REPORT

OF THE

METEOROLOGICAL COUNCIL,

For the Year ending 31st of March, 1899,

TO THE

PRESIDENT AND COUNCIL

OF THE

ROYAL SOCIETY.

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

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For details of Information Received. — See Appendix.

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THE METEOROLOGICAL COUNCIL,

1898–99.

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REPORT

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For the Year ending 31st of March 1899,

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Introductory

The executive of the Office is the same as before, Mr. R. H. Scott, M.A., D.Sc., F.R.S., being the Secretary, and Nav.-Lieut. C. W. Baillie, R.N., F.R.A.S., the Marine Superintendent.

Superannuation allowances to Office staff.

For some time past the Council have had under their consideration the necessity for making systematic provision for superannuation allowances to members of the staff, some of whom will soon have reached such an age that retirement, after prolonged service, becomes desirable. The system under which this may best be arranged offers some difficulties, and the details have not yet been settled. In any case it will be necessary to revise the appropriation of the grant at the disposal of the Council, under the heads to which it has hitherto been allotted, and to make reductions in some directions, in order to provide the means for a satisfactory arrangement. It is hoped that this may be effected without any material diminution of the scientific or practical usefulness of the work of the Office, in view of the fact that the discussions of the results of certain observations extending over a long series of years, have already been completed, and may now without objection be discontinued wholly or in part.

National Physical Laboratory

The establishment of the National Physical Laboratory, provision for which is included in the Parliamentary Estimates of the current year, will lead to a change in the management of the Kew Observatory. The work of that institution, so far as it has relation to meteorology, or meteorological instruments, has been conducted in close communication with the Meteorological Office. It is intended that the existing relations between this Office and the Observatory shall be maintained in all essentials on their present footing, and it may reasonably be anticipated that the improved status of the Observatory will be beneficial rather than otherwise, from the point of view of meteorology.

The work of the Office may be conveniently considered under four heads, namely:

I. Ocean Meteorology.

II. Weather Telegraphy.

III. Climatology.

IV. Miscellaneous Investigations, and Administration.

PART I.

Ocean Meteorology.

Collection of information.

Collection of Information.—The Office continues, as in the past, to collect data with respect to the meteorology of the ocean, and to carry out this object complete outfits of meteorological instruments are supplied to officers of merchant ships who are willing to make observations at sea.

The instruments supplied are:—

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

On the return of the ship to England the officer sends in a fair copy of the meteorological log and returns the instruments to the Office or to its agents.

Her Majesty's ships also are supplied with instruments, which, however, differ slightly from those lent to the Mercantile Marine. The Council continues to receive valuable observations from the officers of the Royal Navy.

Agents.

In order to facilitate the supply of instruments to the Mercantile Marine, agencies are established at some of the principal ports.

The following is a list of these agents:—

Cardiff, T. L. 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, Messrs. Castle and Co., Commercial Road.
Liverpool, J. Gill, Nautical College.
Southampton, Capt. D. Forbes, High Street.

The number of merchant ships supplied with instruments and log books during the year has been 114.

Sets of instruments are kept in working order at the Office in London, and at each agency, for the purpose of instructing observers in the method of observation. Notices to captains as to the supply of instruments are frequently distributed from the Office.

Recognition of "excellent" observers.

As a mark of recognition of valuable co-operation, the Council present various publications to observers who return well-kept logs. A list of the publications of the Office is given in Appendix XVI., p. 125.

Appendix I. (p. 35) contains a list of the observers who have, during the past year, contributed logs classed as "excellent." The Council take this opportunity of expressing their best thanks to those who have thus assisted them. Several of these observers have co-operated with the Office for many years. The names which appear in the list for the first time are as follows:—

Observer's Name.	Ship.
Alsop, J. J.	Barque "Brussels."
Bertie, J. L....	S.S. "American."
Bobardt, A. O., Surgeon, R.N. ...	H.M.S. "Dart."
Boothby, G. C.	S.S. "Heraclides."
Clarke, W. H.	S.S. "Nomadic" and S.S. "Tauric."
Clinock, T. C.	S.S. "Harlech Castle."
Davies, H.	S.S. "La Plata."
Evans, J. E....	S.S. "Wolf."
Gifford, H. C.	S.S. "Amber."
Goudge, E.	S.S. "Naworth Castle."
Haddock, H. J., R.N.R.	S.S. "Britannic."
James, E. Gates, R.N.R.	"Airlie."
Lewis, J.	S.S. "Lassell."
Lowe, J.	S.S. "Duffield."
Mackay, H., R.N.R.	S.S. "Lucania."
Moseley, F. J., R.N.R.	S.S. "Goorkha."
Murray, J. A.	"Milwaukee."
Parry, J. F., R.N.	H.M.S. "Dart."
Reynolds, R., R.N.R.	S.S. "Norman."
Thomas, W....	S.S. "Templemore."
Tyson, J.	S.S. "Moor."
Wade, W. J.	Barque "Loch Sloy."
Wadsworth, F. H.	S.S. "Ethiopia."

Death of excellent observers

The Council have to note with great regret the death of four of their observers. Capt. S. Trott, of the ss. "Minia," commenced observing in 1884, and had kept thirty-six "excellent" logs. Capt. F. H. Crotty, of the ship "Evesham Abbey," Capt. W. E. White, R.N.R., of the R.M.S. "Ormuz," and Capt. J. Johnston, of the barque "Blengfell" had also kept logs of the same high character.

Character of logs received

The meteorological logs received during the year numbered 148, of which 137 were either "excellent" or "very good."

The Council have continued to receive, through the Ocean Steamship Company of Liverpool, a considerable number of logs, principally relating to voyages to and from the China Seas, viâ Suez.

Districts from which observations are obtained.

A list of the meteorological logs received at the Office from ships during the year is given in Appendix II. (p. 37).

The following list gives a summary of the voyages for each ocean made by the ships specified in this Appendix.

North Atlantic... .. 541		Pacific Ocean, South ... 111	
South „ 147		Mediterranean 81	
Indian Ocean 132		Red Sea 66	
Pacific Ocean, North ... 36		Arctic Ocean 2	

Publications.

Various publications of the Office in connection with ocean meteorology have been either completed during the year, or are in progress.

Southern Ocean.

The Meteorology of the Southern Ocean.—The region referred to lies between the Cape of Good Hope and New Zealand, south of latitude 30° S. These charts were described in the last Annual Report. They have now been engraved, and the Introductory Remarks to complete the volume are in the press, so that the work may be expected to appear shortly.

South Atlantic.

The Meteorology of the South Atlantic and of the West Coast of South America.—All the available information extracted from the Office logs and from those of Her Majesty's Ships has been analysed, and a large proportion of this material has been tabulated, ready for discussion. The charting of the data will shortly be taken in hand.

Observations from the Pacific Ocean.

Observations from the Pacific Ocean.—The arrangements described in last Report for the supply of instruments from Her Majesty's Dockyard at Sydney to observers navigating the Pacific Ocean have been in operation. As the logs from this Ocean continue to come in to the Office, the Current observations are plotted on the large scale charts so as gradually to improve the Current Charts for the Pacific Ocean recently published.

The Weather of the Winter 1898-99.

The Weather of the Winter, 1898-99, *over the North Atlantic.*—Gales of unusual severity prevailed in the Atlantic during last winter, and the Council, therefore, decided to carry out an enquiry into the weather over the northern part of that Ocean for the two months, beginning with the middle of December. One of their staff has been sent to Liverpool for a few days, where he met with very great encouragement from all the chief shipping companies, who supplied him with observations for 2,700 days. Fairly representative charts for sixty days may be founded on these observations.

Proposal for New Mode of Discussion of Logs.

A proposal for a new mode of tabulation and publication of data from ships' logs was received from the Deutsche Seewarte, Hamburg, but the Council after careful consideration decided that they could not undertake to carry out such a scheme.

Instruments for distant stations.

Collection of Meteorological Observations from Distant Stations.—It has been the custom of the Office to supply instruments to observers in unfrequented parts of the world, when it has reason to believe that the observations will be taken with due care, the observers undertaking to send in copies of their observations.

A list of the documents received during the year from such foreign land stations is given in Appendix XII. (p. 96).

The only new station of this class supplied with instruments on loan during the past year was Lagos. Capt. Standen, Army Service Corps, is the observer. A mountain barometer and some portable thermometers were lent to Capt. Deasy for his journey across the Pamirs to Yarkand.

Information supplied for the Admiralty.

Climatological Information for the Admiralty.—Statistics as to the climates of foreign ports are from time to time required by the Admiralty for use in various publications; a good deal of research is required to supply the necessary information. The districts so dealt with during the year have been the West Coast of Africa, the China Seas, and New Zealand.

Stock of instruments belonging to the Office.

Supply and Stock of Instruments.—In Appendix III. (p. 48) a list is given of the meteorological instruments supplied during the year by the Office to the Royal Navy, together with a statement of the stock and of the distribution of the instruments standing on the books to the account of the Admiralty on the 31st March, 1899. The recent large increases to the Navy have led to a corresponding increase in the stock of instruments required for Her Majesty's ships.

Appendix IV. (p. 49) gives similar information with regard to the disposal of the other instruments belonging to the Office, which either remain in store, or have been supplied to the Mercantile Marine, to Observatories, or to Telegraphic Stations, &c.

PART II.

Weather Telegraphy and Forecasts.

General.

The forecasts issued by the Office of the probable weather throughout the United Kingdom are based on meteorological observations made at a number of stations, which are in direct telegraphic communication with the Office.

The Telegraphic Reporting Stations are those marked with the letter "T" in the list given in Appendix XI. (p. 89), and the same Appendix contains at p. 94 a list of the Foreign Stations which send daily telegrams to the Office.

The staff of observers has undergone some changes during the year. The station at the North Foreland ceased to send reports on Dec. 31, as Lloyds' had closed their Signal Station there. Ardrossan also ceased reporting at the end of the financial year. It has been in operation for thirty-six years, but has been closed because the station at Malin Head has been established with a better exposure to the open sea than Ardrossan could afford. It is proposed to close other telegraphic stations shortly.

At Donaghadee the observer has resigned, and the duty of reporting has been taken over by the Coastguard at the station.

At Scilly the site of the thermometer stand and anemometer has been taken over by the War Office, so that the Council have had to enter into a fresh agreement for the tenancy of Garrison Hill, St. Mary's.

The General Post Office has recently made an alteration in their charges for supplying copies of telegrams sent abroad. The Council are glad to find that this change will result in a reduction of about £50 in the amount chargeable to their Office for telegraphy.

There has been no serious interruption of telegraphic communication during the year.

The Office receives a large number of inquiries concerning the weather, and a considerable amount of investigation and correspondence is required to obtain the needed information.

Inspection of the Stations.

Inspection of the Telegraphic Reporting Stations.—The stations in the United Kingdom have been inspected during the year, in England by Messrs. Gaster, R. H. Curtis, J. A. Curtis, and Brodie; those in Scotland by Mr. Buchan, and in Ireland and Wales by Mr. Scott.

The reports of the Inspectors are printed in Appendix V. (p. 50), and they show that efficiency has been maintained.

Discussion of the reports.

Discussion and Publication of the Information received.—A detailed account of the manner in which the meteorological information received by telegraph is utilised was given in Appendix X. of the Report for 1891, and there has been no change of procedure since that date. The Daily Weather Report contains a synopsis of the weather on the day of issue, based on the telegraphic data; this has appeared regularly during the year.

Distribution of reports.

Certain copies of the Daily Weather Report are distributed without charge, namely, 7 to newspapers, 71 for public exhibition at seaports, 80 to Government Offices and public institutions, 61 to correspondents of the Office, and 35 to foreign meteorological institutions. The issue to paying subscribers amounted to nearly 200 copies.

Weekly Weather Report.

The Weekly Weather Report, and the various Appendices, contain Weekly and Monthly Summaries of the chief elements of the Weather. Details as to those publications are contained in Part III., p. 17, and in Appendix VI., p. 75.

Display of information in front of the Office.

Display at the Meteorological Office in London of Information as to the Weather on British Coasts.—At 9.30 a.m. and 3 p.m. every week day the substance of the reports received by telegraph, as to the state of the weather and of the sea at the following stations: Yarmouth, Dungeness, the Needles (Hurst Castle), Scilly, Holyhead, and Valencia Island, is conspicuously displayed on the balcony of the Office, at 63, Victoria Street, S.W. At the same hours charts are suspended in the portico of the street door, which exhibit the latest information from all our coasts, and the latest forecasts and storm warnings that have been issued. The Council have reason to believe that the public appreciates the opportunity thus afforded them of learning the state of the weather on the coasts.

Forecasts for the Admiralty.

Supply of Forecasts to the Admiralty.—At the request of the Admiralty daily forecasts are supplied regularly to the Commander-in-Chief, at Devonport.

Forecasts.

Weather Forecasts.—Forecasts are made three times a day, namely, at 11 a.m., at 3.30 p.m., and 8.30 p.m. The Forecasts, issued at 11 a.m., are based on the telegrams of observations made at 8 a.m., and refer to a period of 24 hours from noon on the day of issue. These Forecasts are exhibited at several places in London,* and are supplied to newspapers for their later editions. The Forecasts issued at 3.30 p.m. have been of use in the special series of Hay Harvest Forecasts referred to on p. 11. The forecasts at 8.30 p.m. are prepared for the next morning's newspapers. Each of the forecasts has its special applicability, and is available to the public on inquiry at the Office either by letter, by telegram, or in person.

Inquiries at the Office.

The inquiries received by telegram through the Post Office for special forecasts amounted during the year to 117, and the personal applications to 76. The rules of the Office relating to such inquiries are stated in Appendix VI., p. 79.

Results of Forecasts.

A comparison for the year of the Forecasts for the United Kingdom issued at 8.30 p.m., with the subsequent weather actually experienced, is given in detail in Appendix VII., p. 80. The complete success, partial success, partial failure, and complete failure of the forecast is estimated according to definite rules which are designed to eliminate bias as far as possible.

It will here suffice to state that partial success means that the Forecast was correct for more than half the elements dealt with at the places of observation situated in the district in question, and a similar interpretation is to be applied to the term partial in the case of the failures.

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* 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. Elliott's, St. Martin's Lane; Messrs. Stanford's, Charing Cross; Messrs. Negretti & Zambra's, Regent Street; and at the Office, 63, Victoria Street.

