmore, and I erected it in the signal tower. The employment of Lloyd's signalmen as our observers is not altogether satisfactory, as at the time of the manœuvres the two duties clashed with each other at this station and elsewhere.

Belmullet, visited August 16th.—At this station the observer was absent on leave. I regret to say that the observations are not as carefully taken as we could wish. I have reprimanded the observer, whom I saw afterwards.

Parsonstown, visited August 22nd.—At this station the observer had recently enlisted, and his brother aged 14 had taken the duty, but of course is as yet inexperienced.

Roche's Point, visited August 23rd.—This station was in good order as usual.

Valencia, visited August 24th.—The records are as usual well kept. The sunshine recorder has been placed on the anemometer tower.

Mr. Cullum has erected some gates, and has brought the place into good order. I have authorised his expending 5*l.* on sanitary improvements, and have also allowed him to put in other gates, at his own expense, if he wishes to do so.

St. Ann's Head, visited August 30th.—This station calls for no remark. Mr. Blake, the senior observer, expects promotion about Christmas.

STATIONS OF THE SECOND ORDER.

Dublin (Fitzwilliam Square), visited August 4th.—This station is as usual in good order, but the shrubs in the garden interfere with air circulation.

Dublin (Glasnevin Gardens), visited August 4th.—This station calls for no remark.

Dublin (Mountjoy Barracks), visited August 5th.—This station is in its usual good order. The jackdaws have been taking papers from the sunshine recorder, as had previously happened elsewhere. I have directed that a wire cage be fixed on.

Lissan, visited August 9th.—The observer is the same as in 1892. The thermometer screen has been shifted so as to open to the north. The records are carefully taken.

Armagh, visited August 9th.—I found this station in good order. The anemometer hut on the roof had been moved during the year, and replaced satisfactorily (*vide* my report of 1892).

Colebrooke, visited August 10th.—The station is satisfactory; the reductions are all carried out in this Office.

Londonderry, visited August 12th.—The observer is in arrear with his returns. The thermometers and rain-gauge are in a narrow garden, and bushes interfere with them to some extent.

Markree, visited August 16th.—Mr. Marth's assistant was absent. I found the station in very good order, except that the sunshine recorder was slightly out in azimuth.

Currygrane, visited August 19th.—The observer, S. Leckie, is improving in accuracy, and the records are now well kept.

Arley Cottage, visited August 21st.—Major Maxwell was again absent. The instruments were in fairly good order.

Parsonstown.—See report on Telegraphic Stations.

St. David's, visited August 29th.—This station is, as always, in excellent order.

WEEKLY WEATHER REPORT STATIONS.

Edenfel, visited August 15th.—Colonel Buchanan absent, but his son was taking the observations, and the instruments were in order.

Killarney, visited August 24th.—Archdeacon Wynne absent. His *locum tenens* was observing, and correctly.

Waterford, visited August 28th.—This station calls for no remark.

Llandoverly, visited August 31st.—This station is in good order. Mr. Watkin has, however, better instruments than he has now in use. I hope he will have them set up.

Corrections to be applied to the readings of the thermometers:—

STATIONS.	Dry Bulb.	Wet Bulb.	Max.	Min.	Spare.	Remarks.
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TELEGRAPHIC REPORTING STATIONS.

Holyhead	0·0	-0·3	-0·3	+0·3	-0·4	No spare ther.
Malin Head	-0·4	-0·4	0·0	-0·7	-0·6	
Belmullet	-0·2	-0·1	-0·1	+0·1	—	
Donaghadee	-0·4	-0·5	-0·1	0·0	-0·1	
Parsonstown	-0·7	+0·1	-0·2	+0·1	—	
Valencia (Cahirivecn)	-0·3	-0·3	-0·2	+0·2	-0·1	Dry bulb (corrected) used as standard. No. 3530 do. do. Dry bulb. do. do.
Roche's Point	-0·4	-0·4	0·0	+0·6	—	
St. Ann's Head	-0·4	0·1	+0·9	+0·1	-0·1	

STATIONS.	Dry Bulb.	WetBulb.	Max.	Min.	Spare.	Remarks.
WEEKLY WEATHER REPORT STATIONS.						
Londonderry	-0.2	-0.2	0.0	+0.4	—	Max. ther. is new (bought in May).
Edenfel	—	—	+0.4	-0.3	—	
Waterford	-0.1	-0.1	0.0	+0.5	—	Dry bulb (corrected) used as standard.
Killarney	-0.4	-0.4	-0.3	-0.1	—	
Llandoverly	—	—	-0.3	+0.5	—	Not graduated on stem.
STATIONS OF THE SECOND ORDER.						
Armagh	-0.3	-0.4	-1.7	—	-0.2	Grass min. +1.1. Air min. therm. of Casella's mercurial pattern.
Brookeborough	-0.8	-0.7	-0.1	0.0	—	Grass min. -1.0. Do. -0.6.
Dublin (City)	-0.6	-0.6	-1.0	0.0	—	
Dublin (Phoenix Park)	-0.4	-0.4	-0.4	+0.1	0.0	Do. +0.5.
Edgeworthstown	-0.5	-0.5	-0.3	+0.1	—	
Glasnevin	-0.3	-0.3	-0.1	+0.5	—	Dry bulb (corrected) used as standard.
Lissan	-0.2	-0.4	-0.8	+0.3	—	
Londonderry	-0.2	-0.2	0.0	+0.4	—	Do. do.
Markree Castle	-0.4	-0.3	0.0	0.0	—	
Mount Nugent	-0.1	-0.1	+0.9	0.0	—	Do. do.
Parsonstown	-0.7	+0.1	-0.3	+0.1	—	
St. David's	-0.2	-0.3	0.0	+0.2	—	

(Signed) ROBERT H. SCOTT.

REPORT OF INSPECTION OF SCOTTISH STATIONS FOR YEAR 1893.
BAROMETERS.

The barometers at the stations were compared with inspector's standard No. 690, which continued to be in good order during the inspection, as shown by a comparison with a standard in Edinburgh at the commencement and again at the close of the inspections. I have to report that the whole of the barometers specified in Table I. are correct, allowance being made for known instrumental errors, are in good order, and are correctly observed.

TABLE I.

Stations.	Inspector's Standard No. 690 corrected.	Reporting Barometer uncorrected.	Check Barometer uncorrected.	Remarks.
	Inches.	Inches.	Inches.	
Ochertyre	29.696	29.684	—	Check barometer at lower level.
Dundee	29.762	29.760	—	
Braemar	28.972	28.972	—	
Aberdeen	30.160	30.160	—	
Nairn	30.050	30.047	30.050	
Lairg	29.904	29.890	—	
Dunrobin	30.156	30.158	—	
Wick	29.960	29.956	30.022	
Deerness	29.476	29.460	—	
Stornoway	29.498	29.494	29.494	
Fort Augustus	30.113	30.106	—	
Fort William	29.393	29.936	—	
Laudale	30.414	30.416	30.410	
Callton Mor	30.074	30.040	—	
Rothsay	29.934	29.306	—	
Ardrrossan	30.002	30.004	—	
Pinmore	29.935	29.934	—	
Edinburgh	28.757	28.730	—	
Leith	29.161	29.161	29.164	
Glasgow	29.619	29.619	—	
Cargen	29.690	29.650	—	Check barometer in flat above.

THERMOMETERS.

The minimum thermometers were carefully examined with the result that all were found in good order with the exception of two. At Rothesay and Ardrossan about one degree of the spirit was lodged at the very top of the tubes, which in each instance was put right by the observer himself under my direction. In both cases the evaporated portion was not very easily seen. All the maximum thermometers were found in good order.

TABLE II.

Stations.	Standard Ther- mometer, No. 433	Dry Bulb.	Wet Bulb.	Spare Ther- mometer.	Max. Ther- mometer.	Min. Ther- mometer.	Time in Water in Minutes.	Change of Tempera- ture.	Remarks.
Ochertyre	60.2	0.0	-0.1	—	0.0	-0.1	180	+0.4	Ther. on grass 0.0.
Dundee	58.2	-0.6	-0.6	—	+1.4	-0.3	80	+0.5	New hygro- meter.
Braemar	59.1	+0.3	+0.4	—	0.0	-0.2	140	Uniform	
Aberdeen	61.2	+0.3	+0.3	—	+0.1	+0.3	90	Do.	
Nairn	64.0	+0.7	+0.8	—	0.0	-0.2	75	+0.5	
Lairg	65.4	+0.3	+0.2	—	-0.2	+0.1	100	Uniform	
Dunrobin	64.0	-0.5	-0.5	—	0.0	-0.4	55	Do.	
Wick	60.8	+0.4	+0.5	—	0.0	0.0	90	Do.	
Deerness	64.8	0.0	0.0	+0.2	-0.9	-0.2	70	+0.2	
Stornoway	57.8	+0.5	+0.5	—	-0.6	-0.6	120	+0.2	
Fort Augustus	59.0	+0.1	+0.1	—	+0.2	-0.4	80	Uniform	
Fort William	59.1	+0.1	+0.1	—	+0.2	0.0	120	Do.	
Do. Observa- tory	59.1	—	—	—	0.0	-0.7	120	Do.	
Laudale	58.1	+0.2	+0.2	—	+0.1	+0.2	100	Do.	
Callton Mor	64.2	+0.1	0.0	—	+0.8	-0.4	85	+0.2	
Rothesay	59.9	+0.1	+0.1	—	+0.1	-0.1	80	+0.3	
Ardrossan	60.1	+0.2	+0.2	—	-0.2	-0.2	110	Uniform	
Pinnore	60.0	0.0	-0.1	—	-0.2	0.0	95	Do.	
Edinburgh	52.2	+0.1	0.0	—	0.0	-0.1	90	Do.	
Leith	52.8	0.0	+0.1	—	-0.1	-0.5	60	+0.2	
Glasgow	48.3	—	—	—	-0.1	-0.1	100	-0.4	Ther. on grass -0.2.
Cargen	52.7	-0.1	-0.1	—	0.0	-0.2	135	+0.3	

HYGROMETERS.

The dry and wet bulbs at all the stations were read directly on opening the thermometer screens and the readings compared with the apparent hygrometric conditions at the time, and I am thereby led to report very favourably as to the care with which these observations are everywhere made. At Dundee the hygrometer had been accidentally broken and replaced by one purchased in the town. The errors of the new dry and wet bulbs were ascertained.

NOTES OF INSPECTION OF THE STATIONS

Ochertyre, July 25th, 1893.—Everything at this station is in excellent order, and the observer is enthusiastic and accurate.

Dundee, August 17th.—The instruments are in good order and the observations were made carefully and correctly by the assistant who was temporarily in charge. A new hygrometer had recently been procured to replace the old one which had been accidentally broken. Mr John Carnochan was appointed curator of the cemeteries after the death of

Mr. McKelvie, who was so long in charge of this station. Mr. C. evinces much interest in the observations and is desirous of giving all assistance in his power.

Braemar, August 8th.—The instruments are in admirable order, and the observations are made by Mr. Aitken and his two assistants with care and correctness.

Aberdeen, August 9th.—Instruments and observations at this place are all that can be desired.

Nairn, August 12th.—The thermometer screen has just been repainted and repaired, and the instruments generally are in good order. I had some conversation with Miss Penny about the readings of the barometer, dwelling on the necessity there is for systematically checking the accuracy of each observation entered in the journal by a second observation.

Lairg, August 14th.—The instruments are all in excellent order, and the observations made with care and accuracy.

Dunrobin, August 15th.—The instruments continue to be kept in good order, and the observer is careful and attentive.

Wick, August 16th.—Mr. Sinclair has recently been rather seriously ill, and all the observations were consequently made by Miss S., who occasionally neglected to compare the barometer reading entered in the journal with a second observation. This is promised to be rectified. The instruments are in very good order, and Miss S. continues to manifest much interest in the observations.

Deerness, August 18th.—The instruments are all in admirable order, and the observations are made with much care and intelligence.

Stornoway, August 22nd.—The instruments are in good order, and the observations appear to be made with care. The omission recently to enter in the daily telegram a barometric fluctuation shown by the barograph was pointed out, and the necessity of attending to the notification of these fluctuations in future. Considerable additions have been made to the school buildings, and other changes and additions to the present grounds are in contemplation. Meanwhile, instruments remain in their present position till a decision is come to, when they will be shifted to the positions I pointed out in accordance with the decision arrived at.

Fort Augustus, August 25th.—On examination the sunshine recorder was found slightly out of focus, and directions were given as to putting it right, otherwise the instruments are in excellent order, and the observations are made with special care and intelligence by Father Martin, who has resumed the charge of the station.

Fort William, August 25-28th.—A new maximum thermometer was added in November to replace one which had been accidentally broken. The sunshine recorder was removed to its new position September 1st, 1892, where it will remain permanently. Mr. Omond has, during the past two years, empirically determined the varying number of hours of actual sunshine during the days of the year, as these are reduced by the surrounding hills. The results are given in the following Table :—

TIMES OF HOURS SUNSHINE.

—				Theoretic.	Observed.	Difference.
January	-	-	-	281	151	80
February	-	-	-	275	193	82
March	-	-	-	365	295	70
April	-	-	-	426	357	69
May	-	-	-	508	413	95
June	-	-	-	529	438	91
July	-	-	-	528	429	99
August	-	-	-	467	380	87
September	-	-	-	381	315	66
October	-	-	-	319	241	78
November	-	-	-	242	167	75
December	-	-	-	210	125	85
Year	-	-	-	4,481	3,497	984

The standard barometer was shifted from the south-west to the north-west wall of the instrument room in July, both positions being at the same height. The instruments are in excellent order, and the observations are punctually and accurately made.

Laudale, August 29th.—The instruments are in remarkably good condition, and the observations are made carefully and correctly. Hitherto the observer has been occasionally revising his observations on a faulty method, which in future is not to be practised.

Callton Mor, August 30th.—The instruments are well kept, and the observations made with great care by Mr. Russell and his assistant.

Rothsay, August 31st.—About a degree of spirit was lodged at top of tube of the minimum thermometer, in a position not readily seen. It was put right by the observer under my direction; otherwise the instruments were in good order and the observations made very accurately.

Ardrossan, August 31st.—The rain-gauge has just been thoroughly repaired, and the Stevenson screen was ordered to be repaired and repainted. About one degree of spirit was lodged at the top of the tube of minimum thermometer. It was put right by the observer under my direction. I have pleasure in reporting that matters at this station are now in a satisfactory state.

Pinmore, September 1st.—The instruments are all in very good order, and the observations made with care and intelligence.

Edinburgh, October 4th.—The sunshine recorder, which was very slightly out of order, was put right. The other instruments were in remarkably good order, and great zeal and intelligence is manifested in conducting the work of the station.

Leith, October 5th.—The rain-gauge and the railing inclosing the instruments were put in a state of thorough repair shortly after last year's inspection. Everything is in good order, and care and intelligence are shown on the part of the observer and two assistants in making the observations.

Glasgow, October 9th.—Professor Becker, who has succeeded Professor Grant, evinces the greatest interest in the meteorological department of the observatory. The instruments are in remarkably good order, and the work of observing is well attended to.

It is necessary to remove the anemometer from its present position, where it has been since 1868, but it is not yet decided where to place it.

Cargen, October 10th.—A new barometer has been added, to replace the one that has been accidentally broken. The thermometer screen had recently been repainted, and everything about the station is in excellent order, and the observations are well attended to.

(Signed) ALEXANDER BUCHAN.

REPORT of INSPECTION of the ENGLISH STATIONS, 1893.

I have the honour to submit the following Report of the Stations inspected by me in the year 1893 :—

TELEGRAPHIC REPORTING STATIONS.

Spurn Head, inspected on April 21st.—All the instruments at this station were in good order, and appeared to be carefully attended to. The dry-bulb, without corrections, occasionally exceeds the maximum.

York, April 22nd.—I think that there is some improvement in the observations at this station, and that they are more punctually taken. There is no other change.

Prawle Point, inspected August 20th.—All the instruments were as usual in good order. The assistant, Mr. Fenton, was absent on the day of my visit.

Scilly, inspected August 22nd.—The observer read the barometers a little low. The hygrometer was rather foul.

Jersey, September 2nd and 3rd.—The observer had been obliged to relinquish his office as railway station master at St. Aubins, and the barometers had been moved to his own house, without however, any appreciable change of altitude above mean sea level. The instruments were in good order. I examined some other sites for both the outdoor and indoor instruments, some remarks about which I supplied to the Meteorological Office in the prospect of Mr. Fisher's having to resign the work of observation.

Hurst Castle, September 6th.—The instruments were all in good condition. Errors have occasionally been made in the readings of the barometers. The remarks made by me in previous reports as to this station remain applicable. I have since learned that Mr. Appleton is about to retire.

Yarmouth, October 24th.—The instruments were all in good order as usual.

Cambridge, October 26th.—The instruments were in fair order, and the new observer seems to me accurate and careful. Wind forces are, as it appears to me, estimated at higher figures since the resignation of Mr. Todd.

Loughborough, October 28th.—Much care is still taken by the observer at this excellent station.

North Shields, November 1st.—Mr. Irvine was absent. I have now no fault to find with the observations at this station, and the barometers were correctly read.

Liverpool, November 7th.—Both Mr. Plummer and Mr. Skinner were absent. The instruments appeared to be in fairly good order. The thermometer corrections seemed to be nearly in accordance with those previously determined by me.

Dungeness, December 22nd.—All the instruments were clean and in good order; and I have no fault to find with the station, except that the observers set the verniers a little too low.

North Foreland, December 27th.—The observer was absent. I called, however, at his lodgings and suspended my standard by the side of the barometer which is there kept, with the conclusion that the latter does not read quite correctly. There is no air in either of the barometer tubes at this station. The thread of spirit in the minimum I found to be broken in several places, and the deputy observer informed me that it was frequently in this condition. A new minimum is, I think, required. All the other instruments were in excellent order.

SECOND ORDER STATIONS.

York, April 22nd.—There is no alteration of any importance at this station. The thermometers, as I have before reported, are in my opinion too crowded.

Plymouth, August 21st.—The barometer was about to be moved to the observer's new house. This promises to be a good station.

Southampton, September 1st.—All the instruments at this station were, as usual, in good order, and appear to be carefully attended to.

Geldeston, October 25th.—Mr. Dowson was absent at the time of my visit. All the instruments were, as usual, in excellent order. The wet-bulb, however, read somewhat high.

Uppingham, October 27th.—The observations are excellently taken. Some of the old thermometer corrections seemed to need alteration, as will be observed from the table.

Durham, November 1st.—The instruments were in very fair condition. Mr. Carpenter is a careful and efficient observer.

Aysgarth, November 3rd.—This station continues to be excellent. The observer has at times been absent. The minimum seems to require a large correction, and is not a very good instrument.

Prestwich, November 5th.—Dr. Clunn, who kindly read the instruments with me, failed to read them quite correctly in water, being very myopic. The deputy overseer only arrived just before I had to leave.

Liverpool, November 7th.—The instruments were in fairly good order, but the wet-bulb a little foul. The observers were absent.

Cronkbourne, November 8th.—Both Mr. Moore and his assistant were absent from the Isle of Man. I found everything in good order at this well-maintained station.

St. Leonard's, December 23rd.—The observations are, in my opinion, very ill-attended to. The wet-bulb was dry and excessively dirty. Doctor Colborne was absent. He has again changed his residence. I was shown the barometer, but was unable to open the case.

Eastbourne, December 23rd.—I found all the instruments in excellent condition and well attended to. The corrections applicable to the thermometers are trivial, and practically unaltered. No interference with the rain-gauge has lately been noticed. The observations are likely to be permanent.

SECOND ORDER STATIONS whose RETURNS are not fully published.

Tealby, October 30th.—The observer has been seriously ill, and I have fears that the station will not be kept up permanently. The instruments were all in good order.

Seaham, November 1st.—Mr. Aird had been taken ill on the morning of my visit. The instruments at the Cemetery grounds were in good order and well attended to; and the hygrometer was no longer dirty. The returns seem to me to be in themselves, as regards condition, worthy of publication, though errors are not infrequent. The proximity of the station to Durham renders, however, these returns of comparatively little value. The station has been continued for a long time, and promises to be permanent.

Manchester, November 5th.—Doctor Tatham was absent. I do not think that his new appointment can lead to any discontinuance of the observations; and I hope that they may be taken in the evening as well as in the morning. The instruments were in good order, and the deputy observer takes great care.

St. Helen's, November 7th.—No returns have yet been sent in. I strongly urged that the work should be begun. The instruments were all in fair order, and I see no sufficient reason why the station should not be a good one.

SELF-RECORDING OBSERVATORIES.

Stonyhurst, November 6th.—The returns from this observatory show gradual but satisfactory improvement, although errors are still not uncommon. The computer read the barometer rather low. The corrections needed for the self-recording thermometers seem trivial.

NEW STATIONS.

Normanhurst (Matlock), October 28–29th.—Mr. Smedley informed me that the barometer had been broken and sent back to London. The outdoor instruments are good, but no evening observations are at present taken. The exposure is all that could be desired.

Heysham Hall (Morecambe), November 4th.—This new station promises well. The instruments were all in good order. The deputy observer, Mr. S. Lomas, at first read the barometer wrongly; he is intelligent and careful, but unequal at present to hygrometrical reductions. The thermometer screen, made by a Lancaster workman, is, I think, rather too near a greenhouse on the north side of a large vegetable garden. The barometer, a good instrument, is in the house of Mr. Lomas, 10 feet below the outdoor instruments.

WEEKLY WEATHER REPORT STATIONS.

Besides those of the above stations which send weekly weather reports, I visited *Arlington Court* on August 24th. The observer has been changed since my last visit; and the instruments did not appear to be quite so well attended to, more especially the hygrometer.

Bristol, August 26th.—The observer, J. H. Jones, Esq., F.R.A.S., has regarded the maximum temperatures registered by him as abnormally high. I hesitate to adopt this opinion. All the instruments were in very fair order, and the station promises to be a useful one.

Cirencester, August 28th.—The sunshine recorder is not fixed to the stand, and is evidently, experimentally or accidentally, moved from time to time. Professor Ohm was absent at the date of my visit. The thermometers were in excellent order.

Hesley Hall (Bawtry), October 31st.—All the instruments were, as usual, in satisfactory order, and the returns appear to be carefully made.

Alnwick Castle, November 2nd.—The garden instruments are good. The thermometers in the library window are, as I was informed, "corrected by those kept in the gardens." But the latter are not well attended to; and the head gardener is frequently changed. The hygrometer was in a very unsatisfactory condition.

RAINFALL STATIONS.

I visited *Poulton (Fairford)* on August 28th.—The station is not ill situated. The gauge is fairly exposed, but stands rather too high above the ground. I spent a long time in giving instructions to the observer who is not well educated.

Market Rasen, October 30th.—There is no alteration at this station. The instrument was in good order, and Mr. Jevons continued to take the readings carefully.

INSTRUMENTS EMPLOYED.

I again employed Adie 590 as a standard barometer at the few stations to which I took a mercurial barometer. One of my two standard thermometers was broken by some passenger who meddled with my instrument case in crossing to Scilly, and I have since employed in its stead Negretti and Zambra's 5077.

NAME OF STATION.	THERMOMETER.										NAME OF STATION.	
	BAROMETER.		Temperature of Water.	DRY BULB. Correction to reduce to Inspector's Standards.	WET BULB. Correction to reduce to Inspector's Standards.	Difference of Wet from Dry Bulb.	State of Hygrometer.	MAXIMUM. Correction to reduce to Inspector's Standards.	MINIMUM. Correction to reduce to Inspector's Standards.	SPARE ON GRASS. Correction to reduce to Inspector's Standards.		General Condition.
	Difference of Observers' from Inspector's Readings.											
Alnwick Castle	—	—	47	+0.8	+1.2	-0.4	C	-3.0	-2.0	0	C	Alnwick Castle.
Arlington Court	—	—	61	-0.4	-0.5	+0.1	C	-0.4	-0.1	—	C	Arlington Court.
Aysgarth	.000	—	52	-0.1	-0.7	+0.6	A	-0.3	-1.2	—	A	Aysgarth.
Bristol	—	—	62	-0.4	-0.4	0.0	A	-0.1	-0.3	-0.2	A	Bristol.
Cambridge	-.001	—	51	-0.6	-0.5	-0.1	A	-0.9	+0.1	—	A	Cambridge.
Cirencester	—	—	61	-0.1	-0.2	+0.1	A	-0.1	-0.1	0.0	A	Cirencester.
Cronkbourne	-.002	—	40	-0.4	-0.3	-0.1	A	0.0	+0.2	-0.1	A	Cronkbourne.
Dungeness	-.003	—	45	-0.1	0.0	-0.1	A	0.0	-0.2	—	A	Dungeness.
Durham	-.001	—	46	-0.4	-0.4	0.0	A	-0.2	+0.4	—	A	Durham.
Eastbourne	—	—	46	0.0	-0.2	+0.2	A	-0.2	0.0	—	A	Eastbourne.
Geldeston	-.001	—	51	-0.3	-0.6	+0.3	A	-0.1	-0.1	—	A	Geldeston.
Hesley Hall (Bawtry)	—	—	51	-0.6	-0.1	-0.5	A	-0.2	-0.1	—	A	Hesley Hall (Bawtry).
Heysham Hall	-.009	—	51	-0.3	-0.1	-0.2	A	-0.1	+0.2	—	A	Heysham Hall.
Hurst Castle	-.003	—	61	-0.8	-0.2	-0.6	A	-0.8	-0.1	—	A	Hurst Castle.
Jersey	-.002	—	62	-0.2	-0.5	+0.3	A	+0.4	-0.1	—	A	Jersey.
Liverpool	—	—	44	-0.1	0.0	-0.1	B	-0.2	+0.2	—	B	Liverpool.
Liverpool	—	—	44	-0.1	0.0	-0.1	B	-0.1	+0.2	—	B	Liverpool.
Loughborough	-.001	—	52	-0.4	-0.4	0.0	A	-0.4	-0.3	+0.3	A	Loughborough.
Manchester	-.001	—	47	0.0	-0.1	+0.1	A	+0.4	+0.1	—	A	Manchester.
Matlock	—	—	51	-0.1	0.0	-0.1	A	+0.2	-0.2	—	A	Matlock.
North Foreland	+.004	—	43	-0.4	0.0	-0.4	A	-0.2	0.0	-0.2	A	North Foreland.
North Shields	-.002	—	53	-0.1	-0.1	0.0	B	-0.1	+0.1	—	A	North Shields.

NAME OF STATION,	THERMOMETER.										NAME OF STATION.		
	BAROMETER.		Temperature of Water.	DRY BULB.		WET BULB.		Difference of Wet from Dry Bulb.	State of Hygro-meter.	MAXIMUM.		MINIMUM.	SPACE ON GRASS.
Difference of Observers' from Inspector's Readings.	Correction to reduce to Inspector's Standards.			Correction to reduce to Inspector's Standards.		Correction to reduce to Inspector's Standards.					Correction to reduce to Inspector's Standards.		Correction to reduce to Inspector's Standards.
Plymouth	-.001		66	-0.1	-0.6	+0.5	A	0.0	+0.3	0.1	0.1	A	Plymouth.
<i>Praule Point</i>	.000		67	-0.2	-0.7	+0.5	A	-0.1	-0.2	0.0	0.0	A	<i>Praule Point</i> .
Prestwich	-		48	-0.5	-0.1	-0.4	A	-0.2	+0.3	-0.2	-0.2	A	Prestwich.
St. Helen's	+.002		50	-0.2	-0.2	0.0	A	0.0	+0.1	-	-	A	St. Helen's.
St. Leonard's	-		50	-0.7	-0.9	+0.2	C	0.0	+0.1	-	-	C	St. Leonard's.
<i>Scilly</i>	-.002		65	-0.7	-0.6	-0.1	B	-0.5	-0.3	-	-	B	<i>Scilly</i> .
Seaham	+.002		40	-0.6	-0.4	-0.2	A	-0.1	-0.3	-	-	A	Seaham.
Southampton	-.001		63	-0.2	-0.2	0.0	A	-0.2	-0.2	-0.1	-0.1	A	Southampton.
<i>Spurn Head</i>	.000		48	-0.7	-0.4	-0.3	A	0.0	0.0	-	-	A	<i>Spurn Head</i> .
Stonyhurst	-.004		-	-0.1	-0.3	+0.2	A	0.0	+0.1	-	-	B	Stonyhurst.
Tealby	-.001		45	-0.4	-0.2	-0.2	A	-0.6	+0.4	-0.1	-0.1	A	Tealby.
Uppingham	.000		55	-0.3	0.0	-0.3	A	-0.5	-0.2	-	-	A	Uppingham.
<i>Yarmouth</i>	+.001		50	-0.1	-0.5	+0.4	A	-0.5	-0.1	-	-	A	<i>Yarmouth</i> .
York	.000		53	-0.7	-0.7	0.0	A	-0.1	0.0	-	-	A	York.
York	.000		53	-0.7	-0.7	0.0	A	-0.4	0.0	-	-	A	York.

(Signed) W. CLEMENT LEY.

REPORTS ON INSPECTIONS OF OBSERVATORIES, &c.

To R. H. Scott, Esq., F.R.S.

DEAR SIR,

Kew Observatory, October 27, 1893.

I BEG to submit the following report to the Meteorological Council concerning their self-recording instruments at the various observatories and anemograph stations, inspected on the days named:—

Yarmouth, August 16th–18th.—The anemometer at this station having been reported to be out of order, I was instructed to go down to Yarmouth as soon as arrangements could be made with Mr. Chree for me to leave the Observatory. Accordingly I left Kew on August 16th, and called upon Mr. Watson at the Sailors Home, who has charge of the anemograph.

After carefully examining the recording apparatus, I came to the conclusion that the irregularity in the trace shown on the sheet for August 10th was due to the clamping screw (which had become very much worn) not gripping the spindle of the cylinder with sufficient force, so that the pressure of the pencils, combined with a shift in the direction of the wind, no doubt caused the cylinder to slip back from time to time. This I had put right by a local clockmaker, and then dismantled the external parts of the anemometer (which had been well attended to in oiling), and, after cleaning and examining the orientation, the instrument was started on the 17th, and the curve taken off on the following morning showed that the defect had been remedied.

Glasgow, August 31st to September 2nd.—The wet-bulb standard thermometer No. 709 having been accidentally broken at this observatory, another standard, No. 711, was ordered to be taken down from Kew to replace it. This I did, and fitted up the new one in the thermograph screen, after making some slight alterations in the metal mounting.

There is one spare thermograph tube at the observatory for use in case of breakage, but no scales have yet been constructed for tabulating the photographic curves derived from the new dry and wet tubes which were fitted up by me in April 1892.

When examining the thermograph clock and lenses, I improved the definition of the zero-lines, and also rectified the action of the light stop, which had failed to cut off the light from time to time.