The detailed comparison of the Forecasts with actuality may be summarised as follows:— Results of Forecasts.

SUMMARY of RESULTS of 8.30 p.m. FORECASTS, 1898-99.

Districts.	Per-centages.				
	Complete Success.	Partial Success.	Partial Failure.	Complete Failure.	Sum of Successes, Complete and Partial.
SCOTLAND, N. ...	56	28	12	4	84
,, E. ...	53	28	15	4	81
ENGLAND, N.E. ...	60	26	11	3	86
,, E.	56	29	12	3	85
MIDLAND COUNTIES...	54	30	14	2	84
ENGLAND, S.	59	29	10	2	88
SCOTLAND, W. ...	51	27	16	6	78
ENGLAND, N.W. ...	55	27	13	5	82
,, S.W. ...	57	27	12	4	84
IRELAND, N.	52	29	14	5	81
,, S.	49	29	16	6	78
Summary ...	55	28	13	4	83

In order to test the success of the Forecasts of the year in comparison with those of previous ones, the following table has been drawn up. It shows for each year of the decade 1889-98 the per-centages of complete and partial success of the Forecast issued at 8.30 p.m. It will be noticed that the highest degree of complete success was obtained in 1893, and that 1898 did not fall far short of that figure.

PER-CENTAGES of SUCCESS in the FORECASTS for the whole of the BRITISH ISLES.

Year.	Complete Success.	Partial Success.	Sum of Successes, Complete and Partial.
1889	49	32	81
1890	50	32	82
1891	50	30	80
1892	46	33	79
1893	59	25	84
1894	56	27	83
1895	55	25	80
1896	54	27	81
1897	55	26	81
1898	55	28	83
Average	52·9	28·5	81·4

Hay Harvest Forecasts.—As in previous years the Council have during the hay harvest sent Daily Forecasts, without charge, to certain observers selected by the Royal Agricultural Society, the Royal Dublin Society, and the Highland and Agricultural Society. The Council make it a condition for the supply of these forecasts, that the information Hay Harvest Forecasts.

Hay Harvest Forecasts.

shall be disseminated by the recipients as widely as possible, and that a record of the weather actually experienced shall be sent weekly to the Office.

LIST of RECIPIENTS of the HAY HARVEST FORECASTS in 1898.

Districts.	Recipients.	Address.
0. SCOTLAND, N. ...	Rev. Dr. Joass ...	Golspie.
	Major Smith	Munlochy, 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, Belford Northumberland.
	J. Smith	The Ferneries, Ulceby.
3. ENGLAND, E. ...	Garnett Taylor ...	Trowse House, Thorpe, Norwich.
	Sir J. B. Lawes, Bt., and Sir J. H. Gilbert.	Rothamsted, Harpenden.
4. MIDLAND COUNTIES ...	Royal Agricultural College.	Cirencester.
	H. G. Godfrey Payton	Warwick.
	T. H. Thursfield ...	The Grange, Much Wenlock.
	F. E. Harcourt-Vernon	Grove Hall, East Retford.
5. ENGLAND, S. ...	The South-Eastern Agricultural College.	Wye, near Ashford, Kent.
	C. Whitehead ...	Barming House, Maidstone.
	E. P. Squarey ...	The Moot, Downton, Wilts.
	M. J. Sutton	Kidmore Grange, Caversham.
6. SCOTLAND, W. ...	W. Calder	Castle Hill, Dalreoch, Dumbarton.
	Sir M. J. Stewart, Bt., M.P.	Ardwell, Stranraer.
	J. Laughton	Eallabus House, Islay.
7. ENGLAND, N.W.	Lord Egerton of Tatton	Tatton Park, Knutsford.
	R. Metcalfe, M.D. ...	Eastfield Lodge, Leyburn, Yorkshire.
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. ...	G. H. Major	Connellan, Coolmore, Thomastown.
	W. Talbot Crosbie ...	Ardfert Abbey, Tralee, Co. Kerry.

Hay Harvest Forecasts.

The telegrams were sent daily for the period of about five weeks, commencing in some districts on June 6th. In certain cases, by special request, they were continued for a longer period. They were also sent to six subscribers.

The information from which the degree of success of the Forecasts has been estimated was furnished by the recipients themselves. The following table, compiled from these estimates, contains a summary of the independent judgments of those to whom the telegrams were sent.

SUMMARY OF RESULTS.—HAY HARVEST FORECASTS, 1898.

Districts.	Names of Stations.	Per-centages.				
		Complete Success.	Partial Success.	Partial Failure.	Complete Failure.	Sum of Successes, Complete and Partial.
SCOTLAND, N. ..	Munlochy and Golspie	46	40	12	2	86
,, E. ..	Aberfeldy, Glamis, and Rothiemay ..	49	39	10	2	88
ENGLAND, N.E. ..	Belford and Ulceby	58	30	11	1	88
,, E. ..	Rothamsted and Thorpe	62	26	11	1	88
MIDLAND COUNTIES	Cirencester, East Retford, Warwick, Much Wenlock.	68	18	12	2	86
ENGLAND, S. ..	Maidstone, Downton, Caversham, and Wye.	68	28	3	1	96
SCOTLAND, W. ..	Ardwell, Islay, and Dumbarton ..	51	41	8	—	92
ENGLAND, N.W. ..	Leyburn and Knutsford	53	40	7	—	93
,, S.W. ..	Tortworth, Clifton, and Glastonbury	69	23	7	1	92
IRELAND, N. ..	Moynalty and Edgeworthstown ..	57	19	21	3	76
,, S.	Tralee and Thomastown	57	33	10	—	90
	Mean for all districts	58	31	10	1	89

These figures show that 89 per cent. of the Forecasts were useful; the corresponding per-centage in 1897 was 90. Several of the recipients have written expressing their satisfaction with the accuracy of the Forecasts.

Storm Warnings.

Storm Warnings for the Coasts of the United Kingdom.—Warnings of coming storms are despatched by telegraph to certain stations on the coast. These stations are supplied with signals which are hoisted as warnings to mariners of expected storms. The signals are defined in Circular 717 of the Board of Trade, issued in February, 1874.

A list of the stations is given in Appendix VIII., p. 81. At the end of March, 1899, there were 234, of which 121 were in England and Wales, 70 in Scotland, 31 in Ireland, 4 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 subsequent weather actually experi-

enced. The method of comparison is explained in **Appendix VI.**, p. 79, and the results are exhibited in the following table:—

COMPARISON between the WARNINGS and the subsequent WEATHER in 1898.

Coasts.	Total No. of Warnings.	Warnings justified by subsequent Gales. Force 8 and upwards.	Warnings justified by subsequent strong Winds. Forces 6 & 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 in consequence of telegraphic errors.	Storms for which no Warning was issued.
Scotland, N.E. ...	57	38	8	6	1	3	1	Nov. 27–28.
„ E. ...	39	14	21	4	—	—	—	Feb. 15–16.
„ N.W. ...	57	32	16	7	—	2	—	—
„ W. ...	54	29	18	7	—	—	—	—
Ireland, S.W. ...	53	29	16	5	2	1	—	—
„ N.W. ...	57	40	9	1	1	6	—	May 2–3, Nov. 27–28.
Irish Sea	54	41	7	4	—	2	—	Feb. 15–16.
St. George's Channel	41	21	15	5	—	—	—	—
Bristol Channel ...	37	27	4	3	1	2	—	April 30.
England, S.W. ...	33	21	7	2	—	3	—	April 30.
„ S. ...	25	11	13	1	—	—	—	—
„ S.E. ...	24	12	12	—	—	—	—	—
„ E. ...	24	18	6	—	—	—	—	Feb. 2.
„ N.E. ...	26	14	8	3	1	—	—	Feb. 2.
Totals ...	581	347	160	48	6	19	1	
Percentages...		59·8	27·5	8·2	1·0	3·3	0·2	

NOTES as to GALES EXPERIENCED in 1898, for which no WARNING was issued.

February 2nd—ENGLAND, E. and N.E. A W. gale.

The W. and N. coasts had all been warned an Jan. 31st, but, owing to another deep depression which appeared over our N. districts, the gale spread further south than was anticipated.

February 15th–16th—SCOTLAND, E. and IRISH SEA. A N.W. gale.

The extreme N. and N.W. coasts had been duly warned on the 14th and 15th, but, as in the previous case, the gale spread further to the south than was expected.

April 30th—ENGLAND, S.W. and BRISTOL CHANNEL. A S.E. to S.W. gale.

A depression was lying off our W. coasts on April 29th, but was only moderate. During the night a well-marked secondary reached Cornwall without giving any indication of its approach, and at 8 a.m. on the 30th it was too late to warn these coasts. The S. and E. coasts were all warned in time.

May 2nd–3rd—IRELAND, N.W. An E. gale.

The N.E. and E. of Scotland were duly warned, but it was not expected that the gale would reach the Irish coasts.

November 27th-28th—SCOTLAND, N.E., and IRELAND, N.W. A N. gale, very sporadic, and occurring on a Sunday.

At 8 a.m. the distribution of pressure was very complex, strong winds being indicated, but no gale. The gales actually experienced occurred only at the most exposed stations in the districts.

The following table contains a statement of the amount of success of storm warnings in the decade 1889-98. It will be seen that the warnings were not quite so successful as in the last few years.

Comparison of results for 1898 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.
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
1894	502	68·5	23·5	92·0	6·0
1895	523	63·3	26·4	89·7	8·0
1896	467	67·7	23·8	91·5	2·9
1897	596	60·1	31·7	91·8	4·5
1898	581	59·8	27·5	87·3	4·5

Fishery Barometers.

Fishery Barometers.—Barometers have for many years been lent by the Office to fishing villages and other places on the coast, for the benefit of sailors and fishermen. A list of the stations thus provided is given in Appendix IX., p. 84. There are 220 stations of this kind, of which 67 are in England, 7 in Wales, 62 in Ireland, 79 in Scotland, 4 in the Isle of Man, and 1 in Jersey.

PART III.

CLIMATOLOGY.

I.—BRITISH ISLES.

Climatology.

Meteorological observations of the highest refinement and completeness entail considerable expense, and the service of highly trained observers. It has, therefore, been the policy of the Office to subsidise, and to maintain an intimate relationship with, a small number of observatories of the highest class. The data derived from these stations are suited for such investigations as require minute and continuous knowledge of the several meteorological elements. These stations are, however, too few and too widely scattered to afford a good general representation of the conditions of climate, the winds, barometric pressure, temperature, and sunshine of the British Isles, and it has accordingly been found necessary to supplement them by certain other "anemographic," "barographic," and "sunshine" stations.

The distribution of stations required for representing the climate of these islands likewise differs from that needed for the forecasting of the weather. For the latter purpose the Office relies only on the "Telegraphic Reporting Stations" referred to in Part II.

The climate of different parts of Great Britain and Ireland is very diverse, and fortunately there are throughout the country many stations where good meteorological observations are made by volunteer observers. Such of these stations as furnish the Office with observations are classed as stations of the second and third order respectively

according to the amount of information furnished by each. In addition to these stations there are others—maintained by various public bodies—that send up observations, and some of these, such as the Observatory at Bidston, Liverpool, and the Radcliffe Observatory, at Oxford, are really first order Observatories, although ranking in the Office list as of the second order only by reason of the smaller amount of information supplied by them to the Office.

A list of all the stations is given in Appendix XI. (p. 89). Certain letters are attached to each station, which indicate the nature of the information supplied to the Office. From what has been just stated it will have appeared that the stations may be classified in seven categories; but an examination of the list in Appendix XI. will show that the categories to a certain extent over-lap, so that the same station may occur in two of them.

The seven categories are as follows:—

Observatories of first order.

1. *Observatories of the First Order*, maintained or subsidised by the Office, and furnishing continuous photographic records of the barometrical pressure and the temperature, and continuous records of rainfall, wind, and bright sunshine with frequent eye observations of the weather, and of the kind and amount of cloud.

Anemographic Stations.

2. *Anemographic Stations* which furnish continuous records of the direction and force of the wind. These records are often of use in affording evidence in courts of law, and they are regularly employed in checking the accuracy of the storm warnings.

Barographic Stations.

3. *Barographic Stations* which furnish continuous records from the aneroid barometer.

Sunshine Stations.

4. *Sunshine Stations* which furnish continuous records of bright sunshine. At most of these the record is made by the Campbell-Stokes instrument, of which an account was given in the Annual Report of the Office for 1879 (p. 32.)

The stations of the categories 2, 3, and 4 are of especial service in matters which relate to the weather, as distinguished from climate.

Telegraphic Reporting Stations.

5. *Telegraphic Reporting Stations* which furnish the data for the forecasts and storm warnings, as explained in Part II.

Second Order Stations.

6. *Stations of the Second Order* which furnish complete climatological data. The observations are taken twice a day, and the observers are volunteers and unpaid.

Third Order Stations.

7. *Stations of the Third Order* which resemble those of the second order, except that the information sent to the Office is less full.

An account of the methods employed by the Office in dealing with all these records is given in Appendix X., p. 85.

The stations may be summarised as follows:—

Class.	Description.	Number.
1	Observatories	7
2	Anemographic stations	15
3	Barographic (Aneroid) stations	16
4	Sunshine stations	73
5	Telegraphic stations	30
6	Second Order stations	84
7	Third Order stations	77

Inspection of Stations.

Inspection of the Stations.—The stations classified under the heads 1, 2, 5 and 6 are regularly inspected, while those in Classes 3, 4 and 7 are visited as opportunity offers. Some of the stations of Class 6 belong to the Royal Meteorological Society, and are visited by an Inspector appointed by that Society. In accordance with the recommendation of the Treasury Committee (1877) a contribution towards the cost of this inspection is made by the Office. The rest of the stations of Class 6 are visited, in most cases annually, by the Inspectors of the Office. The inspection of the seven principal observatories and of some of the anemographic stations was carried out by Messrs. T. W. Baker and E. G. Constable, of Kew Observatory.

Extracts from the reports of the Inspectors are given in Appendix V., p. 50.

Reports supplied to Registrar-General for Ireland.

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

Information supplied to the Local Government Board.—Particulars as to the rainfall in the South-East of England in the early autumns of 1897 and 1898 were supplied to the Local Government Board at Mr. Chaplin's request.

Publications. Weekly.

Details as to the Weekly Weather Report, which is prepared in the Telegraphic Branch of the Office, are given in Appendix VI. (p. 75). It supplies, by its synchronous daily charts and Monthly Summaries, an instructive view of the meteorological changes, day by day, over the greater part of Europe.