The barograph clock was oiled and the instrument generally attended to, and the vent-hole in the cistern was found to be quite free.

The external parts of the anemometer were dismantled and cleaned, and all the bearings lubricated with fresh oil. After examining the clock and recording apparatus, the orientation was duly tested, and the observer instructed to prepare, and send in each month, an orientation paper.

As requested, I examined some of the anemograph and rain-gauge tracings. The former tracings were found to be exact copies of the originals, but the latter were not, inasmuch as the assistant had carried the trace down to the full extent of the scale and fully up to the zero-line, as will be seen by the tracings accompanying this report (not reproduced here).

This appears to have always been done, but I requested Mr. Connell to send in for the future facsimiles of the curves. After oiling and cleaning the friction rollers of the rain-gauge, I found by experiment that the pencil, when lightly pressing against the paper, descended to the full extent of the scale, although it did not return again to the zero line but this gauge is *not provided* with a Stonyhurst discharger.

The various thermometers were compared with the Kew standard thermometer No. 682 at 55 degrees, and their corrections found as follows :—

Dry standard 708	-	-	-	-	-0 ^o ·1
Wet „ 711	-	-	-	-	+0·1
Maximum 58846	-	-	-	-	+0·1
Minimum 63942	-	-	-	-	-0·1
„ (for grass) 59003	-	-	-	-	-0·1
Standard barometer	-	} No. K.O. 2479	-	-	-0·5
Attached thermometer	-		-	-	-0·5
Barograph thermometer (no number)	-	-	-	-	-0·8

The Mason's hygrometer, which was used in the screen, temporarily, in place of the broken thermometer, was also examined :—

Dry bulb, 2847	-	-	-	-	-0·5
Wet „	-	-	-	-	-0·5

Aberdeen, September 4th-6th.—The two new thermograph tubes ordered to be sent down to this observatory from Kew were safely conveyed by me, and on September 4th No. 1 was fitted up to replace the broken wet bulb tube, whilst the other (No. 3) was carefully put away for future use when required. The curves developed on the following morning showed that the new tube had been successfully adjusted, and that the records were satisfactory.

To obviate any further danger of breakage, Mr. Boswell placed a small piece of zinc over the hole in the wall at the back of the screen to prevent any stray bird from resting there.

Although the barograph and thermograph were going well, the clocks required cleaning as well as the lenses. These operations were duly carried out, and the thermometers were compared in pounded ice, with the following results :—

Dry bulb 397, read	-	-	32·1	° correction	-0 ^o ·1
Wet „ 395, read	-	-	32·6	„	-0·6
Maximum 1002, read	-	-	32·0	„	0·0
Minimum 5056, read	-	-	31·9	„	+0·1
Attached thermometer (to standard barometer) 71061, read	-	-	32·2	„	-0·2
Barograph thermometer (no number)	-	-	34·0	„	-2·0

The anemometer was dismantled and all parts cleaned, the different bearings being afterwards replenished with sperm oil. The orientation was examined, and squeezes taken of both the spare and self-recording rain-gauges after the latter had been examined and the various parts cleaned and oiled.

Deerness, Orkney, September 8th-9th.—At this station the anemograph was inspected on September 8th, but through a misunderstanding as to the exact date of my visit Mr. Spence was absent.

I had the exterior parts entirely dismantled, and found that the various bearings were all well oiled, and the instrument had been care-

fully looked after. The curve taken off the cylinder on the morning of my visit was not altogether satisfactory, but this, I think, was owing to the assistant not having clamped the clock sufficiently tightly to the cylinder when starting the instrument on the previous day.

The clock was taken to pieces and cleaned, the recording apparatus oiled, and afterwards the orientation was examined and found correct.

On the following morning I drove over again from Kirkwall and found that the anemometer had gone all right, and Mr. Spence, who had returned home that day, called my attention to a slight defect in the direction-pencil, but unfortunately I had no emery buff with me to correct it. Since my return, however, I have sent out two emery buffs to Mr. Spence, in case the end of the pencil still requires to be slightly rubbed down.

The observer was instructed to adjust the sheet upon the cylinder so as to make the traces fit the printed forms.

The sun recorder was in good order.

Fort William, September 13th-15th.—The clocks of both the barograph and thermograph were taken to pieces and cleaned. The lenses, condensers, and mirrors received the usual attention, and the zero dots were changed to the winter position. The intensity of the photographic traces was also much improved after the mirrors, &c., had been cleaned.

The thermometers were compared with the Kew standard No. 682, and found to have the following corrections at 60 degrees:—

Dry bulb 671	-	-	-	-	-	0.0
Wet „ 672	-	-	-	-	-	-0.2
Barograph thermometer, K.O. 6-90	-	-	-	-	-	-2.2
Standard barometer, attached thermometer No. 72222	-	-	-	-	-	-0.1
Maximum 1032	-	-	-	-	-	+0.1
Minimum 1322	-	-	-	-	-	+0.7

Note.—As the minimum thermometer was reading low, I dismantled it from the scale and slightly heated the chamber end over a lamp and after standing the tube in a vertical position for some three hours, the following correction was found:—

Minimum 1322	-	-	-	-	-	+0.3
--------------	---	---	---	---	---	------

My special attention having been directed to the unsatisfactory action of the self-recording rain-gauge, I suggested to Mr. Omond the advisability of entirely dismantling the instrument and fitting it up temporarily in the observatory, as the weather at the time was stormy.

After cleaning the clock we again tested the capacity of the receiver which was found to agree with the original value given, of 0.18 inch.

Experiments were then made with the Stonyhurst discharger, when it was discovered that the float did not exert sufficient lifting power to push the pencil up to the zero line after a discharge of 0.18 inch. We found that the position of the float in the discharger was adjusted for a fall of 0.20 inch, so that the amount of rain (0.18) passing in from the receiver did not rise to a sufficiently high level.

As a ready way of getting over the difficulty we put a number of pebbles of suitable size into the bottom of the discharger, thereby raising the level of the water and the float was then found to act perfectly in forcing the pencil up to the zero-line.

As regards the difference shown between the trace and the amount measured in the glass, the former being less, I think that this was principally due to friction, as the instrument badly required cleaning. After filtering the mercury and cleaning the friction rollers, which had become somewhat sticky, the free action of the float carrying the pencil was considerably improved.

Alnwick, September 18th.—I visited Alnwick Castle on September 18th by appointment with H. J. Willyams, Esq., who has succeeded Colonel F. Holland in the service of His Grace the Duke of Northumberland. Through the kind courtesy of Mr. Willyams, every facility was afforded me for examining the anemometer, though unfortunately the weather was unsettled and rainy at the time.

The anemometer is erected on one of the turrets on the roof of the Castle, and, by means of a considerable amount of shafting, is connected to the recording apparatus which is placed in the library.

The exterior parts of the instrument appeared to be well oiled, and are attended to from time to time by the resident mechanic. On examining the recording apparatus I found that the direction-pencil was a few points out of orientation, but after some little difficulty this was put right, and on testing the four principal points it registered satisfactorily.

The exposure of the anemometer is fairly good for all winds, excepting those coming from the N.N.W., N., and N.E. When the direction is in any of these quarters the flag-tower to the N.E., which is in close proximity to the instrument, causes eddies to sweep round the tower and turrets to such a degree that the direction-vane frequently makes a complete turn round the compass, so that the record is not of much value.

The observer's attention was called to the times of starting, and also to the desirability of more care being exercised in tracing the curves.

From an inspection of these it was evident that the clock lost considerably in the course of the day. I endeavoured to shorten the length of the pendulum, but was unable to do so as the bob had become firmly rusted in.

I suggested that this should be seen to by a local clockmaker.

North Shields, September 19th-20th.—The anemometer here was found working very well, and is in excellent order, neither the fans nor the cups showed any signs of wear. I entirely dismantled the instrument and had every part cleaned, and all the bearings lubricated with fresh sperm oil; afterwards the orientation was examined and found correct.

Fleetwood, September 22nd-23rd.—At this station the anemograph was in good working order, and, as usual, well attended to by Mr. Gaultier.

On examining the direction fans I found that one of the blades had become unsoldered; this was put right before leaving. The cup-arms, and stays did not show any signs of wear.

The external portions of the instrument were thoroughly cleaned and oiled, as well as the clock and recording apparatus. Afterwards the orientation was duly examined and found correct.

Stonyhurst, September 25th-26th.—Here I found the photographic instruments in good order, but had the thermograph clock dismantled and cleaned and attached a new line to the barrel; also the barograph was examined and the usual cleaning of lenses, &c. performed.

The zero-lines of the thermograph were shifted to the winter position and the intensity of the dots of light improved.

the bearings being screwed up too tightly. The interior recording parts were cleaned and the orientation was tested and found correct, and the observer instructed to make a mark with the pricker at the time of starting.

(Signed) T. W. BAKER.

REPORT ON INSPECTION of the OBSERVATORIES at FALMOUTH
and OXFORD, 1893.

Falmouth Observatory, visited August 14th-17th.—All the instruments were found in very fair condition and well attended to.

The anemograph has been kept well oiled wherever it was possible to do so without disturbing the instrument, but on dismounting the exterior portion, the oil in platform containing the direction roller bearings was found almost dried up, and what little was left had thickened. This was all removed, and, after thorough cleaning, filled up with fresh asbestoline.

The clock and recording parts were also examined and cleaned, and the orientation tested by local marks and by compass bearings.

The endless screw of the direction-spindle begins to show marked signs of wear, and will eventually require renewal.

The check-piece fitted to the rain-gauge, to prevent the pencil rising beyond zero-line of curve paper, was found to have worked loose; this was made rigid.

The cylinder platform was noticed to be revolving dangerously close to the "stop"; the latter was bevelled off to allow more room.

The pencil used—which gives good traces—is a Wolff's "Spanish Graphite," carefully pointed each time the curve is changed, and the least necessary pressure used to cause it to record clearly.

Mr. Kitto pointed out that the screw fixing this pencil in its holder was quite worn out. A new one was procured locally, and fitted to holder next day.

Examination showed that some of the wooden stakes used to secure the "check" rain-gauge had decayed, rendering the instrument liable to move in high winds. Fresh supports were driven in, gauge made firm and carefully levelled, and a "squeeze" taken of rim of funnel.

The instrumental portions of the barograph and thermograph were in good order, but the escapements of both clocks required cleaning, which was done. Some difficulty having recently been experienced in altering the length of the barograph pendulum, I examined same, and found that the thread taking-into-rating nut was rusted; after soaking it in oil for some time this was remedied.

The dial divisions on both these clocks are becoming very difficult to read, and fresh enamelled dials would be a great improvement.

The bulbs of the thermometers are 3 feet 4 inches above the ground.

The thermometers were all compared with my standard at a temperature of 65°, and the following corrections determined:—

Dry,	No. 383	-	-	-	=	-0.5
Wet,	„ 388	-	-	-	=	-0.3
Maximum,	„ 104	-	-	-	=	-0.4
Minimum,	„ 308	-	-	-	=	-0.1

Height of barometer above sea level	-	=	183 feet.
„ rain-gauge	„	=	169 „
„ anemograph cup	„	=	about 210 feet.

Radcliffe Observatory, Oxford, visited August 30th.—Mr. Stone was absent, but his chief assistant, Mr. Wickham, courteously rendered every assistance.

All the instruments were found in good order and working satisfactorily.

I examined the clocks, &c., and oiled the escapements.

It having been rather difficult to read the thermometer attached to the standard barometer at low temperatures, it was with some trouble and risk removed, and then raised in its shield-tube, so as to bring the scale divisions, at about 32°, better into view.

I made a comparison with my standard of the various thermometers in use, and the following corrections were given:—

Dry-bulb standard, No. 576 (in thermograph screen)	-	=	-0·1
Wet " " 575	"	=	-0·2
Dry thermometer B.T. 1710 (in Stevenson's screen)	"	=	-0·3
Wet " B.T. 1709	"	=	-0·3
Maximum " M.O. 356	"	=	-0·3
Minimum " M.O. 363	"	=	+0·1

(Signed) E. G. CONSTABLE.

Kew Observatory,
October 1893.

APPENDIX VI.

METHOD OF DEALING WITH TELEGRAPHIC WEATHER INTELLIGENCE.

THE operations connected with the preparation and issue of the Forecasts and Storm Warnings have not undergone any material change. Full details will be found in Appendix X. to the Report for 1891.

DAILY WEATHER REPORT.

An important change has been made during the past year in the Daily Weather Report, as two telegrams are now received daily from P. Delgada, in the Azores, forwarded by the courtesy of the Portuguese Meteorological Authorities. The service is at present too new for any detailed report as to its value to be submitted. A detailed description of the Report is given in the Annual Report for 1887, and subsequent alterations have been noticed in the more recent Reports. The Report fills four large quarto pages as before.

The standing portions (maps, &c.) are printed in blue, while the information for each day is in black.

The subscription for the Report is—

<i>For delivery by hand, where feasible, £2 per annum ;</i>
<i> " by book post £1 "</i>

MS. copies of the observations and remarks can be supplied at the rate of 2*l.* 10*s.* per annum. Arrangements can also be made for the supply of charts drawn from the 8h. a.m. or 6h. p.m. observations, such as appear in the "Times."

The Office receives, when the telegraphic communications are perfect, fifty-eight reports each morning, seventeen each afternoon (except on Sundays), and twenty-nine each evening, the arrangement of which is explained in the Annual Reports for recent years.

The Monthly "Correction and Addition List" is published as before.

WEEKLY WEATHER REPORT.

The Weekly Weather Report, which has appeared since February 1878, and was re-arranged at the commencement of 1890, is prepared for the calendar week, Sunday to Saturday. It is published regularly on Thursdays and is illustrated by three maps for each day. These, like the Daily Reports, show the outline of the land and sea in blue, while the information on them is in black. The maps show (1) for 8 a.m., the temperature, weather, and sea disturbance: and (2) for 8 a.m. and 6 p.m., the distribution of pressure and the winds, over, and on the coasts of, Europe. The information on the first and second pages of each report has been increased, and consists of observations of Temperature and Rainfall made at 79 stations, the individual values for which are given on the second page of the Report, and of Sunshine records taken at 47 stations.

Tables of *Accumulated Temperature*, designed to give persons engaged in agriculture better means of estimating the manner in which vegetation is affected by temperature than that afforded by the more usual methods of treating the readings of the thermometer, are published on the first and second pages, and show for each week, and for the whole period from the beginning of the year, the weekly and progressive values respectively, of the combined amount and duration of the excess or defect of the air temperature, above or below a suitably fixed standard, or *base temperature*. The base value adopted is 42° Fahr.

Accumulated Temperature is expressed in *Day-degrees*; a Day-degree signifying 1° F. of excess or defect of temperature above or below 42° F. continued for 24 hours, or any other number of degrees for an inversely proportional number of hours. An explanation of the rules by which it is obtained will be found in the Annual Report for 1889, while full details as to the facts on which the rules are founded are published in Appendix II. to the Quarterly Weather Report for 1878.

In addition to the reports from the Telegraphic Reporting Stations, and the returns from the self-recording Observatories, weekly schedules from 56 volunteer observers are used, the names of the stations and observers being given in App. XI., p. 64.

The MS. of the report is prepared on Tuesday in every week, and the summary on its first page is sent to several papers on that evening; the printed copies of the complete report are ready for sale on Thursday afternoon.

Appendices, &c.

Two Appendices, I. and II., have appeared, similar to those for recent years. The Monthly Summary Supplement has been improved by the addition to its Tables of Columns showing the difference between the Pressure, Temperature, Rainfall, and Bright Sunshine of the current month, and the means for the corresponding months in a long series of years.

ISSUE OF FORECASTS.

There has been an important change in this work, the Board of Agriculture having forwarded the 3.30 p.m. daily forecasts to the rural parts of Northumberland and Essex, p. 12.

Remarks on the actual state of the weather, and forecasts *for not more than one day in advance*, are prepared at the Meteorological Office as under:—

*On Week Days.**

- (1.) At 11 a.m. (from the morning reports), for the 24 hours ending at Noon on the day following the date of issue. These are intended especially for the early editions of the evening papers, for the clubs, and for exhibition at certain selected stations. See page 10.
- (2.) At 3.30 p.m. (from the morning and afternoon reports), for the day following that of issue. This set of forecasts is not intended for publication in newspapers, but a copy is exhibited regularly at the door of the Meteorological Office, and during the Hay Harvest they are telegraphed to about 28 well-known agriculturists, to be made known in their neighbourhoods, see p. 11, and to the Board of Agriculture for transmission to certain counties in England (see p. 12).
- (3.) At 8.30 p.m. (from the 8 a.m., 2 p.m., and 6 p.m. reports), for the day following that of issue. These are supplied gratis to any newspaper or news agency which may apply for them, and send for them regularly. A very large number of the more important papers and news agencies avail themselves of this advantage.

* Good Friday and Christmas Day are reckoned as Sundays.

The forecasts are made for the following districts :—



0. SCOTLAND, NORTH.
1. SCOTLAND, EAST.
2. ENGLAND, N.E.
3. ENGLAND, EAST.
4. MIDLAND COUNTIES.
5. ENGLAND, SOUTH.
6. SCOTLAND, WEST (with Isle of Man).
7. ENGLAND, N.W. (with North Wales).
8. ENGLAND, S.W. (with South Wales).
9. IRELAND, NORTH.
10. IRELAND, SOUTH.

The remarks and forecasts are posted at the doors of the Meteorological Office, 63, Victoria Street, S.W., on week days,* for the inspection of the public. Copies, or extracts from them, are communicated under the conditions stated below, but no information which is not substantially included in them can be supplied.

A series of boards is exhibited on the front of the Office showing in large type the state of the wind, weather, and sea disturbance at six stations, situated on our S.E., S., and W. coasts. The stations selected are Yarmouth, Dungeness, The Needles, Scilly, Holyhead, and Valencia Island, and the observations posted up are those for 8 a.m. and 2 p.m. daily, except on Sundays,* the boards being changed at about 9h. 45m. a.m. and 3h. 30m. p.m. The information can be easily read from the street.

FORECASTS FOR SUBSCRIBERS.—Any person can be supplied with a copy of the 11 a.m. Forecasts, once on each week day,* on payment of a subscription of ten shillings per annum, or 2s. 6d. per official quarter, or any part thereof, *in addition to the cost of transmission*; the charges will therefore be, by *letter post*, 9s., by *book post*, 5s. 9d., per quarter.

The forecasts for any of the districts and for any of the hours mentioned above can be forwarded by telegraph daily, on payment of 3d. per day for any definite period, in addition to the cost of telegraphy.

FORECASTS FOR CLUBS.—These are drawn up at 11 a.m., for all the districts, and are supplied to Clubs, for a subscription of ten shillings per annum. They are delivered by hand to Clubs situated in or near Pall Mall. Special arrangements can be made for delivery at a greater distance by hand or by post.

FORECASTS FOR HAY AND CORN HARVESTS, OR FOR PUBLIC USE.—Special facilities are offered for the transmission of Forecasts for these purposes, a nominal fee of 2s. 6d. being charged for an official quarter or any part thereof, in addition to the cost of the telegrams.

EXHIBITION OF TELEGRAPHIC FORECASTS AT LOCAL POST OFFICES.—The Post Office has sanctioned the exhibition of Forecasts at Local Post Offices, provided space is available, if the persons to whom they are addressed desire them to be so exhibited instead of being delivered.

Unless otherwise arranged, all forecasts transmitted by post are sent by book post, not as letters.

* Good Friday and Christmas Day are reckoned as Sundays.

INQUIRIES AS TO THE WEATHER.

INQUIRIES PERSONALLY OR BY MESSENGER.—Any person applying at the Meteorological Office between 11 a.m. and 8 p.m. on week days, and between 7 p.m. and 8 p.m. on Sundays,* can be supplied, in writing, with the latest information in the possession of the Office and with the latest forecast issued for any specified district, on payment of one shilling for each inquiry.

INQUIRIES BY LETTER.—Application may be made by letter, enclosing thirteen pence in stamps if the reply is to be *by post*, and one shilling in stamps, in addition to the cost of the reply (consisting of ten words, exclusive of the address) if the reply is to be *by telegraph*.

INQUIRIES BY TELEGRAPH.—Any person may obtain *by telegraph* from the Meteorological Office the latest information as to the weather in any district of the United Kingdom by payment of a fee of 1s. in addition to the cost of a telegram and reply to any post office. The telegram containing the inquiry must be addressed as follows:

To

WEATHER,

LONDON.

The payment for the reply should be for at least ten words in addition to the address.

Application may also be made for similar information to be sent either *by telegraph* or *post* on some future specified day.

CHECKING OF FORECASTS AND STORM WARNINGS.

The forecasts and storm warnings issued by the Office are carefully checked by being compared with the conditions actually experienced during the time to which they refer. The method adopted was fully explained in the Annual Report for 1891, and the results for 1893 will be found on p. 14.

In order to render the information in the possession of the Office as to the weather experienced on our coasts still more complete, the Council have, as in preceding years, obtained from the various Lighthouse Boards the original log-books from some of the most exposed lightships and lighthouses. They again express their cordial thanks for the co-operation so readily granted to them by these Boards.

* Good Friday and Christmas Day are reckoned as Sundays.

(continued from p. 56.)

		Per-centages.			
		Wind.	Weather.	Average.	a + b.
The entire year	a	52	66	59	84
	b	27	23	25	
	c	14	7	11	
	d	7	4	5	

APPENDIX VIII.

TELEGRAPHIC WEATHER INTELLIGENCE.

The Meteorological Office issues notices of atmospherical disturbances on or near the coasts of the British Islands (free of charge) to ports and fishing stations recommended by responsible local authorities.

The fact that one of these notices has been received at any station, is made known by hoisting a black canvas cone, 3 feet high and 3 feet wide at base, which has the appearance of a triangle when hoisted. The telegram directing the cone to be hoisted should be exhibited near the signal staff.

At dusk, whenever a signal ought to be flying if it were daylight, a night signal consisting of three lanterns hung on a triangular frame, may be hoisted in place of the cone.

The Meteorological Office supplies the canvas cone, but does not undertake to supply the lanterns. In all cases the local authorities must undertake the charges incidental to the hoisting of the signal, such as flagstaff and gear, oil, &c., and also as to the keeping of the apparatus in repair, painting, &c.

The following is a list of the stations at which the signals are hoisted. They are situated, 101 in England and Wales, 47 in Scotland, 21 in Ireland, 3 in the Isle of Man, and 3 in the Channel Islands:—

NORTH.	WEST.	SOUTH.	EAST.
SCOTLAND, N.E.	IRELAND, S.W.	ENGLAND, S.W.	ENGLAND, E.
Lerwick.	New Ross.	Scilly.	Harwich.
Scalloway.	Dunmore East.	St. Sennen.	Ipswich.
Dunrossness.	Dungarvan.	Newlyn, West.	Southwold.
Stromness.	Youghal.	Penzance.	Yarmouth.
Kirkwall.	Queenstown.	The Lizard.	Cromer.
Holborn Head.	Passage.	Falmouth.	Sheringham.
Dunnet Head.	Cork.	Pendennis.	Lynn.
Wick.	Kinsale.	Mevagissey.	Sutton Bridge.
Avoch.	Do. (Old Head).	Devonport.	
Inverness.	Brow Head.	Plymouth.	
Nairn.	Tralee.	Prawle Point.	
Burghead.	Limerick.	Teignmouth.	
Lossiemouth.	Galway.	Exmouth.	
Buckie.			
Port Knockie.			
Cullen.	IRELAND, N.W.		
Portsoy.	Rathmullan.	ENGLAND, S.	ENGLAND, N.E.
Banff.	Malin Head.	Guernsey.	Boston.
Fraserburgh.	Portrush.	St. Helier's	Cleethorpes.
Peterhead.	Port Ballintrae.	(Jersey).	Grimsby.
Aberdeen.		Gorey (Jersey).	Goole.
	IRISH SEA.	Weymouth.	Hull.
	Belfast.	Poole.	Bridlington Quay.
SCOTLAND, E.	Donaghadee.	Cowes.	Flamborough
Stonehaven.	Howth.	Ryde.	Head.
Montrose.	Kingstown.	St. Catherine's	Filey.
Broughty Ferry.	Ramsey (I. of M.).	Point.	Whitby.
Dundee.	Douglas "	Portsmouth.	Redcar.
St. Andrews.	Castletown "	Southampton.	Middlesborough.
Anstruther.	Silloth.	Littlehampton.	West Hartlepool.
Pittenweem.	Maryport.	Brighton.	Sunderland.
Burntisland.	Workington.	Newhaven.	South Shields.
Grangemouth.	Whitehaven.		Tynemouth.
Bo'ness.	Barrow.	ENGLAND, S.E.	Berwick - on -
Granton.	Morecambe.	Eastbourne.	Tweed.
Newhaven.	Fleetwood.	Hastings.	
Leith.	Blackpool.	Rye.	
Fisherrow.	Lytham.	Sandgate.	
Dunbar.	Preston.	Folkestone.	
Cockburnspath.	Southport.	Dover.	
St. Abb's Head.	Liverpool.	Ramsgate.	
Eyemouth.	Runcorn.	North Foreland.	
	Connah's Quay.	Margate.	
	Penmaenmawr.	Faversham.	
	Port Penrhyn.	Sheerness.	
	Port Dinorwic.	Chatham.	
	Carnarvon.		
	Holyhead.		
	ST. GEORGE'S		
	CHANNEL.		
	Aberystwith.		
	Milford.		

[continued.]

NORTH.	WEST.	SOUTH.	EAST.
<p>SCOTLAND, N. W. Stornoway. Port of Ness (Island of Lewis).</p> <p>SCOTLAND, W. Glasgow. Greenock. Rothesay. Campbelton. Girvan. Ballantrae.</p>	<p>BRISTOL CHANNEL.</p> <p>Pembrey. Llanelly. Swansea. Briton Ferry Porthcawl. Penarth. Cardiff. Do. Barry Dock. Newport. Weston-super- Mare. Burnham. Bridgewater. Ilfracombe. Lundy Island. Barnstaple. Appledore. Boscastle. Port Isaac. Newquay. Hayle. St. Ives.</p>		

APPENDIX IX.

FISHERY BAROMETERS.

LIST of PLACES supplied with FISHERY BAROMETERS.

Shetland Isles.—Balta Sound, Uya Sound, Burravoe, Nesting, Lerwick, Sandsair, Scalloway, Symbister.

Orkney Isles.—Westray, Papa, Burray, Kirkwall.

Scotland, east coast.—Duncaensbay, Freswick, Auchengill, Keiss, Ackergill, Staxigoe, Wick, Lybster, Dunbeath, Portmahomack, Cromarty, Avoch, Nairn, Burghhead, Portessie, Port Knockie, Portsoy, Whitehills, Gardenstown, Roseheart, Pitullie, Fraserburgh, Inverallochy, Pointlaw, Findon, Portlethen, Skateraw, Stonehaven, Arbroath, Broughty Ferry, St. Andrews, Crail, Cellardyke, St. Monance, Burnt-island, Newhaven.

England, east coast.—Berwick, North Shields, South Shields, Sunderland, West Hartlepool, Staithes, Scarborough, Filey, Flamborough, Bridlington Quay, Withernsea, Hull, Lynn (2), Wells, Gorleston, Lowestoft, Orford Haven, Woodbridge Haven, Harwich, Brightlingsea, West Mersea, Maldon, Margate, Deal, Kingsdown, Dover.

England, south coast.—Bognor, Ryde, Bembridge, Brixton, Atherfield, Ventnor, Gorey (Jersey), Haslar Hospital, Poole, Weymouth, Portland, Budleigh Salterton, Exmouth, Cawsand, Mevagissey, Gorranshaven, Devoran, Portseath, Penryn, Durgan, Porthallow, Falmouth, Coverack, Newlyn (2), Mousehole.

England, south-west coast.—St. Ives, Hayle, Port Isaac, Boscastle, Bideford, Burnham, Highbridge, Weston-super-Mare.

Wales.—Briton Ferry, Swansea, Angle, Milford, Aberystwith, Nevin, Carnarvon.

England, north-west coast.—Fleetwood, Morecambe, Maryport.

Isle of Man.—Douglas, Port St. Mary, Peel (2).

Scotland, south-west coast.—Port Patrick, Stranraer.

Ireland, east coast.—Cushendall, Belfast, Bangor, Groomsport, Donaghadee, Ardglass, Warren Point, Carlingford, Greenore, Dundalk, Malahide, Howth, Kingstown (2), Bray, Wicklow.

Ireland, south coast.—Dunmore East, Dungarvan, Crosshaven, Kinsale, Union Hall, Castletownsend, Baltimore, Schull (2), Crookhaven, Castletown (Berehaven), Ballycrovane.

Ireland, west coast.—Valencia, Dingle, Tralee, Tarbert, Kilcredane, Kilronan, Spiddal, Cleggan, Elly Bay, Ballyglass, Ballycastle (Co. Mayo), Donegal, Tribane, Killybegs, Teelin, Malinmore, Portnoo, Burton Port, Kincaslugh, Bunbeg.

Ireland, north coast.—Dunfanaghy, Rathmullen, Buncrana, Malin Head, Moville, Greencastle, Portstewart, Portrush, Ballycastle (Co. Antrim).

Scotland, west coast.—Tarbert (Loch Fyne), Campbeltown, Carradale, Portree, Armadale (Isle of Skye), Plockton, Gruinard, Ullapool, East Mey, Stroma.

Hebrides.—Stornoway, Portnaguairan, Obb, Valtos, Carloway, Ness.

SUMMARY of STATIONS supplied with INSTRUMENTS.

England and Wales	-	-	-	-	71
Scotland and Isle of Man	-	-	-	-	70
Ireland	-	-	-	-	57

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APPENDIX X.

METHODS FOLLOWED IN DEALING WITH METEOROLOGICAL RETURNS FROM LAND STATIONS IN THE BRITISH ISLES.

These stations are of five classes, as stated on page 16.

I.--*Observatories continuously observing all the Meteorological Elements.*

Hourly measurements of the curves obtained from the self-recording instruments at the observatories of the Office are made by the observers at each station, on printed forms supplied for the purpose, which, together with the curves, are forwarded to the Office weekly. They comprise measurements of the barograms, of the dry bulb and wet-bulb thermograms, of the anemograms, and of the rain-gauge curves.

Returns from observatories.

The measurements are subjected to a careful examination in order to ensure as far as possible their accuracy, and the revised regulations which have been adopted to secure this end will be found in the Report of the Office for 1890. They comprise rules for the guidance of observers, as well as of the assistants charged with the examination of the work at the Office. Attention need be called here to only two of these rules, viz., (a) the use of subsidiary sheets on which are entered the results of a second set of measurements of the curves made after, and quite independently of, the first set, and with a different form of scale, the two sets of measurements being afterwards compared together, and any differences found inquired into and set right; and (b) the re-measurements of the curve made by the assistants at the Meteorological Office, and which always amount to 40, and in doubtful cases to many more, per month, for each element. The attention of the observers is always drawn to such errors as may be detected, and to any failures in the continuity of the curves arising from failure of the light, stoppage of the clock, defective photography, faulty action of the wet-bulb thermometer, &c.; a report containing the results of the examination of each Observatory being also submitted to the Council periodically. The curves and tabulations are eventually bound and stored in the Office.