Appendix I. of the Weekly Weather Report for 1898 gives a summary for each quarter, and for the whole year, of the Rainfall and Temperature in each district, for the 33 years, 1866-1898, and also the Monthly and Progressive values of "Accumulated Heat," Rainfall, and Bright Sunshine for all the districts in each month of 1898.

Appendix II. to the same Report, gives, in continuation of the similar Appendices for 1897 the Weekly and Progressive values of the same elements during the year 1898.

Hourly Means of Meteorological Observations.

Hourly Means of Meteorological Observations.—Commencing with the year 1887, the Office has prepared and published for each year mean values obtained from the hourly readings yielded by the continuously self-recording instruments at their five first-class observatories. These means are for pressure, temperature and the hygrometric condition of the air, the force and direction of the wind, and the amounts of rainfall and sunshine. They are obtained for each hour of the day for periods of five days, for the calendar months, and for the year, and they supply a complete synopsis of the march of the different elements at the several observatories.

Recently, however, it was represented to the Council, by the Meteorological Conference which met at Paris in the autumn of 1896, that for certain investigations these mean values are insufficient, and that for some of the elements at least, and for a few observatories, it is desirable to publish the original hourly readings as derived from the records of the self-registering instruments; the Council have therefore arranged that, commencing with the year 1895, they will add to the volume of *Hourly Means* the hourly readings of pressure, temperature, and rainfall for the observatories of Valencia and Kew, as typical of the conditions prevailing respectively at a coast and at an inland station of the British Isles.

Hourly Means of Meteorological Observations.

The volume of *Hourly Means* for 1895 has not yet been published owing to serious delay at the printing office. A few pages still remain to be revised, and it is hoped that the volume will be ready for issue very shortly.

The volume will contain an Appendix, in which will be found mean hourly values of pressure and temperature for each month, for the five lustra 1871-1895, and also for the entire period of twenty-five years; and also the average hourly amount and frequency of rainfall for the same period; and in addition the mean hourly duration of sunshine for the fifteen years 1881-1895.

Meanwhile the preparation of the volume for the year 1896 has been steadily carried on, and the work is now in a forward state.

The computation of the harmonic components of the diurnal variation of pressure and temperature has been carried to the end of 1895, so that the series is now complete for 27 years.

Observations at Ben Nevis and Fort William.

Observations at Ben Nevis and Fort William.—The directors of the observatories at Ben Nevis and Fort William intimated that the funds at their disposal, including the grants made by the Meteorological Council, would not admit of the continued maintenance of these observatories; that in their opinion it was important that they should be kept open, at all events for two years, from July last; and that an additional sum of £1,000 would be necessary to admit of this being done. They accordingly applied to the Council for a grant of this amount. The Council in reply expressed their regret that it would not be possible for them, consistently with the other demands on the funds entrusted to them, to comply with this request. Further, as it would be out of their power to supply the funds which the Directors thought necessary to maintain the two observatories, in future, they resolved to give notice, under the arrangement originally made regarding these observatories, that the grants would cease after the end of the year 1901.

The correspondence on this subject with the Directors of the observatories and Her Majesty's Treasury, will be found in Appendix A, p. 21.

Publication of Climatological Observations

Observations at Stations of the Second Order.—The volume for 1895 is now issued, and that for 1896 is far advanced.

The form of this publication remains unchanged. It comprises, first, the actual observations at 9 a.m. and 9 p.m. at 21 stations, printed on a modification of the form, A., adopted for International use by the Meteorological Congress at Rome, 1879—and, secondly, the Monthly Means and Summaries at 51 stations printed in the form B. also adopted by the same Congress, together with an Annual Summary for all stations, and a Return of Bright Sunshine.

As stated in the last Report, the volume for 1895 differs from that for 1894 only by the disappearance from the B. list of Edgeworthstown, Ireland, and the inclusion of Tavistock in South Devon, the number of stations both A. and B. remaining as before.

The volume for 1896, now passing through the press, will include five new stations, namely, Woolacombe, near Ilfracombe, on Form A. (detailed observations), and Strathpeffer-Spa, N.B., Gilcrux, near Maryport, Belvoir Castle (Grantham), and Norwood (South London), on Form B., while two stations are discontinued, namely, Margate, where Mr. J. Stokes, F.R.Met.Soc., finds himself unable any longer to continue the evening observations, and Brookebrough, Co. Fermanagh, which has ceased owing to the death of Sir Victor Brooke, Bart.

The Council have recently received from the Office of Her Majesty's Woods and Forests an application for advice as to the institution of meteorological observations over the Forest of Dean. Observations in Forest of Dean.

II.—Foreign and Colonial Stations.

Observations made at various Foreign and Colonial Stations are frequently received at the Meteorological Office. Foreign and Colonial Stations.

During the year 46 such returns have come in, and a list of them is contained in Appendix XII., p. 96.

In most cases the observations were taken twice a day, and the results have been dealt with in the same way as those from Stations of the Second Order, in Class 6, p. 16. Continuous records of bright sunshine were received from Georgetown (Demerara).

The meteorological results given in the Cyprus Blue-Book, refer to six stations in the island. The tables continue to be compiled in the Office.

Returns from foreign and colonial stations have been published from time to time, but the Council have now determined upon a systematic publication of them. It was hoped that the first of these volumes (which will contain the available data up to, and inclusive of, 1895), would have already appeared, but owing to the pressure of other work and the reduction of staff, the requisite examination and preparation of the Returns has been delayed. The sheets are now, however, in a fairly forward condition, and it is expected that the work will be in the printer's hands before the end of the current year.

PART IV.

Miscellaneous Investigations and Administration.

Anemometer Experiments.—The bridled anemometer at Holyhead has not yet been dismounted, and the records of the three experimental anemometers on Salt Island, to which reference was made in last year's Report, have been kept regularly at work during the year. The relative infrequency of very strong winds makes the acquiring of sufficient data respecting high pressures a long process. Anemometer Experiments

Atmospheric Electricity.—The Council having obtained from the Government Grant Committee the sum of £200 "for a research on the best methods of dealing with the Records of atmospherical electricity obtained at Kew Observatory," have requested Mr. C. T. R. Wilson, of Sidney-Sussex College, Cambridge, to undertake the proposed investigation, and Mr. Wilson has already submitted to the Council a preliminary report on the subject. Atmospheric Electricity.

The diurnal Range of Rain.—A paper on the diurnal range of rain during the 20 years (1871-90), recorded by the Beckley's self-recording gauge, at the seven observatories in connection with the Office, has been drawn up by the Secretary, Mr. Scott, and will be printed by the Office. Diurnal Range of Rain.

Exceptionally Heavy Falls of Rain.—In compliance with a request from some hydraulic engineers, a record of all the exceptionally heavy falls of rain at the seven observatories, 1871-98, has been drawn up by Mr. Scott and submitted to the Royal Meteorological Society for publication in their Quarterly Journal. Heavy Falls of Rain.

The Library, &c.

Library.

The library contains standard works and serial publications on Meteorology and the allied sciences. It consists at present of about 15,000 volumes and pamphlets, there are besides many charts and MS. records of observations. The library at the Office is accessible to students engaged in meteorological investigations.

Each work, immediately on receipt, is entered on a card under the Author's name, and is subsequently entered in a classified catalogue under the subject to which it refers.

Appendix XIII., p. 98, contains a list of the additions to the library during the year.

Appendix XV., p. 120, gives a list of the important contributions to meteorology which have appeared in the various reports issued by the Office since 1866.

Appendix XVI., p. 125, gives a catalogue of publications issuing from the Office.

Expenditure.

Financial.

Appendix XIV., p. 119, shows the receipts and payments during the year ending 31st March, 1899. The amount voted by Parliament was 15,300*l.*, as in the previous year, and the miscellaneous receipts amounted to £1,296 14s. 6d. In addition to these amounts the sum of £200 was received from the Government Grant Committee, as above explained.

The following abstract of expenditure shows the true charge against the grants of this and the preceding year, together with the increase or decrease in 1898-99, as compared with the previous year:—

Net Expenditure.	1897-98.	1898-99.	Increase.	Decrease.
General Administration:	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Payment of Council ...	968 9 5	990 0 0	21 10 7	—
Secretary	800 0 0	800 0 0	—	—
Office	990 1 3	930 0 0	—	60 1 3
Rent, Fuel, and Lighting	721 13 7	710 13 2	—	11 0 5
Alterations to premises and contingencies ...	313 11 8	236 2 9	—	77 8 11
Expenses incidental to International Meteorological Congress ...	—	4 3 10	4 3 10	—
Pensions	144 0 0	144 0 0	—	—
Special Researches ...	782 17 3	786 11 5	3 14 2	—
Land Meteorology ...	3,596 4 5	3,609 3 0	12 18 7	—
Weather Information ...	3,913 8 7	3,871 13 2	—	41 15 5
Inspections	403 5 11	431 17 4	28 11 5	—
Ocean Meteorology ...	2,350 12 1	2,489 1 7	138 9 6	—
Total ... ... £	14,984 4 2	15,003 6 3	209 8 1	190 6 0

In the year 1898–99 the sum of £1,726 0*s.* 5*d.* was paid to the Post Office on account of inland and foreign telegrams, allowances to telegraph clerks, rental of private wires, &c.

(Signed) R. STRACHEY,
Chairman.

June, 1899.

APPENDIX A.

CORRESPONDENCE relating to Allowances made by the Meteorological Council to the Ben Nevis Observatories.

SCOTTISH METEOROLOGICAL SOCIETY TO METEOROLOGICAL COUNCIL.

(M.O. 1262.)

Scottish Meteorological Society,
Edinburgh, July 23, 1898.

SIR,

WE are instructed by the Council of the Scottish Meteorological Society and the Directors of the Ben Nevis Observatories to send you the enclosed Extract from the last Report to the Society at their Meeting on the 21st inst., intimating the closing of the High and Low-level Observatories in October next. We are further instructed to say that this step is taken with deep regret.

We are, &c.,

JOHN M'LAREN, Vice-President.
JOHN MURRAY, Convener of Directors.
ARTHUR MITCHELL, Honorary Secretary.
ALEXANDER BUCHAN, Meteorological Secretary.
W. B. WILSON, Honorary Treasurer.

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

EXTRACT FROM THE REPORT OF THE SCOTTISH METEOROLOGICAL SOCIETY TO THE HALF-YEARLY MEETING OF THE SOCIETY ON 21ST JULY, 1898.

Closing of the Ben Nevis Observatories.

The Directors greatly regret to have to announce that the High and the Low-level Observatories at Ben Nevis will cease to exist in October of this year. This is the necessary outcome of the want of funds. There is no way, so far as the Directors can see, by which these great first-class Meteorological Observatories can be continued, except by aid from the State. In other words, the Directors have no grounds for expecting that further assistance will come from private sources.

This decision has been come to in consequence of estimates submitted by the Honorary Treasurer, from which it appears that if, in October next, the property belonging to the Directors were realised and all obligations met, there would probably remain a balance of £250. If, however, the Observatories were carried on till October, 1899, there would be a debt of probably £150.

By the establishment of these Observatories, and the unique observations made at them, a great experiment has been carried out with signal success. In this work the Council of the Society has been strengthened by having on the Board of the Directors of the Observatories representatives of the Royal Society of London, the Royal Society of Edinburgh, and the Philosophical Society of Glasgow. The experiment has been, as anticipated, a costly one. A sum of no less than £18,150 has been expended on the inquiry, and the sum has been obtained by contributions partly from scientific bodies, but mainly from the public.

The Scottish Meteorological Society cannot fail to experience great satisfaction from its having been found possible to do so much; indeed, when resolving on making the experiment, and founding the Observatories, the most sanguine expectation could not have predicted the ready and liberal response made to the appeal for the necessary funds.

With much pleasure the Directors are able to report that in a large sense the objects aimed at have been attained. A long series of hourly observations has been obtained by night and by day without a break over a period of fifteen years, though these included eye or other observations outside in the severe climate of the top of Ben Nevis, forming a set of observations quite unique, nothing similar having as yet been done at any other High-level Observatory in the world.

The Directors would have been extremely glad if the period of simultaneous hourly observations at the High and Low-level Observatories could have been prolonged for other three years, in order to give ten annual instead of seven annual averages running from January to December, and to furnish a better basis for a minute and careful discussion of the mass of observations now in the possession of the Society, and available for the study of meteorological phenomena.

In conclusion, the Directors cannot contemplate without sadness the giving up of these two Observatories, both well-equipped and in full working order, especially as they are strongly of opinion that two such Observatories should continue to be carried on as essentials in the observing system of the country.

METEOROLOGICAL COUNCIL TO SCOTTISH METEOROLOGICAL SOCIETY.

Meteorological Office, July 25, 1898.

SIR,

I HAVE the honour to acknowledge the receipt of your letter of the 23rd instant, which shall be laid before the Meteorological Council.

I am, &c.,

ROBERT H. SCOTT, Secretary.

The Secretary, Scottish Meteorological Society.

SCOTTISH METEOROLOGICAL SOCIETY TO METEOROLOGICAL COUNCIL.

(M.O. 1316.)

Scottish Meteorological Society,
Edinburgh, July 28, 1898.

SIR,

WITH reference to our Circular of 23rd inst., intimating the closing of the Observatories at Ben Nevis in October next, we are now instructed to inform you that it will not be necessary this year to take that step. The annexed letter, which has been sent to the *Scotsman* and other newspapers, will explain how this satisfactory and gratifying result has been obtained.

We are, &c.,

JOHN M'LAREN, Vice-President.
JOHN MURRAY, Convener of Directors.
ARTHUR MITCHELL, Honorary Secretary.
ALEXANDER BUCHAN, Meteorological Secretary.
WILLIAM B. WILSON, Honorary Treasurer.

R. H. Scott, Esq.,

Scottish Meteorological Society,
Edinburgh, July 27, 1898.

SIR,

IT was announced last week in your columns that the Ben Nevis Observatories were to be closed in October next for want of funds. It gives me much pleasure to announce now that this will not be the case. I have received a letter from Mr. J. Mackay Bernard, Kippenross, in which he promises to give £500 "in order that the Observatories may be carried on for another year." The record of Observations for one whole year will thus be the result of Mr. Bernard's great generosity.