Examination of returns.

Results of examination and report to Council.

In connexion with this work should be mentioned the general watch which has to be kept over the working of the observatories and of the instruments, not only to secure uniformity amongst them and observance of rules, but also to guard against small changes which are liable to occur at certain times, especially with the thermographs, and which may affect the scale-values of the instrument or the datum lines used for the tabulation of the curves. About twice a year this work calls for special examination, entailing some considerable time and occasionally the engraving of new scales for measuring the curves.

General supervision of observatory work.

[METHOD OF DEALING WITH THE NUMERICAL RESULTS FROM THE SELF-RECORDING OBSERVATORIES.

In dealing with the tabulations the first step is to go over the sheets and fill up by interpolation, wherever possible, any gaps or breaks in the continuity of the record.

Interpolations.

The records having been made as complete as possible, are then used for the calculation of daily and hourly mean values, for periods of five days, calendar months, and for the year; which, together with other data obtained from the same source, are published under the title of "Hourly Means of the Readings obtained from the Self-recording Instruments at the Four Observatories under the Meteorological

“ Council.” The volume for 1891 is almost ready for issue, and some progress has been made with the calculations for the year 1892. See p. 17.

II.—*Anemographic Stations at which the Wind is recorded continuously.*

The anemograms received from Alnwick Castle, Deerness, Dublin, Fleetwood, Holyhead, North Shields, Scilly, and Yarmouth are regularly examined and tabulated in the Office, and the sheets bound up in volumes. Besides special inquiries on legal and other points that from time to time arise, and in which these documents are of high importance, the tabulations are always employed in the preparation of the various Reports issued by the Office. They are also regularly used in the checking of the Storm Warnings.

III.—*Land Stations of the Second Order.*

Origin and progress of system.

Ever since the year 1866 returns of more or less completeness have been received from land stations in the United Kingdom. In that year there was only one station, but by 1871 the number had increased to 15, and five years later to 49, including 14 stations belonging to the Royal Meteorological Society, copies of the returns from which were sent to the Office under a special arrangement with the Society.

At the end of March 1894 the total number of stations was 113, including 15 belonging to the Royal Meteorological Society and 19 belonging to the Scottish Meteorological Society.

It must, however, be observed that while this number is exclusive of the self-recording observatories and of the anemographic stations, it includes several others from which only very scanty information is received.

The stations are distributed as follows: 50 in England, 6 in Wales, 26 in Scotland, and 31 in Ireland.

The methods followed with regard to the examination and publishing of these returns have been fully detailed in previous reports, and need not now be repeated. The changes introduced into the volume for 1886 have been continued in those for later years. These refer to the barometer readings, which are now given at station-level instead of being reduced to the mean sea-level; and to the humidity, where the depression of wet-bulb is shown, the international forms A and B being modified accordingly.

The volume for 1890 contains returns from 68 stations.

Arrangements have been made under which it is hoped that the arrears of this publication will be rapidly reduced.

Reports from the Irish stations are regularly supplied to the Registrar-General for Ireland for his Weekly and Quarterly Returns.

New stations.

When an application for the adoption of a new station is received, a schedule is forwarded to the observer containing a series of questions as to the outfit of the station, the exposure of the instruments, and the influence likely to be exerted on their indications by surrounding objects, such as houses and trees. Only mercurial barometers are accepted, and only such as have been duly verified. All thermometers must have been tested at Kew. A plan of the station, showing the positions of the instruments with regard to neighbouring objects, is also required.

On the return of this schedule the answers are considered, and, where necessary, alterations are advised.

If, however, the existing arrangements are satisfactory, tables for reducing the barometer readings to 32° Fahrenheit at mean sea-level are prepared and duplicates sent to the observer, together with a set of Hygrometrical Tables, and a copy of "Instructions in the Use of Meteorological Instruments."

The first returns are compared and examined with special care, and a report of the result of the examination is forwarded to the observer, with instructions how best to improve and complete the returns.

There are still many parts of the British Islands very poorly represented by the existing stations, and any information for these districts would be valuable.

The daily records of sunshine which are now received from 51 Stations in the British Islands are examined generally, to guard against accidental changes in the adjustment of the instruments. Notes explaining any omission or accidental defect are added to the cards if required, and after their receipt has been acknowledged, they are duly stamped and dated and then stored in the Office. Sunshine records.

A tabulation of these curves is published as part of the Weekly Weather Report, mentioned in Appendix VII., and for those stations which are also Stations of the Second Order the monthly totals of bright sunshine in hours, together with the per-centages of its possible duration, are published as Part IV. of "Returns from Stations of the Second Order." A table showing the daily amount of sunshine at Bunhill Row, one of the London stations, is also prepared quarterly for the Royal Meteorological Society. Weekly totals.

INSPECTION.

The Stations of the Second Order are regularly inspected, the attention of the inspector being directed by the Office to any special point which may require investigation.

IV.—*Telegraphic Reporting Stations.*

Full particulars relating to these stations, the information received from them, and the method of dealing with that information, will be found in Appendix VII. to the Report for the year 1888-9. A paragraph in that Appendix (p. 60) explains the use that is made of the monthly schedules sent in by the observers.

V.—*Extra Stations.*

The returns from Stations of the Fifth Class are not regularly published by the Office, but they are available for any special investigation that may be taken up. The rainfall values at these stations are, however, copied and supplied to Mr. Symons, F.R.S., for publication in "British Rainfall."

LIST OF STATIONS.

In Appendix XI., page 64, is given a complete list of the stations supplying information to the Office.

APPENDIX XI.

LIST of STATIONS in the BRITISH ISLANDS from which INFORMATION has been received at the METEOROLOGICAL OFFICE during the year ending March 31st 1894.

The Stations marked “**S**” are in connexion with the Scottish Meteorological Society, and those marked “**M**” are in connexion with the Royal Meteorological Society. The returns from these Stations are received by the Office under an arrangement which will be found detailed in previous reports.

In certain cases where the actual station at which the Observations have been taken is not generally known, and could not be readily identified, the name of some village or town near has been inserted, with the name of the station following within brackets.

The nature of the information received from each station is indicated by letters as follows :—

A. Observatories.—Continuous record of pressure, temperature, wind, sunshine and rain, with eye observations of the amount, form, and motion of the clouds, and notes on the weather.

B. Anemograph Stations.—Continuous record of the direction and velocity (or force) of the wind.

C. Barograph Stations.—Continuous record of pressure.

D. Second Order Stations.—Regular observations at 9 a.m. and 9 p.m. each day, local time, of pressure, temperature (dry-bulb and wet-bulb), wind, cloud, and weather, with the daily maxima and minima of temperature, the daily rainfall, and general remarks on the weather.

E. Second Order Stations.—Monthly means and summaries on Form B. of observations taken at 9 a.m. and 9 p.m., each day as above.

F. Climatological Stations.—The maximum and minimum temperature and the rainfall for each day, with remarks on the weather. This information is sent to the Meteorological Office each week for use in the “Weekly Weather Report.”

G. Third Order Stations.—Observations of the same kind as at Second Order Stations, but either :—

- (a) less full.
- (b) taken only once daily.
- (c) taken at irregular hours.

R. Rainfall Stations.—Daily observations of the amount of rainfall, with remarks on the weather.

S. Sunshine Stations.—Continuous record of bright sunshine.

T. Telegraphic Stations.—Regular observations at 8 a.m. and 6 p.m. G.M.T. (and from some stations at 2 p.m. in addition), of pressure, temperature, wind and weather, with the daily maxima and minima of temperature, the daily rainfall, and, where possible, the sea-disturbance at 8 a.m. each day and the daily amount of bright sunshine. This information is sent to the Meteorological Office each day by telegraph, for use in the “Daily Weather Report” and, as required, for use in the “Weekly Weather Report.”

W. Sea-temperature.—Daily observations of the temperature of the sea water.

Station.	Lat.	Long.	Height in feet above M.S.L.	Observer.	Nature of Informa- tion supplied.
Aberdeen (Observatory) -	57° 10' N.	2° 6' W.	46	Prof. C. Niven	A. T.
" (Cove Bay) -	57° 9' "	2° 5' "	—	Coastguard -	W.
Alnwick Castle -	55° 25' "	1° 43' "	210	Humphry Wilyams, for the Duke of Northumberland.	B. F.
Ardrossan, Ayrshire -	55° 38' "	4° 50' "	15	J. W. Mayes -	T.
Arlington Court, Barn- staple.	51° 8' "	3° 58' "	613	W. Stewart, for Lady Chichester.	F.
Armagh Observatory -	54° 21' "	6° 39' "	196	J. L. E. Dreyer -	B.D.F.S.
Arran, North, Galway -	53° 6' "	9° 40' "	—	Coastguard -	G. W.
Aysgarth Vicarage, Bedale, Yorks.	54° 18' "	1° 58' "	646	Rev. F. W. Stow -	D.
Bahama Bank Lightship	54° 20' "	4° 13' "	—	Light-keepers -	W.
Ballantrae, Ayrshire -	55° 6' "	5° 0' "	—	Coastguard -	W.
Ballycastle, Co. Antrim -	55° 16' "	6° 14' "	—	" -	G.
Ballydonagan, Berehaven -	51° 38' "	10° 3' "	—	" -	W.
Ballyglass, Co. Mayo -	54° 17' "	9° 52' "	—	" -	W.
Baltimore, Co. Cork -	51° 28' "	9° 22' "	—	" -	G.
Bantry -	51° 41' "	9° 27' "	—	R. Brennan -	E.
Bawtry (Hesley Hall), Notts.	53° 26' "	1° 2' "	65	B. I. Whittaker -	F.
Belmullet, Co. Mayo -	54° 13' "	9° 59' "	40	Miss M. J. Tolan -	T.
Ben Nevis -	56° 48' "	5° 8' "	4,406	R. T. Omond, for Directors Ben Ne- vis Observatory.	A.
Bennington, Herts. -	51° 54' "	0° 5' "	407	Rev. J. D. Parker -	E.
Berkhamstead -	51° 46' "	0° 34' "	400	E. Mawley -	E.
Blackpool -	53° 48' "	3° 3' "	31	A. J. Anderson -	F. S.
Blacksod Point, Co. Mayo -	54° 6' "	10° 4' "	—	Coastguard -	W.
Bolton (Chadwick Museum)	53° 35' "	2° 27' "	389	W. W. Midgley -	G.
Bournemouth -	50° 43' "	1° 53' "	—	Messrs. Prinavesi for Town Council.	S.
Braemar -	57° 0' "	3° 24' "	1,111	J. Aitken -	D. F. S.
Bray, Co. Wicklow -	53° 12' "	6° 6' "	—	Coastguard -	G.
Brighton -	50° 49' "	0° 8' "	—	A. Newsholme -	S.
Bristol -	51° 28' "	2° 35' "	92	J. Harvey Jones -	F.
Broadford (Hurdlestown), Co. Clare.	52° 48' "	8° 38' "	157	Capt. W. O. Bentley, R.A.	R.
Brookeborough (Colebrooke Park), Co. Fermanagh.	54° 21' "	7° 22' "	271	W. Ferguson -	D. F.
Burnmouth, Ayton, Berwick	55° 51' "	2° 4' "	—	Coastguard -	W.
Burntisland -	56° 4' "	3° 14' "	—	" -	W.
Buxton -	53° 14' "	1° 54' "	987	E. J. Sykes -	E.
Caernarvon Bay Lightship	53° 6' "	4° 45' "	—	Light-keepers -	W.
Callton Mor -	56° 8' "	5° 30' "	132	J. Russell (for John Malcolm of Pol- talloch).	E.
Cambridge -	52° 13' "	0° 6' E.	88	P. Morris -	T. S.
Cardigan Bay Lightship -	52° 25' "	5° 1' W.	—	Light-keepers -	W.
Cargen -	55° 2' "	3° 37' "	72	P. Dudgeon and A. Peacock.	E.
Carmarthen -	51° 52' "	4° 18' "	188	G. J. Hearder -	D.
Castletownshend, Co. Cork	51° 32' "	9° 19' "	—	Coastguard -	G.
Chatham -	51° 23' "	0° 32' E.	136	The Instructor in Surveying.	G.
Cheadle -	52° 58' "	1° 57' W.	646	J. C. Philips -	E. F.
Cheltenham -	51° 54' "	2° 3' "	184	R. Tyrer -	E.
Chilworth, Surrey -	51° 13' "	0° 32' "	307	C. S. Bell -	D.
Churchstoke -	52° 31' "	3° 5' "	538	P. Wright -	D. F. S.
Oirencester -	51° 43' "	1° 57' "	446	Prof. Ohm -	F. S.
Cleggan, Co. Galway -	53° 33' "	10° 8' "	—	Coastguard -	W.
Clonakilty, Co. Cork -	51° 37' "	8° 50' "	—	E. Moore -	R.
Coningbeg Lightship -	52° 2' "	6° 40' "	—	Light-keepers -	W.
Cooper's Hill, Egham -	51° 26' "	0° 34' "	279	Prof. H. McLeod -	G.
Crieff (Ochertyre) -	56° 23' "	3° 53' "	329	G. Croucher for Sir P. K. Murray, Bt.	E. F.
Cromarty -	57° 41' "	4° 0' "	—	Coastguard -	W.
Crookhaven -	51° 28' "	9° 43' "	—	" -	G.
Crosshaven -	51° 48' "	8° 18' "	—	" -	G.
Cuckfield, Sussex -	51° 1' "	0° 9' "	389	John Howe -	E.
Cullompton -	50° 51' "	3° 23' "	202	T. Turner -	F. S.
Daunt's Rock Lightship -	51° 43' "	8° 16' "	—	Light-keepers -	W.
Deerness, Orkney Islands -	58° 56' "	2° 45' "	169	M. Spence -	B. D. S.
Donaghadee -	54° 38' "	5° 32' "	26	T. MacGowan -	T.
Doneraile, Co. Cork -	52° 13' "	8° 34' "	—	Captain Evans -	R.
Douglas (Cronkbourne) Isle of Man.	54° 10' "	4° 29' "	137	A. W. Moore -	D. F. S.
Dublin (Botanic Gardens, Glasnevin).	53° 23' "	6° 16' "	67	F. W. Moore -	D.
Dublin (City) -	53° 20' "	6° 15' "	47	J. W. Moore -	D. F.

Station.	Lat.	Long.	Height in feet above M.S.L.	Observer.	Nature of Infor- mation supplied.
Dublin (Mountjoy Obser- vatory, Phoenix Park).	53° 22' N.	6° 21' W.	155	Lt.-Col. Kirkwood, R.E.	B. D. S.
26 Dundee	56 28 "	2 56 "	160	J. Carnochan	D.
Dunfunagh (Sheephaven)	55 11 "	7 58 "	—	Coastguard	W.
Dungeness	50 55 "	0 59 E.	26	W. Batton	T.
28 Dunrobin Castle	57 59 "	3 56 W.	12	D. Melville, for the Duke of Sutherland.	D.
Durham	54 46 "	1 35 "	336	H. J. Carpenter	D. F. S.
Eastbourne	50 46 "	0 17 E.	39	R. Sheward	D. S.
East Goodwin Lightship	51 13 "	1 36 "	—	Light keepers	W.
Edgeworthstown (Curry- grane).	53 45 "	7 39 W.	267	J. M. Wilson	D. F.
Edinburgh	55 57 "	3 12 "	253	R. C. Mossman	D. S.
English and Welsh Grounds Lightship.	51 27 "	3 0 "	—	Light-keepers	W.
Ennis, Co. Clare	52 51 "	8 59 "	18	J. Hill and P. L. K. Dobbin.	B.
" (Roslevan)	52 51 "	8 59 "	40	Mrs. J. W. Scott	B.
Epsom (Royal Medical College).	51 20 "	0 14 "	294	C. I. Gardiner	D.
Falmouth	50 9 "	5 4 "	167	E. Kitto	A. F.
Fleetwood	53 56 "	3 1 "	—	M. S. Gaultier	B.
26-28 Fort Augustus	57 8 "	4 40 "	68	Rev. M. Wall	E. F. S.
Fort William	56 48 "	5 6 "	32	R. T. Omond for Directors, Ben Nevis Observatory.	A. F.
Foynes, Co. Limerick	52 37 "	9 7 "	108	Lord Monteagle	F.
Galway	53 17 "	9 3 "	—	Lieut. C. G. F. Law	G.
Geldeston, Beccles	52 28 "	1 31 E.	37	E. T. Dowson	D. F. S.
Glasgow	55 53 "	4 18 W.	130	Prof. L. Becker	A. D. F.
Glencarron	57 30 "	5 14 "	499	D. D. Munro	E. F.
26-28 Glenlee	55 5 "	4 12 "	203	W. Melville	E. F.
Gordon Castle	57 37 "	3 5 "	101	J. Webster (for the Duke of Richmond and Gordon, K.G.).	E.
Gorleston, Suffolk	52 35 "	1 43 E.	—	R. J. C. Day	G.
Guernsey (St. Peter's)	49 32 "	2 32 W.	—	F. E. Carey	S.
Harpden, Herts.	51 49 "	0 20 "	419	T. Wilson	G.
Haslar Hospital, Hants	50 47 "	1 7 "	—	G. Coppen	G.
Hawes Junction	54 19 "	2 18 "	1135	W. H. Bunce	T.
26 Hereford	52 5 "	2 45 "	274	T. A. Chapman	F.
Heysham Hall, Lancashire	54 3 "	2 54 "	95	S. Lomas for Miss L. Grafton.	D.
26 Hillington	52 48 "	0 33 E.	88	Rev. H. E. B. Pfolkes	D. F. S.
Holyhead (Harbour Office)	53 18 "	4 39 W.	—	F. M. Cottou	B. W.
" (Sailors' Home)	53 18 "	4 39 "	48	T. Chope	T.
Hurst Castle	50 42 "	1 33 "	12	E. T. Tremble	T.
Jersey (St. Aubins)	49 12 "	2 11 "	25	J. Fisher	T.
" (St. Heliers)	49 11 "	2 6 "	—	Signal Officer Fort Regent.	S.
Kearsney Abbey (Dover)	51 8 "	1 17 E.	100?	C. W. Curtis	R.
Ketton, Stamford	52 39 "	0 33 W.	—	F. Coventry	F. G.
" (The Holmes)	52 39 "	0 33 "	—	"	R.
Kew Observatory	51 28 "	0 19 "	18	C. Chree	A.
Kilcredane, Co. Clare	52 35 "	9 47 "	—	Coastguard	W.
Kilkenny	52 39 "	7 14 "	212	H. Carlton, for the Marquis of Or- monde.	C. F.
26 Killarney	52 4 "	9 30 "	86	Ven. Archdeacon Wynne.	E. F.
Killiney (Cloncvin), Co. Dublin.	53 16 "	0 7 "	—	R. O'Brien Furlong	R.
Kirkwall	58 59 "	2 57 "	—	Coastguard	W.
Kish Bank Lightship	53 19 "	5 55 "	—	Light keepers	W.
Ladylaw (Hawick)	55 28 "	2 47 "	439	W. R. Wilson	C. D.
28 Lairg	58 1 "	4 22 "	335	J. Young	E. F.
Lambash, Isle of Arran, Scotland.	55 32 "	5 8 "	—	Coastguard	W.
Laudale, Argyleshire	56 41 "	5 41 "	14	A. Fletcher for T. H. G. Newton.	D. F.
Laugharne, Carmarthen- shire.	51 47 "	4 28 "	15	R. W. Pinney	R.
28 Ledmathie	56 45 "	3 7 "	719	W. Morrison (for Stornmouth Dar- ling).	E.
Leith	55 58 "	3 10 "	20	T. Richardson	T.
Leman and Ower Light- ship.	53 8 "	2 2 E.	—	Light-keepers	W.
Lerwick	60 9 "	1 8 W.	—	Coastguard	W.
28 Lissan, Co. Tyrone	54 41 "	6 45 "	305	Sir Nathaniel Staples, Bart.	E.

Station.	Lat.	Long.	Height in feet above M.S.L.	Observer.	Nature of Information supplied.
Liverpool (Bidston Observatory).	53 24 N.	3 4 W.	188	W. E. Plummer	D. T.
Liverpool (North-West Lightship).	53 31 "	3 31 "	—	Light-keepers	W.
Llandinam, Montgomerysh.	52 30 "	3 26 "	496	Edward Davies	R.
Llandoverly	51 59 "	3 48 "	217	J. Watkins	F. S.
Llandudno	53 21 "	3 50 "	88	J. Nicol	E. F. S.
London (Brixton)	51 29 "	0 7 "	77	F. Gaster	T.
" (City)	51 32 "	0 5 "	80	Messrs. de la Rue	S.
" (Pall Mall)	51 32 "	0 8 "	—	Athenæum Club	C. S.
" (Westminster)	51 31 "	0 8 "	76	The Staff of the Met. Office.	B. S.
Londonderry	55 0 "	7 19 "	67	J. Conroy	D. F.
Loughborough	52 47 "	1 12 "	169	W. Berridge	T.
Lowestoft	52 29 "	1 44 E.	—	J. Andrew	G.
Malin Head, Co. Donegal	55 23 "	7 25 W.	230	O. O'Doherty	T.
Manchester	53 29 "	2 13 "	190	J. Tatham	G. S.
Marchmont	55 44 "	2 25 "	498	P. Loney for Sir H. P. Campbell, Bt.	E. F. S.
Margate	51 24 "	1 24 E.	83	J. Stokes	D. S.
Market Rasen	53 23 "	0 20 W.	83	W. B. Jevons	R.
Markree Castle, Co. Sligo	54 11 "	8 27 "	122	A. Marth for Col. Cooper.	D. F. S.
Minard, Co. Kerry	52 7 "	10 8 "	—	Coastguard	W.
Mold (Penbedw)	53 12 "	3 16 "	650	H. W. Buddiwm	C.
Montrose (Uzon)	56 40 "	2 28 "	—	Coastguard	W.
Morpeth	55 11 "	1 40 "	—	Captain H. Terry	G.
Mount Nugent (Arley Cottage).	53 50 "	7 18 "	262	Major Somerset H. Maxwell.	D. S.
Nairn	57 36 "	3 52 "	84	Miss Penny	T.
Newarp Lightship	52 45 "	1 53 E.	—	Light-keepers	W.
Newport (Ynis-y-bro), Mon.	51 38 "	3 3 W.	115	F. W. Houghton	R.
Newquay, Cornwall	50 25 "	5 5 "	—	J. Pearce	S.
"	50 25 "	5 5 "	—	Coastguard	W.
Northallerton	54 20 "	1 26 "	139	W. Stead	E.
North Foreland	51 23 "	1 27 E.	115	A. Cox	T.
Omagh (Edenfel)	54 36 "	7 19 W.	300	Col. Buchanan	F.
Oswaldkirk, Yorks.	54 12 "	1 3 "	—	R. Thompson	S.
Outer Dowsing Lightship	53 27 "	1 5 E.	—	Light-keepers	W.
Owers Lightship	50 39 "	0 41 W.	—	—	W.
Oxford	51 46 "	1 16 "	208	W. Wickham for E. J. Stone.	T. S.
Parkstone, Dorset	50 43 "	1 56 "	197	R. H. Barnes	D.
Parsonstown (Birr Castle)	53 6 "	7 55 "	175	O. Boeddicker, for Earl of Rosse.	D. S. T.
Pembroke (St. Ann's Head).	51 41 "	5 11 "	150	H. T. Knott	T. S. W.
Pennant Bay, Aberdour	57 40 "	2 16 "	—	Coastguard	W.
Pinmore (Girvan)	55 12 "	4 49 "	137	P. Donald for Capt. Hamilton.	E.
Plymouth	50 22 "	4 8 "	116	H. V. Prigg	D. F. S.
Portrush	55 13 "	6 40 "	—	Coastguard	W.
Prawle Point	50 12 "	3 43 "	332	M. Holmes	T.
Prestwich	53 32 "	2 17 "	294	T. R. H. Clunn	D. F. S.
Roche's Point, Cork	51 47 "	8 19 "	42	W. Kennedy	T.
Rosewell	55 51 "	3 7 "	690	R. W. D. Cameron	E.
Rothamsted	51 48 "	0 22 "	368	Sir J. B. Lawes and Sir J. H. Gilbert.	F. S.
Rothesay	55 50 "	5 4 "	115	J. Kay	E.
Rounton, Northallerton	54 24 "	1 18 "	249	Sir L. L. Bell, Bart.	E.
Rousdon, Devon	50 42 "	3 0 "	523	C. E. Peek	E.
Roxborough, Co. Limerick	52 39 "	8 36 "	—	A. W. Shaw	R.
Royal Sovereign Lightship.	50 43 "	0 27 E.	—	Light-keepers	W.
Rugby	52 22 "	1 15 W.	379	H. P. Highton	G.
St. David's	51 53 "	5 16 "	215	W. P. Propert	D.
St. Helen's, Lancashire	53 28 "	2 45 "	151	J. Robertson	G.
St. Leonards	50 51 "	0 33 E.	129	H. Colborne	D. F. S.
Salcombe, Kingsbridge	50 14 "	3 46 W.	—	Coastguard	W.
Sandgate, Kent	51 4 "	1 9 E.	—	H. E. Stilgoe	R.
Scarborough	54 17 "	0 23 W.	159	Dr. H. G. H. Monk	D. F.
"	54 17 "	0 23 "	—	Coastguard	W.
Schull	51 32 "	9 32 "	—	—	G.
Scilly Islands (St. Mary's)	49 56 "	6 18 "	80	A. Hicks	B.S.T.W.
Seafield (Co. Clare)	52 48 "	9 30 "	—	Coastguard	W.
Seaham	54 50 "	1 19 "	148	G. H. Aird	D.
Sedbergh	54 19 "	2 32 "	400	E. C. Malan	R.
Seven Stones Lightship	50 4 "	6 5 "	—	Light-keepers	W.
Shambles Lightship	50 31 "	2 20 "	—	Light-keepers	W.
Sheffield	53 23 "	1 29 "	429	E. Howarth	D.

Station.	Lat.	Long.	Height in feet above M.S.L.	Observer.	Nature of Informa- tion supplied.
†† Sherborne (Stowell), Dorset.	50 57 N.	2 31 W.	376	Rev. H. J. Poole	F.
Shields, North	55 0 "	1 27 "	97	J. W. Irvine	T.
Shields, North, Old Light- house.	55 0 "	1 27 "	—	Captain Harrison	B.
Shipwash Lightship	52 2 "	1 38 E.	—	Light-keepers	W.
Solway Lightship	54 48 "	3 32 W.	—	Light-keepers	W.
Southampton	50 55 "	1 24 "	78	J. T. Cook for Dir. Gen. of Ordnance Survey.	D.F.S.
South Rock Lightship	54 25 "	5 22 "	—	Light keepers	W.
Spidall, Co. Galway	53 15 "	9 17 "	—	Coastguard	G.
Spurn Head	53 34 "	0 7 "	19	G. Freeman	T.
Spurn Lightship	53 34 "	0 13 E.	—	Light-keepers	W.
Stokesay, Craven Arms	52 26 "	2 52 W.	370	Miss M. A. Digges La Touche.	D.
Stonyhurst College	53 51 "	2 28 "	375	Rev. W. Sidgreaves	A.D.F.
Stornoway	58 11 "	6 22 "	28	J. Forbes	T.S.
"	58 11 "	6 22 "	—	Coastguard	W.
Stranraer	54 54 "	5 2 "	—	Patrick Doran	G.
†† Strathfield Turgiss, Hants	51 20 "	1 0 "	195	Rev. C. H. Griffith	F.
Sumburgh Head (Dunross- ness).	59 51 "	1 17 "	126	Rev. W. Brand	T.
Sunderland	54 54 "	1 23 "	—	Coastguard	W.
Sutton Coldfield	52 34 "	1 49 "	392	C. F. Marston	S.
Symbister, Shetlands	60 14 "	1 25 "	—	J. S. Nicolson	G.
Tarbert, Harris	57 53 "	6 47 "	—	D. Bethune	G.
Tealby, Lincolnshire	53 24 "	0 16 "	251	Rev. S. Lewin	D.
Teelin, Donegal	54 38 "	8 39 "	—	Coastguard	W.
Tenby	51 41 "	4 42 "	79	J. E. Gower	S.
Thurcaston, Leicester	52 42 "	1 10 "	253	Rev. T. A. Preston	S.
Torquay	50 28 "	3 31 "	—	A. Chandler	S.
Totland Bay, Isle of Wight	50 41 "	1 33 "	84	J. Dover	G.
Union Hall, Co. Cork	51 33 "	9 8 "	—	Coastguard	G.
Uppingham	52 35 "	0 44 "	484	Rev. G. H. Mullins	D.
Valencia Observatory, Cahirciveen.	51 56 "	10 15 "	30	J. E. Cullum	A. T.
" Island (Glanleam) (Knightstown)	51 55 "	10 20 "	—	Miss E. FitzGerald	B.
"	51 55 "	10 20 "	—	Coastguard	G.
†† Wakefield	53 41 "	1 30 "	96	H. Clarke	E.
Waterford (Brook Lodge)	52 15 "	7 6 "	104	C. P. Bolton	C. F.
Waterford	52 15 "	7 8 "	—	Harbour Authorities	C.
Westbourne, Sussex	50 52 "	0 55 "	—	Rev. L. B. Birkett	S.
Westray, Orkney	59 17 "	3 0 "	—	J. Hewison	G.
Wick	58 27 "	3 6 "	80	J. Sinclair	T.
Wick	58 27 "	3 6 "	—	Coastguard	W.
§ Wolfelee	55 23 "	2 39 "	587	W. Cockburn	D.
Worksop	53 18 "	1 8 "	—	H. Mellish	S.
Yarmouth	52 37 "	1 43 E.	10	G. T. Watson	B. T.
York (Boothgate)	53 57 "	1 5 W.	—	J. E. Clark	S.
" (The Museum)	53 57 "	1 5 "	51	H. M. Platnauer	D. T.

In addition to the above, reports are received daily from the following
Continental Stations.