He expresses a hope in his letter that before the end of that year arrangements may have been made for the permanent carrying on of the work by State aid, and his very liberal and prompt action makes the Directors more hopeful than they were that this desirable end may yet be reached. But if the State does not charge itself with the maintenance of these Observatories, then Mr. Bernard's example may perhaps be followed by others, so that the Directors may at least be able to obtain continuous and complete observations for the eleven years of a Sun-spot period. This would mean the making of an important addition to knowledge by Scotland, and in that aspect Mr. Bernard is patriotic as well as liberal.

In conclusion, allow me to thank you, and the Press generally, in the name of the Directors, for the sympathetic attitude which has been taken by the newspapers towards the work carried on by the Scottish Meteorological Society.

I am, &c.,

ARTHUR MITCHELL,
Honorary Secretary.

METEOROLOGICAL COUNCIL TO SCOTTISH METEOROLOGICAL SOCIETY.

Meteorological Office, August 6, 1898.

SIR,

I HAVE the honour to acknowledge the receipt of your letter of the 28th ultimo, which shall be laid before the Meteorological Council.

I am, &c.,

C. W. BAILLIE, for Secretary.

The Secretary, Scottish Meteorological Society.

TREASURY TO METEOROLOGICAL COUNCIL.

(M.O. 1395.)

Treasury Chambers, August 17, 1898.

GENTLEMEN,

THE Lords Commissioners of Her Majesty's Treasury are aware that your attention has been called to recent questions and discussions in Parliament upon the announcement that the Ben Nevis Observatories are about to be closed.

My Lords understand that you at present subscribe £350 per annum to these institutions, and receive from them copies of their observations.

They do not doubt that at your next meeting this subject will come formally under your notice, and I am accordingly to inform you that my Lords consider (as stated on their behalf in Parliament) that any assistance from public funds to this institution should be provided out of the Parliamentary Grant administered by you for the benefit of meteorology throughout the United Kingdom generally.

My Lords must not be understood as expressing any opinion upon the scientific questions involved.

I am, &c.,

R. W. HANBURY.

The Meteorological Council,
63, Victoria Street, S.W.

METEOROLOGICAL COUNCIL TO TREASURY.

(M.O. 1395.)

Meteorological Office, August 23, 1898.

SIR,

I AM directed to acknowledge the receipt of your letter of the 17th instant (No. 13049/98), and in reply, to inform you that the subject therein referred to will be duly considered by the Meteorological Council at their next meeting, when they will have the honour to address you further regarding it.

I am, &c.,

C. W. BAILLIE, for Secretary.

The Secretary to the Treasury.

METEOROLOGICAL COUNCIL TO SCOTTISH METEOROLOGICAL SOCIETY.

(M.O. 1395.)

Meteorological Office, October 27, 1898.

DEAR SIR,

I AM instructed by the Meteorological Council to send to you a copy of the letter from the Treasury of the 17th August last, with reference to recent discussions in Parliament relating to the maintenance of the Ben Nevis Observatories, and also a copy of Mr. Hanbury's remarks on the same subject, as reported in the *Times* of the 12th of that month. (*Not printed here.*)

Yours faithfully,

ROBERT H. SCOTT, Secretary.

Dr. Buchan, F.R.S.,
Scottish Meteorological Society, Edinburgh.

SCOTTISH METEOROLOGICAL SOCIETY TO METEOROLOGICAL COUNCIL.

(M.O. 2021.)

Scottish Meteorological Society, Edinburgh,
December 2, 1898.

SIR,

DR. BUCHAN, the Meteorological Secretary, has submitted to the Directors of the Ben Nevis Observatories, your letter to him of 27th October, 1898, enclosing, at his request (1), a copy of the report

by the *Times* newspaper of 12th August, 1898, of Mr. Hanbury's answer to a question by Mr. Piric, M.P., relating to the Ben Nevis Observatories; and (2), copy of a letter of 17th August, 1898, to the Secretary of the Meteorological Council from Mr. Hanbury, for the Lords Commissioners of H.M. Treasury, also relating to the Ben Nevis Observatories. Your letter bears that it was written by instruction from your Council, but there is no wish expressed in it that the enclosures should be laid before the Directors, for the purpose of eliciting their views in regard to the matter to which the enclosed documents relate. The Directors, however, assume that such was the wish of the Council, and they accordingly instruct me to write as follows:—

They desire, at the outset, to point out that the Lords Commissioners, as stated by Mr. Hanbury, "consider that any assistance from public funds (to the Ben Nevis Observatories), should be provided out of the Parliamentary Grant administered by you (the Council) for the benefit of meteorology throughout the United Kingdom generally." As the grant here referred to is administered by the Meteorological Council, the Directors will be glad to learn from them what they propose to do in the matter.

In order to assist the Council in considering the question, I am directed to enclose a copy of that part of the Report to the last General Meeting of the Scottish Meteorological Society which deals with the Ben Nevis Observatories, and also to furnish the Council with information as to the cost of working the observatories, as to their financial history, as to the suitability of their position, as to the composition of the Directorate, &c.

It appears, from the report referred to, that the observatories would have been closed in October last, as a "necessary outcome of the want of funds." But, soon after the meeting to which the report was made, a donation of £500 was received from Mr. Mackay Bernard, of Kippenross, for the purpose of keeping the two observatories at work for another year, and this sum, with the payment of £350 received annually from the Council and some other sources of income, will be sufficient for the purpose. But there is no expectation of further benefactions from the public, and, if State assistance is not obtained, it will be necessary to close both the High and Low Level Stations in October of next year. It seems of importance here to point out that the Directors would require to know, not later than July of next year, whether such assistance is to be given, because the provisioning of the High Level Station must be completed before winter begins.

The payment of £350 from the Council consists of an annual payment of £100 in respect of the High Level Station since 1881, and of an annual payment of £250 in respect of the Low Level Station since 1890, when it was established. In return for these payments copies of all observations at both stations are prepared and transmitted to the office of the Council. A detailed statement of what is sent to the Council is given in an appendix to this letter. The cost of this probably falls to be deducted from the payments made by the Council, in a strict calculation of the cost of carrying on the two observatories. But, assuming that this part of the work continues to be done as at present, then the experience of the Directors shows that about £500 a year would be needed in addition (1), to the £350 contributed by the Council, to which reference has just been made; (2), to the other sources of income, also just referred to, namely, profits, (1), from the sale of road permits and guide-books; and (2), from the supply of

weather reports to newspapers—the continuance of which may be safely counted on, and which amount to about £150. The actual total cost of carrying on the two observatories during the three years, from June, 1895, to June, 1898, has been £3,004 13*s.* 11*d.*, giving a yearly average of £1,001 11*s.* 4*d.*

The Treasury consider the annual grant of £15,300 as being "for the benefit of meteorology throughout the United Kingdom generally." This of course cannot be regarded as involving an expenditure in each of the three divisions of the United Kingdom of such a portion of the grant—after deduction of the necessarily central and large cost of the office and staff—as would correspond to the different populations, because some one division of the Kingdom may contain better localities and conditions for meteorological research than the others, and may thus, in the interest of the study of the Meteorology of the United Kingdom, broadly, be entitled to an expenditure within its borders of more of the grant than its proportion, as calculated on population. For instance, as regards the observatories at Ben Nevis, Scotland is in a position which is altogether exceptional. Not only is there no other place in the United Kingdom which is so favourably conditioned for making simultaneous high and low level observations, but there is probably no place in Europe so favourably conditioned. Its exceptional suitability lies in the concurrence of the two facts (1), that the height of the High Level Station is very considerable—4,406 feet; and (2), that the Low Level Station is at sea level, and on the sea shore, and is less than five miles distant from a perpendicular falling from the High Level Station. This special fitness of Ben Nevis and Fort William for high and low level stations, working together as practically one station, might justify the expending in Scotland of more than its proportion of the grant, as calculated on population. The two observatories have been established, and have for many years been carried on, mainly through assistance voluntarily given by the public. The total expenditure on them up to 30th June, 1898, has been £18,150. This sum will be increased when the amount which will be spent during the current year comes to be added. The observatories may, therefore, be fairly regarded as a striking example of courageous private enterprise in the search after additions to knowledge.

The Directors, in conclusion, trust that the Council may be able, either by some rearrangement of the work which they control and direct, or as the result of the establishment of a National Physical Laboratory, to set aside a sum out of the funds at their disposal which would be sufficient to keep the Ben Nevis Observatories in full operation.

It will be observed from the enclosed Report of the Scottish Meteorological Society, that the Directors are specially anxious that the two observatories should be continued in full operation for at least three years from October, 1898.

The Directors of the Observatories consist of the Council of the Scottish Meteorological Society, with four representatives from the following Societies,—one from the Royal Society of London, two from the Royal Society of Edinburgh, and one from the Philosophical Society of Glasgow. The four representatives at present are Lord Kelvin, Professor Tait, Professor Chrystal, and Mr. Gilbert Thomson, and the present members of Council of the Society, which consists of men of science and men of affairs, are the Duke of Richmond and Gordon, Lord McLaren, Sir John Murray, Professor Crum Brown, Sir Archibald Geikie, Professor Copeland, Professor Geikie, Mr. John

Aitken, Mr. J. Y. Buchanan, Mr. R. T. Omond, The Earl of Moray, Professor McKendrick, Dr. J. B. Russell, Sir James D. Marwick, Mr. Robert Cox, Mr. Wenley, Mr. J. G. Bartholomew, and Mr. W. B. Wilson. Eight of these are Fellows both of the Royal Society of London and the Royal Society of Edinburgh, and nine others are Fellows of the Royal Society of Edinburgh.

It is perhaps desirable to state that hourly observations for the four years at the High Level Station—1883 to 1887—have been published by the Royal Society of Edinburgh, that the hourly Observations for the next nine years made at the High Level Station, and also those made at the Low Level Station, since its establishment in 1890, are now ready for the press, and that efforts are being made to arrange for the publication of these last.

The Directors hope that this statement may be useful to the Council, and they beg to express their desire that a copy of it be forwarded to Mr. Hanbury, for the information of the Lords Commissioners of Her Majesty's Treasury.

I am, &c.,
ARTHUR MITCHELL,
Honorary Secretary.

R. H. Scott, Esq.,
Secretary of the Meteorological Council.

APPENDIX.

Data supplied to the Meteorological Council by the two Observatories.

I. Ben Nevis.—

One copy of each daily sheet containing the 24 hourly readings of the various instruments with daily totals and means, made and recorded in accordance with the instructions of the Directors of the Observatories.

II. Fort William.—

The photographic tracings of the barograph, dry bulb thermograph and wet bulb thermograph, along with the hourly values of these curves reduced to figures according to the regulations drawn up for such work by the Meteorological Council.

The traces of the self-registering rain gauge and hourly values similar to the above.

The traces of the sunshine recorder with the daily totals of same.

Eye readings of barometer and thermometer made seven times each day to control the self-recording instruments, which, along with notes of wind and weather, are done according to the regulations of the Meteorological Council and entered on forms provided by them.

Here follows the extract from the Report of the Scottish Meteorological Society to the half-yearly meeting of the Society on 21st July, 1898, on the closing of the Ben Nevis Observatories, already printed on p. 22.

METEOROLOGICAL COUNCIL TO SCOTTISH METEOROLOGICAL SOCIETY.

Meteorological Office, December 5, 1898.

SIR,

I HAVE the honour to acknowledge the receipt of your letter of the 2nd instant, which shall be laid before the Meteorological Council.

I am, &c.,
ROBERT H. SCOTT, Secretary.

The Secretary,
Scottish Meteorological Society.

METEOROLOGICAL COUNCIL TO TREASURY.

(M.O. 2021.)

Meteorological Office, December 21, 1898.

SIR,

AT the request of the Scottish Meteorological Society the accompanying papers relative to the maintenance of the Meteorological Observatories at Ben Nevis and Fort William are forwarded for the information of the Lords of the Treasury.

I am to add that the Meteorological Council will give early attention to the subject, and will communicate to you the result of their deliberations as soon as practicable.

I am, &c.,

ROBERT H. SCOTT, Secretary.

The Secretary of the Treasury.

TREASURY TO METEOROLOGICAL COUNCIL.

(M.O. 4.)

Treasury Chambers, January 2, 1899.

GENTLEMEN,

I AM directed by the Lords Commissioners of Her Majesty's Treasury to acknowledge the receipt of Mr. Scott's letter (M.O. 2021) of the 21st ultimo, and its enclosures respecting the maintenance of the Meteorological Observatories at Ben Nevis and Fort William.

My Lords await the further communication on the subject promised by you. It is desirable that they should be in the possession of your views before deciding upon the estimate to be presented to Parliament next session, which must shortly be considered.

I am, &c.,

R. W. HANBURY.

The Meteorological Council,
63, Victoria Street, S.W.

METEOROLOGICAL COUNCIL TO TREASURY.

(M.O. 4.)

Meteorological Office, January 19, 1899.

SIR,

I AM directed by the Meteorological Council to inform you, in continuation of my letter of the 21st ultimo, that the Council have given careful consideration to their position in relation to the Scottish Observatories at Ben Nevis and Fort William, with the results that I shall proceed to explain.

In 1879 the Council agreed to make a yearly grant of £100 in aid of the work to be carried on at the Observatory on Ben Nevis, as soon as it was brought into operation. This grant took effect from 1881 and has been continued up to the present time.

In 1889 and 1890 the Council further supplied for the Observatory at Fort William an equipment of self-registering and other Meteorological instruments, at a cost of about £275, and agreed to make an annual grant in aid of the maintenance of the Observatory of £250, on the understanding that (subject to the Treasury grant to the Council being continued) this contribution should be continued for five years, and that it should not be withdrawn without two years' previous notice. This grant has also been continued up to the present time, and notice of withdrawal has not hitherto been given.

The decision of the Managers of the two Scottish Observatories, announced in July of last year, of their inability to maintain the Observatories unless an additional yearly sum of £500 was obtained for the purpose, was come to without any previous communication on the subject to the Meteorological Council, and neither in the published notice of this decision, nor in the letter dated the 23rd July, 1898, addressed to the Council by the Managers of the Observatory, was any allusion made to the yearly grant that had been made by the Council, nor any suggestion or claim put forward for its increase.

I am further to explain that for some time before this announcement was made, the Meteorological Council had arrived at the conclusion that the position of the staff of the Meteorological Office was such that the adoption of some system of superannuation had become essential, which could not be carried out without a considerable reduction of expenditure on other objects, or an equivalent increase to the Parliamentary grant. They therefore addressed the Royal Society on the subject, pointing out the nature of the difficulty, and proposing that the Treasury might be solicited to make such an additional grant as would enable the Council to meet it.

The President and Council of the Royal Society, while recognising the virtual necessity for a system of superannuation, considered, however, that the Meteorological Council should in the first place review their present expenditure, and endeavour to provide the necessary funds by reductions, where they could be made without undue sacrifice of essential objects, before the question of an additional grant could be entertained. The Meteorological Council could not avoid acquiescing in this conclusion, and are about to enter on such an enquiry as was suggested by the Royal Society. Copies of this correspondence are annexed. *(Not printed here.)*

In these circumstances, all that the Meteorological Council are able to say with reference to their attitude in relation to the Scottish Observatories is, that it is at present impossible to contemplate any increase of the present contributions, and much more likely that these will have to be reduced or discontinued, as soon as the conditions under which they were promised will admit of this being done.

For the same reason the Meteorological Council has been unable to give any definite reply to Sir Arthur Mitchell's letter dated the 2nd December, 1898, a copy of which was forwarded to the Treasury.

I am, &c.,
ROBERT H. SCOTT, Secretary.

The Secretary of the Treasury.

TREASURY TO METEOROLOGICAL COUNCIL.

(M.O. 241.)

Treasury Chambers, January 30, 1899.

GENTLEMEN,

I am directed by the Lords Commissioners of Her Majesty's Treasury to acknowledge the receipt of Mr. Scott's letter (M.O. 4) of the 19th instant, and to thank you for the full information as to the history of your relations with the Ben Nevis Observatory, and also as to the general financial position of the fund which you administer.

My Lords observe that the continuance of the Ben Nevis Observatory is secured up to October next, and is desired for two more years from that date; but that it is necessary for the managers of that institution to be in a position to decide as to its future not later than July next.

They further understand that your two present grants of £100 and £250 (or at least the second of them) cannot be withdrawn without two years' notice, and that such notice has not yet been given.

They note also that you are at present reconsidering the scope of your expenditure within the limits of the present grant for the reasons indicated in your correspondence with the Royal Society.

It appears, therefore, that, while on the one hand there is no need for an immediate decision, on the other hand there are reasons which make it difficult to form such a decision at once. But my Lords trust that you will find it possible to deal with the question definitely before July.

Referring to the letter from Sir A. Mitchell, of which you forwarded a copy on the 21st ultimo, my Lords have no doubt that you will weigh impartially the relative claims of the several branches of meteorological enquiry to a share in the funds at your disposal; and their confidence that full justice will be done to the case of Ben Nevis is increased by the fact that the Council includes an eminent representative of the Scotch meteorologists.

I am, &c.,

R. W. HANBURY.

The Meteorological Council,
63, Victoria Street, S.W.

SCOTTISH METEOROLOGICAL SOCIETY TO METEOROLOGICAL COUNCIL.

(M.O. 553.)

122, George Street, Edinburgh,
March 16, 1899.

SIR,

AT a meeting on the 11th instant of the Directors of the Ben Nevis Observatories, there was submitted a letter from Dr. Buchan, of date 9th instant, enclosing an excerpt from the minutes of the meeting of the Meteorological Council of January 2nd, 1899, which referred to the letter to the Council from the Directors of date 2nd December, 1898, and stating that the excerpt was sent to him for the information of the Directors. This excerpt is a copy of a letter, of date 19th January, 1899, from the Meteorological Council to the Lords of the Treasury.

There was at the same time submitted a copy of Mr. Hanbury's answer, dated 30th January, 1899, which was also enclosed in Dr. Buchan's letter referred to, and which he was desired by the Meteorological Council to forward to the Directors.

After consideration of these documents, the Directors now instruct me to make application to the Meteorological Council for a grant of one thousand pounds, in addition to the three hundred and fifty pounds now received annually, in order to enable them to carry on the two Ben Nevis Observatories till the autumn of 1901, and to express a hope that the Council will be able to grant this assistance, as a special value attaches to having the work carried on till that period.

I am, &c.,

ARTHUR MITCHELL,
Honorary Secretary.

R. H. Scott, Esq.,
Secretary of the Meteorological Council.

METEOROLOGICAL COUNCIL TO SCOTTISH METEOROLOGICAL SOCIETY.

(M.O. 553.)

Meteorological Office, March 29, 1899.

SIR,

I AM directed by the Meteorological Council to acknowledge the receipt of your letter of the 16th March, which informs them that Dr. Buchan had, as requested by the Council, communicated to your Directors a copy of a letter dated the 19th January last addressed to the Secretary of the Treasury by the Council, relative to the grants hitherto made in aid of the Observatories at Ben Nevis and Fort William, and the reasons that rendered it improbable that any addition could be made to those grants, and possible that they might be reduced or discontinued.

The Council observe that after consideration of this letter and the reply to it from the Secretary of the Treasury, a copy of which you had also received, your Directors have thought it necessary to request the Council to make a grant of £1,000 in addition to the £350 heretofore given, to enable them to carry on the two Observatories till the autumn of 1901, as a special value attaches to having the work continued till that period.

In reply to this request I am directed to express the great regret of the Council that it is quite beyond their power to comply with it, consistently with the other claims upon the sum placed at their disposal by Parliament, and the obligations that have to be met, as explained in their letter to the Treasury of the 19th January last, in connection with the provision of superannuation allowances to their staff. The necessities of their position will indeed impose on them the duty of reducing their expenditure to such an extent as must, in some direction at least, limit their future power of aiding meteorological research, and without questioning the value of the work done at the two Scottish Observatories now in view, they have felt it impossible to avoid the conclusion above communicated to you.

I am to remind you that the Council, in arriving at this decision, have before them the circumstance, that besides the Central Observatory at Kew, and that at Valencia in Ireland, only one Observatory in England, that at Falmouth, has for some years past received any grant from the Meteorological Council. Falmouth last year received £255, while in Scotland the grants to Aberdeen, Ben Nevis and Fort William aggregated £625.

As the Council understand from your letter under reply that your Directors do not contemplate the continuance of work at Ben Nevis or Fort William after 1901, they think it will be convenient that you should now receive the formal notice, contemplated when the grants to these Observatories were first made, that the grants will cease at the end of the year 1901.

I am, &c.,
ROBERT H. SCOTT, Secretary.

Sir A. Mitchell, K.C.B.,
Honorary Secretary, Scottish Meteorological Society.

METEOROLOGICAL COUNCIL TO TREASURY.

(M.O. 553.)

Meteorological Office, March 29, 1899.

SIR,

IN continuation of former correspondence, the Meteorological Council direct me to forward for your information copies of a letter

lately received by them from the Directors of the Observatories of Ben Nevis and Fort William, and of their reply to that letter.

The Meteorological Council have come to the conclusions stated in their letter to the Directors of the Scottish Observatories with much regret, but the prolonged consideration of the measures that it will be necessary for them to take, in order to carry out the contemplated arrangements for superannuation, have in their opinion left no alternative course of action open to them, unless the annual grant made to them were increased by £1,200, the sum named in their letter of the 11th May last to the President of the Royal Society, a copy of which was forwarded to you with my letter of the 21st December last.

I am, &c.,

ROBERT H. SCOTT.

To the Secretary of the Treasury.

TREASURY TO METEOROLOGICAL COUNCIL.

(M.O. 754.)

Treasury Chambers, April 19, 1899.

GENTLEMEN,

The Lords Commissioners of Her Majesty's Treasury desire me to thank you for Mr. Scott's letter (M.O. 553) of the 29th March, and enclosures, respecting the grants from the funds under your control to the Ben Nevis and Fort William Observatories.

My Lords gather that you hold that there are claims on your funds more important, from your point of view, than would admit of the special donation of £1,000 for which the Directors of those Observatories ask, assuming the Parliamentary grant of £15,300 not to be increased.

I am to ask whether this correctly expresses your view.

I am, &c.,

R. W. HANBURY.

The Meteorological Council,
63, Victoria Street, S.W.

SCOTTISH METEOROLOGICAL SOCIETY TO METEOROLOGICAL COUNCIL.

(M.O. 792.)

Scottish Meteorological Society, Edinburgh,
April 24, 1899.

SIR,

AT the request of the Meteorological Council, Dr. Buchan gave me, a short time ago, a copy of a letter, without date, from the Council to the Secretary of the Treasury, for submission to the Director of the Ben Nevis Observatories at their first meeting.

With reference to this letter to the Treasury, I beg the Council to be good enough to send me a copy of the answer, which may be received from the Secretary of the Treasury.

I am, &c.,

ARTHUR MITCHELL.

R. H. SCOTT, Esq.,
Secretary, Meteorological Council.

METEOROLOGICAL COUNCIL TO TREASURY.

(M.O. 754.)

Meteorological Office, April 27, 1899.

SIR,

I AM instructed by the Meteorological Council to acknowledge receipt of your letter of the 19th instant (No. 5561/99), and, in reply, to state that it correctly describes the views of the Council.

I am, &c.,
ROBERT H. SCOTT, Secretary.

The Secretary of the Treasury.

TREASURY TO METEOROLOGICAL COUNCIL.

(M.O. 853.)

Treasury Chambers, May 4, 1889.

GENTLEMEN,

I AM directed by the Lords Commissioners of Her Majesty's Treasury to acknowledge the receipt of Mr. Scott's letter (M.O. 754) of the 27th ultimo, further respecting your inability to contribute a special donation of £1,000 towards the maintenance of the Ben Nevis and Fort William Observatories.

I am, &c.,
R. W. HANBURY.

The Meteorological Council,
63, Victoria Street, London, S.W.

METEOROLOGICAL COUNCIL TO SCOTTISH METEOROLOGICAL SOCIETY.

(M.O. 792.)

Meteorological Office, May 11, 1899.

SIR,

IN reply to your letter of the 24th ultimo, I am directed by the Meteorological Council to forward to you a copy of the correspondence which has passed between them and H. M. Treasury in connection with my letter of the 29th March last, a printed copy of which was handed to you by Dr. Buchan and referred to in your letter of the above date.

I am, &c.,
ROBERT H. SCOTT, Secretary.

Sir Arthur Mitchell, K.C.B.
Honorary Secretary, Scottish Meteorological Society.

SCOTTISH METEOROLOGICAL SOCIETY TO METEOROLOGICAL COUNCIL.

(M.O. 792.)

Scottish Meteorological Office, Edinburgh,
May 12, 1899.

SIR,

I BEG to acknowledge receipt of your letter of the 11th instant, with three inclosures.

I hope your Council will be kind enough to send me a copy of any further correspondence, relating to the Ben Nevis Observatories, which may pass between your Office and the Treasury.

I am, &c.,
ARTHUR MITCHELL.

Robert H. Scott, Esq.,
Meteorological Office.

APPENDIX.

APPENDIX I.

LIST of CAPTAINS and OFFICERS who have sent in Logs classed as "Excellent" during the year ending March 31, 1899. Figures are attached to the name of each observer to show the number of "Excellent" logs which he has supplied during the whole time of his co-operation with the Office.

Name of Captain or Officer.	Number of "Excellent" Logs.	Ship.
Alford, F.	6	S.S. Monarch.
Alsop, J. J.	1	Barque Brussels.
Angus, T. S.	19	S.S. Britannia.
Bertie, J. L.	1	S S. American.
Bobardt, A. O., Surgeon, R.N.	1	H.M.S. Dart.
Boothby, G. C.	1	S.S. Heraclides.
Brewis, Sub-Lieut. C. R. W., R.N.	8	H.M.S. Penguin.
Bright, H.	12	Hornby Castle.
Clarke, W. H.	2	S.S. Nomadic and S.S. Tauric.
Clinock, T. C.	2	S.S. Harlech Castle.
Crewe, E.	2	S.S. Victoria.
Dart, L. C.	18	Barque Alcides.
Davies, E. H.	4	S.S. Heraclides.
Davies, H.	2	S.S. La Plata.
Dawson, W. P., R.N.	3	H.M.S. Waterwitch.
De la Garde, P., R.N. (Assistant Paymaster).	3	H.M.S. Waterwitch.
Dickinson, L. R.	2	S.S. Danube.
Docherty, H.	8	Barque Tinto Hill.
Dupen, P. P.	11	S.S. Cabenda and S.S. Biafra.
Dyke, H. W.	13	Rathdown.
England, T.	23	Barque Glen Grant.
Evans, J. E.	1	S.S. Wolf.
Field, A. M., R.N.	28	H.M.S. Penguin.
Fraser, W. D.	10	Corolla.
Gifford, H. C.	1	S.S. Amber.
Goudge, E.	1	S.S. Naworth Castle.
Griffin, E. J., R.N.R.	2	S.S. Moor.
Haddock, H. J., R.N.R. ...	1	S.S. Britannic.
Hepworth, M. W. C., R.N.R. ...	17	S.S. Aorangi.
Jaggard, R.	2	S.S. Waimate.
James, E. Gates, R.N.R. ...	1	Airlie.

Name of Captain or Officer.	Number of "Excellent" Logs.	Ship.
Lewis, J.	2	S.S. Lassell.
Lobb, Comr. F. J., R.N. ...	5	L.H. Tender Richmond.
Lowe, J.	2	S.S. Duffield.
Lowis, Lieut. A. W., R.N. ...	4	H.M.S. Penguin.
MacKay, H., R.N.R.	2	S.S. Lucania.
Martin, W., R.N.R.	7	S.S. Mexican.
Millican, J. W.	16	S.S Loughrigg Holme.
Milne, W. F.	14	S.S. Eclipse.
Milner, W. H.	29	S.S. Atrato.
Milward, C. A., R.N.R. ...	2	S.S. Mataura.
Moseley, F. J., R.N.R.	1	S.S. Goorkha.
Murdoch, P.	18	Sierra Lucena.
Murray, J. A.	1	Milwaukee.
Nares, Lieut. G. E., R.N. ...	4	H.M.S. Penguin.
Norman, F.	11	S.S. Indravelli.
Parry, J. F., R.N.	1	H.M.S. Dart.
Pascoe, Lieut. F. C., R.N. ...	4	H.M.S. Penguin.
Peebles, R.	23	S.S. Breconshire.
Philip, W., Junr.	3	S.S. Thermopylae.
Reynolds, R., R.N.R.	2	S.S. Norman.
Sargent, A. H.	12	Pleione.
Scott, G. P., F.R.Met.Soc. ...	15	Buckingham.
Smyth, Comr. M. H., R.N. ...	8	H.M.S. Egeria.
Squares De Carteret, W. G. ...	8	S.S. Minia.
Thomas, H. G., R.N.R. ...	8	S.S. Yarrawonga.
Thomas, W.	1	S.S. Templemore.
Trenaman, R. W.	5	S.S. Lassell.
Trott, S., F.R.Met.Soc. (The late)	37	S.S. Minia.
Turner, A. C., R.N.R.	4	S.S. Britannia.
Tyson, J.	2	S.S. Moor.
Veale, E. A.	3	S.S. Ormuz.
Wade, W. J.	1	Barque Loch Sloy.
Wadsworth, F. H.	1	S.S. Ethiopia.
Walker, H., R.N.R.	22	S.S. Campania.
Watson, Sub-Lieut. H. C., R.N.	5	H.M.S. Egeria.
Waugh, Lieut. A., R.N. ...	4	H.M.S. Penguin.
Wilson, J., R.N.R.	18	S.S. Anchoria.
Worcester, W. D. G., R.N.R. ...	12	S.S. India.