Station.	Authority.	Station.	Authority.	
Haparanda	} Meteorological Office, Sweden.	†The Helder	} Bureau Central Météorologique, Paris.	
Hermösand		Cape Gris Nez		
†Stockholm		†Brest (St. Mathieu)		
Wisby	Lorient (Ile de Groix)	} Observatoire, Lisbon.		
Bodö	*†Rochefort (Ile d' Aix)			
†Christiansund	} Meteorological Institute, Nor- way.	†Biarritz		} Cent. Met. Inst. of Germany.
*†Skudesnaes		†Paris		
Færder		Belfort		
†The Scaw		Lyons		
Fano		Nice		
Cuxhaven	} Meteorological Institute, Den- mark. Deutsche See- warte, Ham- burg.	Perpignan	} Observatoire, Lisbon.	
		Berlin		
		Wiesbaden		
		Munich		
		Corunna		
		†Lisbon		

Note.—The stations marked with an asterisk (*) report also at 2h. p.m., and those with dagger (†) at 6h. p.m.; Lisbon reports at 4h. p.m. instead of 6h. p.m.
The Helder does not send reports at 6 p.m. on Sundays.

APPENDIX XII.

ACCESSIONS TO THE LIBRARY DURING THE YEAR ENDING
31ST MARCH 1894.

Accra.—Meteorological observations recorded at the Accra Observatory. By J. F. Easmon. 1891, Jan.—1892, Dec. la. f°. Sheets.

Adelaide Observatory.—Meteorological observations made at the Adelaide Observatory, and other places in South Australia and the Northern Territory, during the years 1884-87, under the direction of C. Todd. 2 vols. sm. f°. Adelaide, 1893.

[—] Rainfall in South Australia and the Northern Territory during 1892; with weather characteristics of each month. By C. Todd. sm. f°. Adelaide, 1893.

Aitken, John.—On the colour of the Mediterranean and other waters. 8°. (*Proc. R. Soc. Edinb.*, xi., 1881-82, p. 472.)

|| — On some observations made without a dust counter on the hazing effect of atmospheric dust. 8°. (*Proc. R. Soc. Edinb.*, xx., 1893, p. 76.)

|| — Breath figures. 8°. (*Proc. R. Soc. Edinb.*, xx., 1893, p. 94.)

— On the number of dust particles in the atmosphere of certain places in Great Britain and on the Continent, with remarks on the relation between the amount of dust and meteorological phenomena. Part ii. la. 4°. Edinburgh, 1892. (*Trans. R. Soc. Edinb.*, xxxvii., Part i., p. 17.)

|| — On the particles in fogs and clouds. la. 4°. Edinburgh, 1893. (*Trans. R. Soc. Edinb.*, xxxvii., 1893, p. 413.)

Åkerblom, P.—De l'emploi des photogrammètres pour mesurer la hauteur des nuages. la. 8°. Upsala, 1894.

[**Algiers, Service Météorologique du Gouvernement Général de l'Algérie.**]—Bulletin météorologique de l'Algérie. 1893, Jan. 1—Dec. 31. sm. f°. Sheets.

[**Allahabad, Meteorological Office.**]—Brief sketch of the meteorology of the North-Western Provinces and Oudh and adjacent parts of Rajputana and the Panjab for the year 1892. sm. f°, s.l.e.a.

Amsterdam, Kon. Nederlandsch Aardrijkskundig Genootschap.—Nomina geographica Neerlandica. Geschiedkundig onderzoek der nederlandsche aardrijkskundige namen, . . . iii^{de} Deel. la. 8°. Leiden, 1893.

— Tijdschrift . . . onder redactie van C. M. Kan en J. Æ. C. A. Timmerman. Tweede serie. Deel x. 2 vols. 8°. Leiden, 1893.

Antigua, Government Laboratory.—Meteorological register for 1893. By F. Watts. (Suppl. to the Leeward Islands Gazette, 8th Feb. 1894.) la. 8°.

* || **Arctic dispatches (The)**, containing an account of the discovery of the North-West Passage by Capt. R. Maclure, commanding H.M.S. "Investigator." With a narrative of proceedings of H.M.S. "Resolute," Capt. Kellett, C.B., and the dispatches of Capt. Sir Edward Belcher, C.B., Capt. Inglefield, and Commr. Pullen. 8°. London, s.a. (*Naut. Mag.*, 2nd ser., xxii., 1853, pp. 577 and 617.)

* — **Sea.**—Letters written during the late voyage of discovery in the Western Arctic Sea. By an Officer of the Expedition. 8°. London, 1821. (*Voyages*, Vol. V., published by Sir R. Phillips & Co.)

Atmósfera, La.—Revista mensual . . . publicada por el Observatorio de Vilafranca del Panadés. Año i., 1892. 8°. Año ii., 1893. sm. f°. 2 vols. Vilafranca del Panadés, s.a.

L'Atmosphère.—Recueil de documents météorologiques publié par les soins de l'Observatoire de la Tour Saint-Jacques à Paris. la. 8°. Paris, 1893.

NOTE.—Books marked * have been acquired by purchase; the others are donations from institutions, societies, or authors. Those marked || are excerpt papers, extra copies of which have been separately printed.

In some cases additional publications have been received besides those specified, but only completed volumes or years are given here.

* **August, E. F.**—Psychrometertafeln nach den neuesten Untersuchungen berechnet von E. F. August. sm. 8°. Berlin, 1848.

* **Babinet, [J.]**—Études et lectures sur les sciences d'observation et leurs applications pratiques. Vo.s. i.-viii. 8 vols., sm. 8°. Paris, 1855-63.

* **Baily, W.**—On an integrating anemometer. Read Dec. 8, 1883. 8°. (*Phil. Mag.*, ser. 5, xvii., 1884, p. 482.)

(**Barber, C. A.**)—Rainfall returns, 1892—Dominica and Montserrat. la. 8°. (*Suppl. Leeward Islands Gazette*, July 6, 1893.)

Bárcena, M.—El clima de la Ciudad de México, 8°. México, 1893.

Batavia, Magnetical and Meteorological Observatory.—Observations Published under the direction of J. P. Van der Stok. Vol. xv., 1892. f°. Batavia, 1893.

[—**Observatorium.**]—Regenwaarnemingen in Nederlandsch—Indië. xiv. Jaarg. 1892. 8°. Batavia, 1893.

Title and Preface in the English language also.

Bathurst, Gambia.—Comparative rainfall in the Colony of the Gambia. 1887-1891. sm. f°. Sheet.

— Meteorological statistics. 1892. Slip.

Baxendell, J.—Abstracts of observations at the Southport meteorological observatory for the weeks ending Dec. 31, 1892 to Dec. 29, 1893. Slips.

|| **Bayard, F. C.**—The direction of the wind over the British Isles. 1876-80. la. 8°. (*Quart. Journ. R. Meteor. Soc.*, xix., 1893, p. 172.)

Belize.—Summary of meteorological observations at St. Joseph's Observatory during the months of Jan.—Dec. 1893. 4°. Sheets. (*The Angelus, Belize*, 1893-94.)

Ben Nevis.—Guide to Ben Nevis, with an account of the foundation and work of the meteorological observatory. sm. 8°. Edinburgh and Glasgow. s.a.

|| ——— Meteorological observations on Ben Nevis. Report of the Committee . . . Drawn up by Dr. Buchan. 8°. (*Rep. Br. Assoc. Adv. Sc.*, 1893.)

Benson, C.—An account of the normal distribution of the rainfall in the Madras Presidency, based on the records of twenty years. sm. f°. Madras, 1892.

Berlin, Deutsche Meteorologische Gesellschaft.—Berliner Zweigverein der deutschen meteorologischen Gesellschaft. 3.10.11. Vereinsjahr, 1886, 1893, 1894. 3 vols. 8°. Berlin, 1886, 1893, 1894.

——— **Königlich Preussisches Meteorologisches Institut.**—Bericht über die Thätigkeit . . . von W. v. Bezold. 1891, 1892. 2 vols. la. 8°. Berlin, 1893.

——— ——— Ergebnisse der meteorologischen Beobachtungen im Jahre 1890. la. 4°. Berlin, 1893.

——— ——— Ergebnisse der Niederschlags-Beobachtungen im Jahre 1891. la. 4°. Berlin, 1893.

|| ——— ——— Witterung nach den Beobachtungen des königlichen meteorologischen Instituts. 1893, Jan.—Dec. la. 4°. (*Statist. Korresp.*)

* **Bert, P.**—La pression barométrique. Recherches de physiologie expérimentale. la. 8°. Paris, 1878.

Bibliothèque Universelle [et Revue Suisse]. Archives des sciences physiques et naturelles. Troisième période. Tomes xxix.-xxx. 2 vols. 8°. Genève, 1893.

|| **Bidwell, S.**—Fogs, clouds and lightning. 8°. [*Proc. R. Inst. Great Britain*, 1893, May.]

Birkenhead. Meteorological results. 1892. 8°. (*Rep. on San. condition of Birkenhead for 1892, by R. S. Marsden*, p. 11.)

* **Blasius, W.**—Stürme und moderne Meteorologie. Vier Vorträge gehalten in Braunschweig. 1891-92. la. 8°. Braunschweig, 1893.

* **Blink, H.**—Wind- und Meeresströmungen im Gebiet der kleinen Sunda Inseln. la. 8°. (*Beitr. z. Geophys., Abhandl. geogr. Seminar. Univ. Strassburg, I.* p. 1, Stuttgart, 1887.)

|| **Boedl, W.**—Die Schneedecke in Bayern im Winter 1891-92. 4°. (*Beob. meteor. Stat. K. Bayern*, xiv., 1892.)

Bombay, Government Observatory.—Magnetical and meteorological observations made at the Government Observatory, Bombay, in the years 1891 and 1892, under the direction of C. Chambers and C. Chambers, jun., together with an appendix containing an account of a magnetic research. f°. Bombay, 1893.

(———) Report on the condition and proceedings of the Government Observatory, Colába, for the year which ended with the 30th June 1893. f°. s.l.e.a.

[**Bombay Meteorological Office.**]—Brief sketch of the meteorology of the Bombay Presidency in 1892-93. f°. s.l.e.a.

|| **Boston, Mass., Weather Bureau.**—Annual summary of the New England Weather Service for the year 1892. la. 4°. Cambridge, Mass., 1893. (*Ann. Astr. Obs. Harvard Coll.*, xli., Part i.)

——— Bulletin of the New England Weather Service. 1893, Jan.-Dec. 4°. s.l.e.a.

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Wigert, T.—Pluies d'Upsal.

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|| **Wild, H.**—Über Unsicherheiten in den Regnault'schen Spannkräften des Wasserdampfes unterhalb 100° und daraus entspringende Differenzen der Correctionen von Siedethermometern je nach ihrer Verificationsart. sm. f°. St. Pétersbourg, 1893. (*Mél. phys. chim.*, xiii., p. 263.)

|| ————— Über den säcularen Gang der magnetischen Declination in St. Petersburg-Pawlowsk. sm. f°. (*Mél. phys. chim.*, xiii., 1893, p. 273.)

|| ————— Zusammenstellung der Beschlüsse der internationalen Meteorologen-Conferenzen von der Conferenz in Leipzig, August 1872, bis und mit der Conferenz in München, August 1891. sm. f°. St. Petersburg, 1893. (*Repert. Meteor.*, xvi., No. 10.)

|| ————— Beiträge zur Entwicklung der erdmagnetischen Beobachtungsinstrumente. sm. f°. St. Petersburg, 1894. (*Repert. Meteor.*, xvii., No. 6.)

* **Wilk, E.**—Grundbegriffe der Meteorologie für höhere Schulen Zusammengestellt von E. Wilk. Zweite Auflage. sm. 8°. Leipzig, 1892.

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|| **Wollny, E.** — Elektrische Kulturversuche. Zweite Mittheilung. 8°. (*Forschungen auf dem Geb. Agrik.-phys., Heidelberg, xvi., Heft 3, 4.*)

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——— **Schweizerische Meteorologische Central-Anstalt.** — Annalen. 1891. "Der Schweiz. meteor. Beob." xxviii. Jahrg. 4°. Zürich, s.a.

——— ——— Instruktionen für die Beobachter der meteorologischen Stationen der Schweiz. Zweite umgearbeitete und vermehrte Auflage. la. 8°. Zürich, 1893.

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ACCOUNT of RECEIPTS and PAYMENTS for the year ending 31st March 1894.

RECEIPTS.			PAYMENTS.							
£	s.	d.	£	s.	d.					
Balance from year 1892-93 -	1,500	8	2	ADMINISTRATION:						
Parliamentary Vote -	15,300	0	0	Payment of Council -	991 5 0					
Repayment of expenses charged under—				Secretary -	800 0 0					
(1.) Incidental expenses -	3	4	1	Salaries and wages -	903 18 8					
(2.) Observatories	37	11	7	Rent, fuel, and lighting	704 13 11					
				Incidental and contingent expenses -	241 1 11					
				Furniture and fittings	161 4 8					
				Pensions -	186 16 4					
					3,989 0 6					
			40	15	8	SPECIAL RESEARCHES:				
SUPPLY OF INFORMATION:				Salaries and other charges -	- - -	787 6 11				
Daily Weather Charts and Forecasts -	283	10	6	LAND METEOROLOGY:						
6 p.m. Charts -	25	0	0	Observatories and stations, including remuneration of observers -	2,390 17 10					
Reports for Press Agencies, &c.	91	14	4	Salaries:—Discussion and reduction of observations, &c. -	1,297 2 3					
Telegrams -	288	17	2		3,688 0 1					
			689	2	0	WEATHER INFORMATION AND FORECASTS:				
SALE OF INSTRUMENTS, &c.:				Telegraphic reports and storm warnings, remuneration of observers, &c. -	2,485 8 3					
Royal Navy -	3	10	8	Salaries:—Preparation and issue of reports and forecasts -	1,861 11 3					
Mercantile Marine account -	25	18	1		4,346 19 6					
M.O. (Stations) account -	30	15	0	INSPECTIONS:						
			60	3	9	Salaries and travelling expenses -				
Repayment of Miscellaneous Commissions executed for Colonial and Foreign Institutions, &c. -			40	5	7					
Commission charged on work done for Colonies, &c. -			6	7	10	OCEAN METEOROLOGY:				
				Salaries:—Discussion and reduction of observations -	1,597 15 0					
				Expenses incidental to the supply of instruments:—						
				Proportion for care and issue of instruments -	200 0 0					
				Royal Navy -	525 12 1					
				Mercantile Marine -	355 2 3					
				Distant island and coast stations -	14 0 8					
					2,692 10 0					
				Miscellaneous Commissions executed for Colonial and Foreign Institutions, &c. -	- - -	26 6 6				
				BALANCE:						
				Cash at Bank -	1,448 0 5					
				„ at Office -	69 12 6					
					1,517 12 11					
			£	17,637	3	0	£	17,637	3	0

In the year 1893-94 the sum of 1,475*l.* 3*s.* 10*d.* was paid to the Post Office on account of inland and foreign telegrams, allowances to telegraph clerks, rental of private wires, &c.

APPENDIX XIV.

LIST OF PUBLICATIONS, &c. issued under the Authority
of the Meteorological Council.

OFFICIAL.