APPENDIX II.

List of Meteorological Logs and Documents received from Ships.

Captain's Name.	Ship.	Voyage.	Year.	Officers who have assisted in keeping the Meteorological Log.
Alford, F.	S.S. Monarch ...	Off British Isles	1897-99	Messrs. Hart, Broadbridge, and Bordeaux.
Alsop, J. J.	Barque Brussels ...	Napier (N.Z.) and Portland (Oregon) ...	1897-98	——
Angus, T. S.	S.S. Britannia ...	Sydney, viâ Suez	1898	R. P. Stevenson, 2nd Officer, Cecil Brooks, 3rd Officer, and A. G. Mead, 5th Officer.
,, ,, ...	,, ...	,, ,, ...	1898	J. H. Brady, 3rd Officer, G. A. Weston, 4th Officer, and A. G. Mead, 5th Officer.
Barker, D. W., R.N.R....	Training Ship Worcester.	Off Greenhithe	1898	The Cadets.
Barron, H.	Ship Evesham Abbey	New York, Rangoon, San Francisco, Algoa Bay and Bombay.	1896-98	——
Baxter, John	Ship Brenhilda ...	Honolulu and Portland (Oregon) ...	1897-98	——
Bertie, J. L.	S.S. American ...	New Orleans...	1898	2nd, 3rd, and 4th Officers.
,, ,, ...	,, ...	,, ,, ...	1898-99	,, ,, ,,
Boothby, G. C.	S.S. Heraclides ...	River Plate	1898	J. P. Hall, 2nd Officer, and J. MacMillan, 3rd Officer.
Brackenbury, W. J. ...	S.S. Atlas	Calcutta, viâ Suez	1898	——
Bright, H.	Ship Hornby Castle...	Adelaide, Portland (U.S.)	1897-98	——
Burton, George... ...	S.S. Rangatira ...	Wellington, viâ Cape of Good Hope, and home viâ Cape Horn.	1898	——
,, ...	,, ...	Wellington, viâ Cape of Good Hope, and home viâ Cape Horn.	1898	G. Dickson, V. Barnsdale, and Z. Stoton.
Carey, F.	S.S. Lake Huron ...	Quebec	1897	——
,, ,, ...	S.S. Lake Superior ...	Halifax	1898	——
,, ,, ...	S.S. Lake Ontario ..	Quebec	1898	——
Casey, Robert	Barque Annazona ...	Melbourne and Antofagasta	1897-98	D. Reid, 2nd Mate.

LIST of METEOROLOGICAL LOGS and DOCUMENTS received from SHIPS—*continued.*

Captain's Name.	Ship.	Voyage.	Year.	Officers who have assisted in keeping the Meteorological Log.
Cattrell, Charles ...	Ship Loch Lomond ...	Melbourne	1897–98	———
Chamberlin, W. C. ...	Ship Narcissus ...	Singapore	1898	———
,, ,, ...	,, ,, ...	Singapore to Albany	1898	———
Clarke, W. H.	S.S. Nomadic ...	New York	1898	G. R. Metcalfe, 2nd Officer, assisted by A. H. Lawson, 3rd Officer, and A. P. Freeman, 4th Officer.
,, ,, ...	,, ...	,, ...	1898	O. L. Beck, J. Keamey, A. J. Lawson, A. J. Pawley, and G. R. Metcalfe.
,, ,, ...	S.S. Tauric	,, ...	1898–99	A. Holme, 2nd Officer, assisted by Mr. Barber, 3rd Officer, and Mr. Robinson, 4th Officer.
Clinock, T. C.	S.S. Harlech Castle ...	Cape Ports and Mauritius	1898	H. M. Cruise, J. Holl, H. B. Ries, and J. Withers.
,, ,, ...	,, ,, ...	,, Tamatave, and Mauritius ...	1898	Messrs. Cruise, Holl, Piers, and Liadert, 1st, 2nd, 3rd, and 4th Officers.
Constantine, Thomas ...	S.S. Don	West Indies	1897–98	T. Blay, 3rd Officer, W. Bilton, 4th Officer, and J. Matley, 5th Officer.
,, ,, ...	S.S. Orinoco	,, ,, ...	1898	J. Gair, 3rd Officer, J. Watts, 4th Officer, and J. W. Matley, 5th Officer.
,, ,, ...	,, ...	,, ,, ...	1898	Mr. Popperwell, assisted by W. Jonish, 3rd Officer, and J. Watts, 4th Officer.
Corner, F. W.	S.S. Macquarie ...	Sydney, viâ Cape	1897–98	F. Groves, 1st Officer, Thomas Taylor, 2nd Officer, H. K. Hole, 3rd Officer, and F. L. Tucker, 5th Officer.
Cox, S. G.	S.S. Rotherfield ...	Newport News, Philadelphia, New York, and Tampico.	1898	Edward A. Alcide, 1st Officer, and W. J. Ingram, 2nd Officer.
Crewe, Edward... ...	S.S. Victoria	Melbourne, viâ Suez	1898	W. Hayward, Chief Officer, S. Finch, 2nd Officer, D. Asbury, Sup. 2nd Officer, T. G. Smith, 3rd Officer, and T. F. Warren, 5th Officer.

Crewe, Edward... ...	S.S. Victoria	Sydney, viâ Suez	1898	W. Hayward, R.N.R., H. G. Evans, R.N.R., S. Finch, R.N.R., C. M. Redhead, R.N.R., C. Hudson, R.N.R., and W. Warren, R.N.R.
„ „	„	„ „	1898–99	W. Hayward, R N.R., Chief Officer, S. Finch, R.N.R., and D. Asbury, 2nd Officers, C. C. Smith, 3rd Officer, W. R. Warren, 4th Officer, and G. Morris, 5th Officer.
Crotty, F. H.	Ship Evesham Abbey	Calcutta and New York	1895–96	
Dart, L. C.	Ship Alcides	San Francisco	1898–99	G. J. Ross, 1st Mate, W. Williams, 2nd Mate, and E. Suliman, 3rd Mate.
Davies, E. H.	S.S. Heraclides ...	River Plate	1897–98	J. P. Hall, 2nd Officer, and W. McMillan, 3rd Officer.
„ „	„ ...	„	1898	J. P. Hall, 2nd Officer, and J. McMillan, 3rd Officer.
„ Herbert ...	S.S. La Plata... ...	Brazil	1897–98	A. F. Smith, 2nd Officer, L. G. Tebbs and C. Durette, 3rd Officers, and V. Lloyd, 4th Officer.
„ „ ...	„	East Coast of South America	1898	A. F. Smith, 2nd Officer, R. A. Ellis, 3rd Officer, C. W. Stevens, 4th Officer.
„ J. A.	S.S. Oanfa	China and Japan, viâ Suez	1898	G. R. Stratford, 3rd Officer.
„ „	„ ...	„ viâ Suez	1898	W. C. Davidson, 1st Officer, J. Metcalfe, 2nd Officer, and W. E. Searle, 3rd Officer.
Dawson, W.P., R.N. ...	H.M.S. Waterwitch...	Sydney, Thursday Island, Hong-Kong, Wei-hai-wei.	1898	Philip de la Garde, Assistant Paymaster, and J. Taylor, J. Featherstone, J. R. Bowering, P.O's. 1st class, A. King, G. Britton, P.O.'s 2nd class.
Dickinson, L. R. ...	R.M.S. Danube ...	East Coast of South America	1898	J. H. Bennett, H. J. B. Popplewell, and J. B, Band.
Docherty, H.	Barque Tinto Hill ...	New York, Melbourne, Manilla, Calcutta, and Boulogne.	1897–98	E. A. Dent, 2nd Officer.

LIST of METEOROLOGICAL LOGS and DOCUMENTS received from SHIPS—*continued.*

Captain's Name.	Ship.	Voyage.	Year.	Officers who have assisted in keeping the Meteorological Log.
Dodd, W. M.	S.S. Port Chalmers ...	Australia, viâ Cape Good Hope, and Monte Video.	1898	J. A. Johnson, 2nd Mate.
Dulling, George ...	S.S. Port Adelaide ...	China and New York, viâ Suez	1897–98	———
,, ,, ...	,, ,, ...	New York, Amsterdam, and Buenos Aires	1898	———
Dupen, P. P.	S.S. Biafra	West Coast of Africa	1898	J. M. Draper, 2nd Officer.
,, ,, ...	,, ...	,, ,, ...	1898–99	Do. Do.
,, ,, ...	S.S. Cabenda	,, ,, ...	1898	J. M. Draper, 2nd Officer, L. Bakewell, 3rd Officer.
,, ,, ...	,, ...	,, ,, ...	1898	J. M. Draper, 2nd Officer.
,, ,, ...	,, ...	,, ,, ...	1898	G. H. Cockeram.
Dyke, H. W.	Ship Rathdown ...	Newcastle (N.S.W.), San Francisco, and Callao.	1896–98	Messrs. Hall and Dyke, 1st and 2nd Mates.
England, Thomas ...	Barque Glen Grant ...	Quebec, Rio Janeiro, and Apalachicola ...	1897–98	———
,, ,, ...	,, ,, ...	Curacoa, Apalachicola, and Bermuda ...	1898–99	———
Evans, Charles	S.S. Lake Huron ...	Quebec	1897	———
,, J. E.	S.S. Wolf	Santos	1898	Richard D. Coffey and Leonard Gibbs.
Field, A. M., R.N. ...	H.M.S. Penguin ...	Suva and Hobart	1897–98	Lieut. C. R. W. Brewis, R.N., assisted by Lieuts. F. C. Pasco, A. Waugh, G. Nares, A. Lowis ; F. Payne, Boatswain ; T. Dinham, A. Lutchford, C. Day, and G. Bailey, P.O.'s 1st Class.
,, ,, ,, ...	,, ...	At Australian Station	1898	Lieuts. F. C. C. Pasco, A. Waugh, G. Nares, A. Lowis, C. R. W. Brewis ; F. Payne, Boatswain ; J. Strickland, T. Dinham, A. Lutchford, G. Bailey, and G. Anstis, P.O.'s 1st Class.
,, ,, ,, ...	,, ...	South Pacific	1898	Lieut. C. R. Brewis, R.N., and Mr. F. Payne, Boatswain, R.N.

Fraser, W. D.	Ship Corolla	Cape Town, Sydney, Taltal, and Baltimore	1897–98	
Free, Thomas, R.N.R. ...	R.M.S. Miowera ...	Sydney, Wellington, Suva, Honolulu, and Vancouver.	1897–98	William Macfarlane, 3rd Officer.
Gadd, C....	S.S. Valetta	Calcutta, viâ Suez	1898	C. Dayas, 3rd Officer, M. Dowling, 4th Officer, and E. A. Farnall, 2nd Officer.
Gedge, H. J., Lieut. and Comr., R.N.	H.M.S. Stork... ...	Malta, Aden, Mauritius, Madagascar, and Mussowa.	1897–98	Sub-Lieut. H. P. Douglas, R.N.
Gifford, H. C.	S.S. Amber	At Aden, Perim, and Zanzibar	1897–98	J. Hunter, 1st Officer, D. P. Morrell, 2nd Officer, and W. F. R. Mist, 3rd Officer.
" "	"	At Zanzibar and Suez	1898	J. Hunter, Chief Officer. D. P. Morrell, 2nd Officer, W. F. R. Mist, 3rd Officer, and A. J. Evans, extra 3rd Officer.
" "	"	Suez, Malta, and Alexandria	1898	J. Hunter, Chief Officer, D. P. Morrell, 2nd Officer, and W. F. R. Mist, 3rd Officer.
Goudge, Edwin... ...	Ship Naworth Castle	Cape Town, Bassein, and Natal	1897–98	P. H. G. Wright, 3rd Officer.
Griffin, E. J., R.N.R. ...	R.M.S. Moor	Cape Town	1898	H. D. Watts-Russell, 2nd Officer, W. A. Swiney, 3rd Officer, A. W. Bennett, 4th Officer.
" " " ...	"	"	1898	A. W. Bennett, 4th Officer.
Haddock, H. J., R.N.R.	R.M.S. Britannic ...	New York	1898	S. A. Anning, 2nd Officer, assisted by J. Kynaston and A. H. Summers.
" " "	" ...	"	1898–99	A. S. Anning and G. R. Metcalfe, 2nd Officers, assisted by R. Learmouth, 3rd Officer, and V. Hickson, 4th Officer.
Hamon, J. J.	S.S. Tekoa	Wellington, viâ Cape Good Hope, and home viâ Cape Horn.	1898	H. C. Barnes, 2nd Officer, H. E. N. Whitehead, 3rd Officer, and S. Porter, 4th Officer.
" "	S.S. Waimate... ...	Wellington, viâ Cape Horn	1898–99	A. Forbes, 2nd Officer, G. Hallett, 3rd Officer, and P. T. Perkins, 4th Officer.

LIST of METEOROLOGICAL LOGS and DOCUMENTS received from SHIPS—*continued.*

Captain's Name.	Ship.	Voyage.	Year.	Officers who have assisted in keeping the Meteorological Log.
Hay, C. W.	R.M.S. Warrimoo ...	Sydney, Wellington, Suva, Honolulu, and Vancouver.	1898	G. M. Hammon, A. H. Reed, and W. Ellis, 2nd, 3rd, and 4th Officers.
Hemming, F. A. ...	R.M.S. Miowera ...	Vancouver, Honolulu, Suva, Wellington, and Sydney.	1898	R. Bailey, 3rd Officer.
Hepworth, M. W. C., R.N.R.	R.M.S. Aorangi ...	Vancouver, Honolulu, Suva, and Sydney	1898	S. Philips, 1st Officer, R. M. Reader, 2nd Officer, F. J. Bayldon, 3rd Officer, and S. Pearson, 4th Officer.
Inskip, H. E.	R.M.S. Ormuz ...	Sydney, viâ Suez	1898	G. H. Jones, assisted by E. J. Taylor and M. B. Sayer.
Jaggard, Russell ...	S.S. Waimate ...	Wellington, viâ Cape Good Hope, and home, viâ Cape Horn.	1898	———
,, ,, ...	,, ...	Port Chalmers, viâ Cape Good Hope ...	1898	A. Forbes, 2nd Officer, G. Hallett, 3rd Officer, and P. T. Perkins, 4th Officer.
James, E. G.	Ship Airlie	Melbourne and Taltal (Chile)	1897-98	H. F. B. Gape, 1st Officer, and H. E. Jackson, 2nd Officer.
Johnston, J., R.N.R. ...	S.S. Goorkha	Calcutta, viâ Suez	1898	F. W. Triggs, Chief Officer, J. Middleton, 2nd Officer, and F. Johnson, 3rd Officer.
Jones, T. J., R.N.R. ...	S.S. Bovic	New York	1898	W. Durack Molony.
Kelly, R.	Ship Westland ...	Cape Town, Otago, Sydney and Lyttleton	1897-98	J. Samuels, Mate, and H. Reynolds, 3rd Mate.
Kempson, C. H. ...	S.S. Ionic	Cape Town, New Zealand, Rio Janeiro, viâ Cape Horn.	1898	J. C. Hamilton and E. Kemp, 3rd and 4th Officers.
,, ,, ...	,, ...	Do. do. do.	1898-99	Do. do.
Lewis, J.	S.S. Lassell	Victoria (Brazil) and New York	1898	F. R. James, 2nd Officer.
,, ...	,, ...	Rio Janeiro and New York	1898-99	Do. do.
Lobb, F.J., R.N. ...	L.H. Tender Richmond	Nassau and Bermuda	1897-98	F. W. Holden, Chief Officer.

Lourison, G. M. ...	Ship Eaton Hall ...	San Francisco, Puget Sound, and Melbourne.	1896–98	Messrs. Commerford, Montadon, and Farquhar, 1st, 2nd, and 3rd Officers.
Lowe, James	S.S. Duffield	Philadelphia	1897–98	F. A. White, 1st Mate.
" "	" ...	"	1898	Do. do.
McKay, Horatio, R.N.R.	S.S. Lucania	New York	1897–98	J. T. W. Charles, R.N.R.
" " "	"	"	1898	Do. do. and A. H. Reade, R.N.R.
Martin, W., R.N.R. ...	R.M.S. Mexican ...	Cape Town	1898–99	Hugh Lockyer, R. M. Pope, and F. Girdler Brown.
Martyr, J. W. C. ...	S.S. Europa	Colon, Genoa, and Boston	1897–98	P. R. Brining, 3rd Officer.
Miller, A. T., R.N. ...	School Ship Conway	Off Rock Ferry (Cheshire)	1898	The Cadets.
Millican, J. W.... ...	S.S. Loughrigg Holme	Quebec, Barcelona, and Alexandria ...	1897–98	E. Russell and E. S. Gibson, 1st and 2nd Officers.
" " ...	" "	Montreal, Sulina, and Savannah	1898	E. Russell, D. S. Turnay, and W. S. Hodgson.
Milne, W. F.	S.S. Eclipse	Davis Strait	1898	———
Milner, W. H.	S.S. Atrato	West Indies	1897–98	Charles Garden, 4th Officer.
" "	"	"	1898	———
" "	"	"	1898	———
Milward, C. A., R.N.R.	S.S. Mataura... ...	Cape Town, New Zealand, and Monte Video.	1897–98	E. G. T., 2nd Officer.
Mitchell, George ...	S.S. California ...	New York and Mediterranean	1897–98	M. Weir, 3rd Officer.
" ...	" ...	Mediterranean Ports and New York ...	1898	Mr. McNeil.
Mitchell W. T. (Chief Officer).	Ship Wasdale ...	Portland, Oregon	1897–98	———
Moseley, F. J., R.N.R....	S.S. Goorkha... ...	Cape Town	1898–99	E. L. Travers, Chief Officer, W. M. Betts, 2nd Officer, T. A. Jones, R.N.R., 3rd Officer, W. Haywood, 4th Officer.
Murdoch, Peter... ...	Ship Sierra Lucena ...	Mauritius, Rangoon, Rio de Janeiro and Chittagong.	1897–98	G. Hopper, Apprentice.
Murray, J. A.	S.S. Milwaukee ...	New Orleans...	1898	Messrs Tonge and Ward, 2nd and 3rd Officers.

LIST of METEOROLOGICAL LOGS and DOCUMENTS received from SHIPS—*continued.*

Captain's Name.	Ship.	Voyage.	Year.	Officers who have assisted in keeping the Meteorological Log.
Nasbet, J. R., R.N.R. ...	S.S. Elphinstone ...	Borneo, Singapore and Hong-Kong ...	1897–98	W. W. Sharpley, 1st Officer, D. G. Taylor, 2nd Officer, and Albert Dransfield, 3rd Officer.
„ „ „ ...	S.S. Sabine Rickmers	In China Sea...	1898	T. Powell, 1st Officer, and Albert Dransfield, 2nd Officer.
Norman, Francis ...	S.S. Indravelli ..	Calcutta, New York, and Yokohama, viâ Suez.	1897–98	C. F. Beresford and N. C. Russell.
Osborne, C. F., R.N.R.	S.S. Persia	Calcutta, viâ Suez	1898	H. Thistle, S. B. Dobson, and A. J. Paulesen.
Parry, J. F.	H.M.S. Dart	At Australian Station	1898	A. O. Bobardt, Surgeon, assisted by Edward Brassington, Charles Lloyd, George Ball, and Noah Smith.
Pattman, R.	Barque Loch Torridon	Melbourne	1898	John A. Robson, 1st Mate, and Robert Craig, 2nd Mate.
Peebles, R.	S.S. Breconshire ...	Philadelphia and Japan, viâ Suez ...	1898–99	Messrs. Elliott, Matthews, and Owens.
Philip, William, Junr.	S.S. Thermopylæ ...	Sydney, viâ Cape Town	1898	W. Douglas, Chief Officer, J. Paterson, 2nd Officer, W. M. Jermyn, 3rd Officer.
„ „ „	„ ...	„ „	1898–99	W. Douglas, J. Paterson, W. M. Jermyn, and E. Legge.
Potter, R.H.	Barque Alliance ...	Brisbane and Valparaiso	1897–98	G. Jones, 1st Mate, and W. Griffiths, 2nd Mate.
Rees, John	S.S. Norseman ...	Boston	1898–99	J. Davies, 2nd Officer, and J. T. Hatton, 3rd Officer.
Reeves, I.	S.S. Australia ...	Sydney, viâ Suez	1898	J. A. Legge, Supernumerary 2nd Officer.
„	„ ...	„ „	1898–99	Do. do.

Reynolds, R., R.N.R. ...	S.S. Norman	Cape Town	1898	J. V. Williams, 1st Officer, W. M. Godfrey, 2nd Officer, A. W. Pearse, 3rd Officer, C. E. Mumford, 4th Officer, D. E. Easton and H. B. Harvey, 5th Officers.
" "	"	"	1898	J. P. Williams, 1st Officer, W. M. Godfrey, 2nd Officer, A. W. Pearse, 3rd Officer, and C. E. Mumford, 4th Officer.
Robinson, E. R., R.N.R.	S.S. Goorkha... ...	Calcutta, viâ Suez	1898	F. W. Triggs, Chief Officer, J. Middleton, 2nd Officer, and F. Johnston, 3rd Officer.
Sargent, A. H.	Ship Pleione	Auckland	1897	G. H. B. Wood, Chief Officer, and J. Middleton, 2nd Officer.
Scott, George P., F.R. Met. Soc.	Ship Buckingham ...	New York and Shanghai	1897–98	W. Bourke, Chief Officer, and J. Maudesley, 2nd Officer.
" "	" ...	New York, Shanghai, and Tacoma.	1898	Do. do.
Singer, P. R.	S.S. Den of Airlie ...	Kurrachee, viâ Suez	1898	James Strachan.
Smyth, Comr. M. H., R.N.	H.M.S. Egeria ...	Esquimalt and Vancouver	1898	Sub-Lieut. H. C. Watson, R.N., and Quartermasters.
" "	" ...	Off Vancouver	1898	Do. do.
Squares De Carteret, W. G.	S.S. Minia	Halifax	1898	J. Adams, Navigating Officer, E. Williams, 2nd Officer, and J. Jeffries, 3rd Officer.
" "	"	East Coast of North America	1898–99	James Adams, Navigating Officer, W. Williams, 2nd Officer, and J. Jeffries, 3rd Officer.
Stephens, T.	S.S. Catalonia ...	Boston	1897–98	——
Thomas, H. G.	S.S. Yarrawonga ...	Batavia and Brisbane, viâ Suez, and home, viâ Cape Good Hope.	1898	F. Owen, 2nd Officer, G. Free, 3rd Officer, and P. Logan, 4th Officer.
" William ...	S.S. Templemore ...	Baltimore	1898	W. McDonald, 1st Officer, A. McKenny, 2nd Officer, and J. Greig, 3rd Officer.

Reynolds, R., R.N.R. ...	S.S. Norman	Cape Town	1898	J. V. Williams, 1st Officer, W. M. Godfrey, 2nd Officer, A. W. Pearse, 3rd Officer, C. E. Mumford, 4th Officer. D. E. Easton and H. B. Harvey, 5th Officers.
" "	"	"	1898	J. P. Williams, 1st Officer, W. M. Godfrey, 2nd Officer, A. W. Pearse, 3rd Officer, and C. E. Mumford, 4th Officer.
Robinson, E. R., R.N.R.	S.S. Goorkha... ...	Calcutta, viâ Suez	1898	F. W. Triggs, Chief Officer, J. Middleton, 2nd Officer, and F. Johnston, 3rd Officer.
Sargent, A. H.	Ship Pleione	Auckland	1897	G. H. B. Wood, Chief Officer, and J. Middleton, 2nd Officer.
Scott, George P., F.R. Met. Soc.	Ship Buckingham ..	New York and Shanghai	1897–98	W. Bourke, Chief Officer, and J. Maudesley, 2nd Officer.
" "	" ...	New York, Shanghai, and Tacoma.	1898	Do. do.
Singer, P. R.	S.S. Den of Airlie ...	Kurrachee, viâ Suez	1898	James Strachan.
Smyth, Comr. M. H., R.N.	H.M.S. Egeria ...	Esquimalt and Vancouver	1898	Sub-Lieut. H. C. Watson, R.N., and Quartermasters.
" "	" ...	Off Vancouver	1898	Do. do.
Squares De Carteret, W. G.	S.S. Minia	Halifax	1898	J. Adams, Navigating Officer, E. Williams, 2nd Officer, and J. Jeffries, 3rd Officer.
" "	"	East Coast of North America	1898–99	James Adams, Navigating Officer, W. Williams, 2nd Officer, and J. Jeffries, 3rd Officer.
Stephens, T.	S.S. Catalonia ...	Boston	1897–98	
Thomas, H. G.	S.S. Yarrawonga ...	Batavia and Brisbane, viâ Suez, and home, viâ Cape Good Hope.	1898	F. Owen, 2nd Officer, G. Free, 3rd Officer, and P. Logan, 4th Officer.
" William ...	S.S. Templemore ...	Baltimore	1898	W. McDonald, 1st Officer, A. McKenny, 2nd Officer, and J. Greig, 3rd Officer.

LIST of METEOROLOGICAL LOGS and DOCUMENTS received from SHIPS—*continued.*

Captain's Name.	Ship.	Voyage.	Year.	Officers who have assisted in keeping the Meteorological Log.
Thomson, W. S. ...	S.S. Macduff	China and Japan, viâ Suez	1898–99	Robert Logan, 2nd Officer.
Trenaman, R W. ...	S.S. Lassell	Bahia, Rio Janeiro and New York ...	1898	R. J. Kite, 2nd Officer.
Trott, Samuel (The late)	S.S. Minia	East Coast of North America	1898	W. G. Squares de Carteret, Chief Officer, J. Adams, Navigating Officer, E. Williams, 2nd Officer, and J. Jeffries, 3rd Officer.
,, ,, ...	,, ...	,, ,, ...	1898–99	Do. do.
Turner, A. C., R.N.R. ...	S.S. Britannia ...	Bombay, viâ Suez	1898	
,, ,, ,, ...	,, ...	,, ,, ...	1898	James Young, 2nd Officer.
,, ,, ,, ...	,, ...	,, ,, ...	1898	
Tyson, J.	R.M.S. Moor	Cape Town	1898	A. W. Bennett, 4th Officer.
,, ,, ...	,, ...	,, ...	1898–99	Do.
Veale, E. A.	S.S. Lusitania ...	Sydney, viâ Suez, and home, viâ Cape Town.	1897–98	A. D. Barff.
,, ,, ...	S.S. Ormuz	Sydney, viâ Suez	1898	G. H. Jones, B. N. Gace, C. Nicholson, and W. G. Cullimore.
,, ,, ...	,, ...	,, ,, ...	1898	B. N. Gace, Chief Officer, C. Nicholson, 2nd Officer, G. H. Jones, 3rd Officer, and W. Cullimore, 4th Officer.
Wade, W. J.	Barque Loch Sloy ...	Adelaide	1897–98	J. McMillan, Chief Officer, and G. Twidale, 2nd Officer.
Wadsworth, F. H. ...	S.S. Ethiopia... ...	New York	1898	W. B. Rome, 4th Mate.
,, ,, ...	,, ...	,, ...	1898	T. G. Keane, 4th Officer.
Walker, Alexander ...	Barque Jordan Hill...	Sydney, Tacoma, and Queenstown ...	1897–98	James Smith, 2nd Officer.
Walker, H.	R.M.S. Campania ...	New York	1898	C. A. Smith, F. W. Hankinson, H. Nelson, and W. Woolley.