- No. 1. Report of the Meteorological Committee for 1867. 1*s*.
2. Instructions for Meteorological Telegraphy. New Edition, 1891. Prepared for the use of observers exclusively.
3. Fishery Barometer Manual. (New edition, 1887.) 6*d*.
4. Charts showing the Surface Temperature of the South Atlantic Ocean in each Month of the Year. 2*s*. 6*d*.
5. Report of the Meteorological Committee for 1868. 5*d*.
6. Report of the Meteorological Committee for 1869. 10*d*.
7. Quarterly Weather Report for 1869.—Parts I. to IV. 5*s*. each.
8. Barometer Manual. (Out of print. See Nos. 3, 24, 40, 60, and 61.)
9. Quarterly Weather Report for 1870.—Parts I. to IV. 5*s*. each.
10. Report of the Meteorological Committee for 1870. 10*d*.
11. Contributions to our Knowledge of the Meteorology of Cape Horn and the West Coast of South America. 2*s*. 6*d*.
12. Currents and Surface Temperature of the North Atlantic Ocean, from the Equator to Lat. 40° N., for each month of the year, with a General Current Chart. 2*s*. 6*d*.
13. A Discussion of the Meteorology of that Part of the Atlantic lying North of 30° N., for the Eleven Days ending 8th February 1870. With Book of Charts, 5*s*.
14. Quarterly Weather Report for 1871.—Parts I. to IV. 5*s*. each.
15. Report of the Meteorological Committee for 1871. 10*d*.
16. Quarterly Weather Report for 1872.—Parts I. to IV. 5*s*. each.
17. Report of the Meteorological Committee for 1872. 1*s*.
18. Contributions to our Knowledge of the Meteorology of the Antarctic Regions. 2*s*.
19. Quarterly Weather Report for 1873.—Parts I. to IV. 5*s*. each.
20. Charts of Meteorological Data for Square 3. Lat. 0°—10° N. Long. 20°—30° W., and Remarks to accompany the Monthly Charts, which show the Best Routes across the Equator for each Month, &c. 20*s*.
21. Report of the Proceedings of the Meteorological Congress at Vienna. 1873. 1*s*.
22. Report of the Meteorological Committee for 1873. 4*d*.
23. Report of the Proceedings of the Conference on Maritime Meteorology held in London, 1874. 2*s*.
24. Instructions in the Use of Meteorological Instruments. [Reprinted 1892.] (New edition in course of preparation.) 2*s*. 6*d*.
25. Quarterly Weather Report for 1874.—Parts I., II., and IV., 5*s*. each. Part III., 5*s*. 9*d*.
26. Report of the Meteorological Committee for 1874. 6*d*.

LIST OF PUBLICATIONS, &c.—*continued.*

- No. 27. Charts of Meteorological Data for the Nine 10° Squares of the Atlantic which lie between 20° N. and 10° S., and extend from 10° to 40° W., with accompanying Remarks, ending with the Best Routes across the Equator. 24s.
28. Contribution to the Meteorology of Japan. By Staff-Commander Thomas H. Tizard, H.M.S. *Challenger*. 1s.
29. Report of the Meteorological Committee for 1875. 4d.
30. Quarterly Weather Report for 1875.—Parts I.—IV. 5s. each.
31. Report of the Meteorological Committee for 1876–7. 3s. 5d.
32. The Meteorology of the North Atlantic during August 1873, with 31 Synoptic Charts. With Book of Charts. 15s.
33. Quarterly Weather Report for 1876 (New Series).—Part I., 6s.; Parts II., III., and IV., 5s. each.
- *33A. Meteorological Observations at Stations of the Second Order for the year 1876.
- 33B. Meteorological Observations at Stations of the Second Order for the year 1877.
34. Contributions to our Knowledge of the Meteorology of the Arctic Regions.—Vol. I.: Part I., 2s.; Part II., 10s.; Part III., 6s.; Part IV., 5s.; Part V., 6s.
35. Report of the Meteorological Council for 1877–8. 1s.
36. Report of the Proceedings of the Second International Meteorological Congress at Rome, 1879. 1s. 6d.
37. Report on the Meteorology of Kerguelen Island. By Rev. S. J. Perry, S.J., F.R.S. 3s.
38. Report of the Meteorological Council for 1878–9. 5d.
39. Meteorological Observations at Stations of the Second Order for the year 1878. 20s.
40. Aids to the Study and Forecast of Weather, by W. Clement Ley, M.A. 1s.
41. Report of the Meteorological Council for 1879–80. 1s.
42. Report of the Meteorological Council for 1880–81. 1s. 2d.
43. Meteorological Charts for the Ocean District adjacent to the Cape of Good Hope, with accompanying Remarks. Charts, 25s.; Remarks, 7s.
44. Report on the Gales experienced in the Ocean District adjacent to the Cape of Good Hope, between Lat. 30° and 50° S., and Long. 10° and 40° E., by Capt. H. Toynebee, F.R.A.S. 7s. 6d.
45. Meteorological Observations at Stations of the Second Order for the year 1879. 20s.
46. Report on the Storm of October 13–14, 1881. By Robert H. Scott, F.R.S. 1s. 6d.
47. Rainfall Tables of the British Isles for 1866–80. Compiled by G. J. Symons, F.R.S. 7s. 6d.
48. Report of the Meteorological Council for 1881–2. 1s.
49. Quarterly Weather Report for 1879. (New Series.) Parts I., II., and III., 6s. each; Part IV., 5s. 6d. Appendices and Plates. 27s.
50. Quarterly Weather Report for 1880. (New Series.) Parts I. and II., 6s. each; Part III., 4s.; Part IV., 6s. Appendices and Plates. 28s.

* The Observations at Stations of the Second Order for the years 1873–1875 will be found in the Quarterly Weather Report for the respective years.

LIST OF PUBLICATIONS, &c.—continued.

- No. 51.* Hourly Readings from the Self-Recording Instruments at the Seven Observatories under the Meteorological Council, 1881. (New Series.) Part I., 10s. 6d. Parts II., III., and IV., 21s. each.
52. Quarterly Weather Report for 1877. (New Series.) Part I., 10s.; Part II., 5s.; Part III., 4s. 6d.; Part IV., 6s. Appendices and Plates. 27s.
53. Meteorological Atlas of the British Isles. 5s. 6d.
54. Hourly Readings from the Self-Recording Instruments at the Seven Observatories under the Meteorological Council, 1882. Parts I. and II., 20s. each; Part III., 22s. 6d.; Part IV., 26s.
55. Quarterly Weather Report for 1878. (New Series.) Parts I., II., III., and IV., 6s. each. Appendices and Plates. 28s.
56. Sunshine Records of the United Kingdom for 1881. 4s.
57. Meteorological Observations at Stations of the Second Order for the year 1880. 34s. 6d.
58. Report of the Meteorological Council for 1882-3. 10½d.
59. Charts showing the Surface Temperature of the Atlantic, Indian, and Pacific Oceans. 21s.
60. Principles of Forecasting by means of Weather Charts. By the Hon. Ralph Abercromby, F.R.Met.Soc. (Second edition, revised.) 2s.
61. A Barometer Manual for the Use of Seamen. (Second edition.) 1s. 3d.
62. Monthly Weather Reports for 1884. Jan., Feb., March, May—Nov., 1s. 6d. each. April (with 2 Appendices), 2s. 6d. Dec., 1s. 9d.
63. Hourly Readings from the Self-Recording Instruments at the Seven Observatories under the Meteorological Council, 1883. Parts I., II., and III., 21s. each; Part IV., 30s.
64. Report of the Meteorological Council for 1883-4. 1s. 2d.
65. Monthly Weather Reports for 1885. Jan. to Dec., 1s. 6d. each.
66. Meteorological Observations at Stations of the Second Order for the year 1881. 35s.
67. Report of the Meteorological Council for 1884-5. 4s. 4d.
68. Monthly Weather Reports for 1886. Jan. to Dec., 1s. 6d. each.
69. Meteorological Observations at Stations of the Second Order for the year 1882. 35s.
70. Hourly Readings from the Self-Recording Instruments at the Four Observatories under the Meteorological Council, 1884. Part I., 12s.; Part II., 10s.; Part III., 10s. 6d.; Part IV., 15s.
71. Synchronous Weather Charts of the North Atlantic and the adjacent Continents. Aug. 1, 1882, to Sept. 3, 1883. Parts I. to IV. (33 sheets each.) 17s. each.
72. Report of the Meteorological Council for 1885-86. 8d.
73. Meteorological Observations at Stations of the Second Order for the year 1883. 30s.
74. Hourly Readings from the Self-Recording Instruments at the Four Observatories under the Meteorological Council, 1885. Parts I. and II., 11s. each; Part III., 10s. 6d. Part IV., 12s.

* For the years 1874-1880 the Hourly Readings were issued in lithographed form. Price 20s. per annum.

LIST OF PUBLICATIONS, &c.—*continued.*

- No. 75. Report of the Meteorological Council for 1886-87. 8*d.*
 76. Charts showing the Mean Barometric Pressure over the Atlantic, Indian, and Pacific Oceans. 10*s.* 6*d.* Supplementary Chart, 6*d.*
 *77. Monthly Weather Reports for 1887. January to April, 1*s.* 6*d.* each. May to December, in wrapper, 12*s.*
 78. Meteorological Observations at Stations of the Second Order for the year 1884. 32*s.*
 79. Report of the Meteorological Council for 1887-88. 1*s.*
 80. Daily Weather Charts for the period of six weeks ending June 25, 1885, to illustrate the tracks of two cyclones in the Arabian Sea. 10*s.*
 81. Hourly Readings from the Self-Recording Instruments at the Four Observatories under the Meteorological Council, 1886. Parts I., II., and III., 10*s.* 6*d.* each. Part IV., 12*s.* 6*d.*
 82. Meteorological Observations at Stations of the Second Order for the year 1885. 31*s.*
 83. Meteorological Observations at the Foreign and Colonial Stations of the Royal Engineers and the Army Medical Department. 1852-1886. 23*s.*
 84. Report of the Meteorological Council for 1888-89. 5½*d.*
 †85. Weekly Weather Report for the year 1888. Vol. V. Second Series. 4*d.* per week. With Appendices and Monthly Supplements, priced separately.
 86. Weekly Weather Report for the year 1889. Vol. VI. Second Series. 6*d.* per week. With Appendices and Monthly Supplements, priced separately.
 87. Weekly Weather Report for the year 1890. Vol. VII. Third Series. 6*d.* per week. With Appendices and Monthly Supplements, priced separately.
 88. Meteorological Observations at Stations of the Second Order for the year 1886. 25*s.*
 89. Meteorological Observations made at Sanchez, Samaná Bay, St. Domingo. 1886-88. By the late W. Reid, M.D. 8*s.* 6*d.*
 90. Cyclone Tracks in the South Indian Ocean. From information compiled by Dr. Meldrum, C.M.G., F.R.S. 7*s.*
 91. Report of the Meteorological Council for 1889-90. 7½*d.*
 92. Meteorological Charts of the portion of the Indian Ocean adjacent to Cape Guardafui and Ras Hafún. 6*s.*
 93. Harmonic Analysis of Hourly Observations of Air Temperature and of Pressure at British Observatories. 12*s.*
 94. Hourly Means of the Readings obtained from the Self-Recording Instruments at the Four Observatories under the Meteorological Council, 1887. 16*s.*
 95. Meteorological Observations at Stations of the Second Order for the year 1887. 24*s.*
 96. Weekly Weather Report for the year 1891. Vol. VIII., Third Series. 6*d.* per week. With Appendices and Monthly Supplements, priced separately. Annual subscription, including Supplements and Appendices, post paid 30*s.*

* Publication continued after this year as a Supplement to the Weekly Weather Report.

† The publication of the Weekly Weather Report began in February 1878, Annual subscription, 1878-1883, 12*s.* 6*d.*; 1884-1887, 21*s.* 2*d.*

LIST OF PUBLICATIONS, &c.—continued.

- No. 97. Hourly Means of the Readings obtained from the Self-Recording Instruments at the Four Observatories under the Meteorological Council, 1888. 20s.
98. Ten Years Sunshine in the British Isles, 1881-90. 2s.
99. Report of the Meteorological Council for 1890-91. 5½*d.*
100. Weekly Weather Report for the year 1892. Vol. IX., Third Series. 6*d.* per week. With Appendices and Monthly Supplements, priced separately. Annual Subscription, including Supplements and Appendices, Post paid, 30s.
101. Meteorological Observations at Stations of the Second Order for the year 1888. 22s.
102. Report of the International Meteorological Conference at Munich in 1891. 1s. 6*d.*
103. Hourly Means of the Readings obtained from the Self-Recording Instruments at the Four Observatories under the Meteorological Council, 1889. 15s.
104. Report of the Meteorological Council for 1891-92. 6*d.*
105. Hourly Means of the Readings obtained from the Self-Recording Instruments at the Four Observatories under the Meteorological Council, 1890. 20s.
106. Wind and Current Charts of the Red Sea. (In the Press.)
107. Weekly Weather Report for the year 1893. Vol. X., Third Series. 6*d.* per week. With Appendices and Monthly Supplements, priced separately. Annual Subscription, including Supplements and Appendices, post paid, 30s.
108. Meteorological Observations at Stations of the Second Order for the year 1889. 34s.
109. Report of the Meteorological Council for 1892-93. 8*d.*
110. Meteorological Observations at Stations of the Second Order for the year 1890. 34s.
111. Weekly Weather Report for the year 1894. Vol. XI., Third Series. 6*d.* per week. With Appendices and Monthly Supplements, priced separately. Annual Subscription, including Supplements and Appendices, post paid, 30s.
112. Report of the Meteorological Council for 1893-94.
113. Hourly Means of the Readings obtained from the Self-recording Instruments at the Five Observatories under the Meteorological Council, 1891. (In the Press.)
114. Rainfall Tables of the British Isles for 1881-90. (In the Press.)

NON-OFFICIAL.

- No. 1. Report of an Inquiry into the Connexion between Strong Winds and Barometrical Differences.—By Robert H. Scott, Director of the Office. 6*d.*
2. Report to the Committee of the Meteorological Office on the Meteorology of the North Atlantic.—By Captain H. Toynbee, F.R.A.S., Marine Superintendent. 1s.
3. Report to the Committee of the Meteorological Office on the Use of Isobaric Curves.—By Captain H. Toynbee, F.R.A.S., Marine Superintendent. 1s.
4. Routes for Steamers from Aden to the Straits of Sunda and back. Translated from a Paper issued by the Royal Meteorological Institute of the Netherlands. 6*d.*

LIST OF PUBLICATIONS, &c.—*continued.*

- No. 5. On the Winds, &c. of the North Atlantic along the Tracks of Steamers from the Channel to New York. Translated from a Paper issued by the Deutsche Seewarte, Hamburg. 6*d.*
6. Report of the Proceedings of the Meteorological Conference at Leipzig. 1872. 1*s.*
7. Notes on the Form of Cyclones in the Southern Indian Ocean.—By C. Meldrum, M.A., F.R.S. [Out of Print.]
8. Report on Weather Telegraphy and Storm Warnings. Presented to the Meteorological Congress at Vienna. 1873. 6*d.*
9. Report of the Permanent Committee of the First International Meteorological Congress at Vienna for 1874. 1*s.* 6*d.*
10. On the Physical Geography of the part of the Atlantic which lies between 20° N. and 10° S. and extends from 10° to 40° W. A Paper read before the British Association at Bristol, in August 1875.—By Capt. Toynebee, F.R.A.S., F.R.G.S., Marine Superintendent. 1*s.* 6*d.*
11. Report of the Permanent Committee of the First International Congress at Vienna for 1876. With Supplement. 2*s.*
12. Reports to the Permanent Committee of the First International Meteorological Congress at Vienna on Atmospheric Electricity, Maritime Meteorology, and Weather Telegraphy, 1878. 2*s.*
13. Report of the Permanent Committee of the First International Congress at Vienna for 1878. 6*d.*
14. Report of the International Meteorological Committee Meeting at Berne, 1880. 1*s.*
15. Report of the Second Meeting of the International Meteorological Committee, held at Copenhagen, August 1882. 2*s.* 6*d.*
16. Report of the Third Meeting of the International Meteorological Committee, held at Paris, September 1885. 1*s.*
17. Report of the Fourth Meeting of the International Meteorological Committee, held at Zürich, September 1888. 4*d.*
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