Williams, J. O.... ...	S.S. Norseman ...	Boston	1897–98	Thomas James, 2nd Officer.
" "	" ...	"	1898	J. Davies, 2nd Officer, and J. T. Hatton, 3rd Officer.
Wilson, John, R.N.R. ...	S.S. Anchoria ...	New York	1898	David Kinnear, 3rd Officer.
" " " ...	" ...	"	1898–99	D. Pearson, 3rd Officer.
Wood, G. H. B.... ...	Ship Pleione	Auckland	1898	F. W. Bollens, Chief Officer, and J. Middleton, 2nd Officer.
Worcester, W. D. G., R.N.R.	S.S. India	Sydney, viâ Suez	1898	C. C. Talbot, R.N.R., Chief Officer, E. B. Bartlett, R.N.R., 2nd Officer, H. W. M. Atkinson, Sup. 2nd Officer, T. W. Bennett, R.N.R., 3rd Officer, E. P. W. Stroud, R.N.R., 4th Officer, R. A. Harden, 5th Officer.
" "	"	"	1898	A. W. Symes, R.N.R., Chief Officer, E. B. Bartlett, R.N.R., 2nd Officer, R. W. Stagg, 3rd Officer, E. P. W. Stroud, R.N.R., 4th Officer, R. A. Harden, 5th Officer, and H. W. M. Atkinson, Sup. 2nd Officer.
" "	... ...	" "	1898–99	C. C Talbot, E. B. Bartlett, A. A. Mellin, T. W. Bennett, and B. B. Hetherington.

APPENDIX III.

INSTRUMENTS supplied, &c., to the Royal Navy.

Per Account.	Barometers.	Aneroids.	Thermometers.				Hydrometers
			Ordinary.	Max.	Min.	Screens.	
April 1st, 1898, afloat ...	235	615	1,462	389	391	238	63
Issued since	83	160	343	114	95	45	1
	318	775	1,805	503	486	283	64
Returned since	83	141	414	88	83	50	19
April 1st, 1899, afloat ...	235	634	1,391	415	403	233	45

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

April 1st, 1898, in use ...	74	79	247	34	46	10	11
Issued since	3	11	33	2	9	—	—
	77	90	280	36	55	10	11
Returned since	2	7	28	2	1	—	—
April 1st, 1899, in use ...	75	83	252	34	54	10	11

DISPOSITION of ADMIRALTY INSTRUMENTS on April 1st, 1899

Afloat in Royal Navy ...	235	634	1,391	415	403	233	45
In use at stations	75	83	252	34	54	10	11
In store at M.O.	68	146	215	101	115	41	32
,, Chatham	14	52	98	27	29	17	15
,, Sheerness ...	7	13	39	15	15	10	6
,, Portsmouth ...	22	52	154	51	54	26	4
,, Devonport ...	18	35	145	44	48	19	16
,, Queenstown ...	3	2	13	3	3	—	4
,, Gibraltar	2	2	7	3	3	—	4
,, Malta	12	15	59	9	7	2	6
,, Bombay	4	7	15	6	6	2	4
,, Halifax	3	4	18	3	1	1	7
,, Bermuda ...	7	12	13	2	8	2	—
,, Jamaica	4	5	18	—	1	1	3
,, Cape of Good Hope	4	5	27	7	7	3	4
,, Trincomalee ...	3	5	21	5	6	1	4
,, Hong Kong* ...	5	17	18	10	11	2	21
,, Coquimbo ...	3	5	19	4	4	1	19
,, Sydney	5	7	34	2	3	2	2
,, Esquimalt ...	3	3	8	2	6	2	4
Total April 1st, 1899 ...	497	1,104	2,564	743	784	375	211
Lost, &c., since April 1st, 1898	—	6	236	38	22	38	6
Under repair, April 1st, 1899	19	0	—	—	—	—	—

* No Return since Jan. 1st., 1899.

APPENDIX IV.

INSTRUMENTS supplied, &c., to Mercantile Marine.

Per Account.	Barometers.	Compasses.	Thermometers.				Hydrometers.
			Ordinary.	Max.	Min.	Screens.	
April 1st, 1898, afloat ...	118	—	715	—	1	107	400
Issued since	54	—	321	—	—	43	178
	172	—	1,036	—	1	150	578
Returned since	59	—	330	—	1	46	179
April 1st, 1899, afloat ...	113	—	706	—	—	104	399

INSTRUMENTS at Stations, viz., Telegraphic Reporting Stations Observatories, Fishing Villages, &c.

April 1st, 1898, in use ...	302	2	292	64	68	58	10
Issued since	19	2	22	5	5	4	8
	321	4	314	69	73	62	18
Returned since	11	2	24	8	2	4	8
April 1st, 1899, in use ...	310*	2	290	61	71	58	10

DISPOSITION of INSTRUMENTS on April 1st, 1899.

In merchant ships	113	—	706	—	—	104	399
„ use at stations	310*	2	290	61	71	58	10
„ store at M.O.	37	3	117	16	25	51	129
At Liverpool Agency ...	8	—	38	—	—	7	23
„ Glasgow „ ...	6	—	37	—	—	3	11
„ Dundee „ ...	5	—	27	—	—	5	21
„ Hull „ ...	4	—	12	—	—	4	15
„ Cardiff „ ...	9	—	47	—	—	4	30
„ Southampton „ ...	5	—	28	—	—	5	12
Total, April 1st, 1899 ...	497	5	1,302	77	96	241	650
Lost, &c., since April 1st, 1898	5	3	115	4	—	16	44
Under repair, April 1st, 1899	3	—	—	—	—	—	—

* Of these barometers 220 are lent for use of seafaring communities at fishing villages and ports.

APPENDIX V.

Report of Inspection of Irish and Welsh Stations, 1898.

I have to report that I have completed the inspection of the stations in Ireland and Wales. I have omitted several stations where there appeared to be no pressing demand for a visit. These were Roche's Point, a telegraphic reporting station, and six of the Weekly Weather Report stations.

Newcastle, Co. Wicklow, visited September 24th.—The observations at this station, the Consumption Hospital for Ireland, have now commenced. The instruments were in good order. The observer, Dr. Steede, was absent on vacation, but his *locum tenens*, Dr. Rutherford, seemed very capable of keeping the records.

Kingstown, visited September 26th.—Observations have been commenced at the People's Park, but as yet the outfit is incomplete. I hope, however, for improvement ere long.

Dublin, Fitzwilliam Square, visited September 26th.—This station was in its usual excellent order, except that the site is too confined, as mentioned in previous reports.

Dublin, Glasnevin Gardens, visited September 26th.—I found observer ill in hospital. His son took his place and appeared efficient, except that he had allowed the mounting of the wet bulb to get dry.

Donaghadee, visited September 27th.—The instruments are clean and in good order. The observer is no longer Postmaster, and the question of his remuneration requires attention.

Lissan, visited September 28th.—This station is in good condition. Its permanence seems doubtful owing to the very advanced age of Sir N. Staples.

Malin Head, visited September 30th.—This station was in very good order.

Edenfel, Omagh, visited October 1st.—This station is also very satisfactory; the reports appear in the Weekly Weather Report.

Markree, visited October 3rd.—The observer here is new, Mr. F. W. Henkel, F.R.A.S., having succeeded the late Dr. Marth. The instruments were clean and in good order.

Belmullet, visited October 5th.—The instruments were clean, but I had to speak severely to the observer about carelessness in sending off reports, a serious defect in such an important station. There is great difficulty in finding thoroughly competent observers at outlying stations.

Mount Callan, Inagh, Co. Clare, visited October 7th.—This is a new rain station; Colonel Tottenham does not, as yet, take any other observations. The rain gauge is well exposed.

Fenloe, Newmarket-on-Fergus, Co. Clare, visited October 8th.—The observer, Major Hickman, R.A., observes rain, and has also other instruments, but not verified. It is possible that he may take fuller records.

Valencia, visited October 11th.—The instruments are in good order. The fence along the road, which I mentioned last year, is still in bad condition, and is decidedly worse than the average fences close by on the road.

Parsonstown, visited October 13th.—The instruments are in good order. One of the observers, Haines, is probably about to leave. I saw another boy, Thos. Colvin, who will replace him, and who appears intelligent, and is careful, by Dr. Boeddicker's report.

Kilkenny, visited October 14th.—The station is in good order, and Mr. Carlton is very careful.

St. David's, visited October 15th.—This station was, as usual, in excellent order.

St. Ann's Head, visited October 17th.—I found everything in good order.

Corrections for Thermometers.

Stations.	Inspector's Standard.	Dry Bulb.	Wet Bulb.	Max. Thermometer.	Min. Thermometer.	Grass Min.	Spare Thermometer.	Remarks.
	°	°	°	°	°	°	°	
Belmullet	57·4	−0·6	−0·6	−0·4	+0·4	—	—	
Donaghadee ..	55·0	−0·4	−0·7	−0·1	0·0	—	—	
Dublin (City) ..	61·3	−0·6	−0·6	−0·8	0·0	—	—	
Glasnevin	56·0	−0·8	−0·5	−0·1	+0·1	0·0	—	
Kilkenny	52·9	—	—	−0·1	−0·1	—	—	
Kingstown ..	57·1	−0·9	−0·9	−1·0	−0·7	—	—	
Lissan	54·2	−0·5	−0·6	−0·3	+0·3	—	—	
Malin Head ..	52·0	−0·6	−0·5	−0·5	−0·2	—	−0·3	
Markree Castle ..	59·2	−0·1	−0·1	−0·6	+0·5		—	
Newmarket-on-Fergus.	59·2	−0·8	−0·8	—	—	—	—	
Newcastle (Co. Wicklow).	60·0	−0·5	−0·6	+0·2	+0·2	—	—	
Omagh (Edenfel)	52·0	—	—	−0·1	−0·1	—	−0·6	
Parsonstown ..	53·7	−0·4	−0·2	−0·3	−0·2	—	—	
St. Ann's Head ..	53·3	−0·8	−0·1	−0·7	−0·6	—	−0·5	
St. David's ..	53·2	−0·5	−0·5	+0·2	−0·1	0·0	—	
Valencia (Cahirciveen).	53·8	−0·7	−0·7	−0·5	−0·1	—	—	

Robert H. Scott.

Report of Inspection of Scottish Stations, 1898.

Barometers.

The barometers of the stations were compared with inspector's standard No. 690, which was in good order during the inspection till it was accidentally broken at the time of the inspection of the station in Edinburgh. All the barometers were correct and kept in the same good order as on previous years. As regards the barometer at the Edinburgh station, it will be compared when a barometer has been received from the Office for purposes of inspection.

Table I. shews the comparisons with No. 690, the readings of the station barometer not being corrected.

Table I.

Stations.	Inspector's Standard No. 690 corrected.	Reporting Barometer uncorrected.	Check Barometer uncorrected.	Remarks.
	Inches.	Inches.	Inches.	
Ochtertyre	29·587	29·577	—	
Ardrossan	29·916	29·914	29·914	
Rothesay	29·860	29·864	—	
Poltalloch	30·005	29·980	—	
Laudale	29·963	29·970	29·970	Check barometer corrected to height of reporting barometer.
Fort William .. .	29·708	29·719	—	
Fort Augustus . ..	29·854	29·854	—	
Nairn	30·078	30·082	30·072	
Stornoway	30·242	30·243	30·250	
Lairg	29·845	29·830	—	
Dunrobin	30·340	30·341	—	
Deerness	30·092	30·115	—	
Dunrossness	29·822	29·826	29·828	Check instrument in shop at lower level.
Wick	29·983	29·983	30·034	
Cullen	—	-	—	A Fitz-Roy barometer only here.
Aberdeen	29·700	29·706	29·704	
Dundee	29·460	29·460	—	
Marchmont	29·486	29·510	—	
Ladylaw	29·762	29·736	—	
Wolfelee	29·618	29·620	—	
Leith	30·363	30·362	30·362	
Edinburgh	*	29·908	—	* Inspector's barometer broken.

THERMOMETERS.

Two readings of the thermometers were taken, first by the observer as they hung in the screen, and then by the inspector after they had been in water for the times specified in the table. They were found to be in good order and carefully attended to.

TABLE II.

CORRECTIONS FOR THERMOMETERS.

STATIONS.	Inspector's Thermometer, No. 4433.	Dry Bulb.	Wet Bulb.	Spare Thermometer.	Max. Thermometer.	Min. Thermometer.
	°	°	°	°	°	°
Ochtertyre	61·8	0·0	0·0	—	0·0	+0·1
Ardrossan	58·7	−0·3	−0·4	—	0·0	+0·2
Rothesay	60·4	0·0	0·0	—	+0·1	+0·2
Poltalloch	56·0	0·0	0·0	—	−0·1	0·0
Laudale	62·1	−0·1	−0·1	—	0·0	−0·3
Fort William	64·9	−0·3	−0·3	—	−0·1	+0·1
Fort Augustus	59·9	−0·1	−0·1	—	−0·1	+0·3
Nairn	61·4	−0·8	−0·9	−0·2	−0·2	0·0
Stornoway	60·9	−0·6	−0·6	+0·4	+0·3	+0·2
Lairg	62·3	−0·1	0·0	—	+0·1	−0·1
Dunrobin	60·8	0·0	0·0	—	−0·1	+0·1
Deerness	60·9	−0·1	−0·1	—	+0·8	+0·4
Dunrossness	55·5	−0·6	−0·6	−0·2	0·0	−0·3
Wick	58·7	−0·4	−0·5	—	0·0	+0·1
Cullen	59·0	+0·1	+0·1	—	—	—
Aberdeen	58·8	−0·1	−0·1	—	−0·1	−0·1
Dundee	59·6	+0·6	+0·6	—	−1·4	+0·4
Marchmont	54·8	+0·1	+0·1	—	0·0	+0·1
Ladylaw	55·5	0·0	+0·3	—	+0·1	+0·2
Wolfelee	53·2	+0·2	+0·1	—	−0·2	+0·2
Leith	58·8	−0·2	−0·3	—	+0·1	+0·3
Edinburgh	56·7	−0·1	−0·1	—	0·0	0·0

HYGROMETERS.

As on previous inspections, much attention was given to the state of the dry and wet bulbs which at all the stations were read, as they hang in the screen, immediately when the screen was opened. I have pleasure in reporting that in all cases these thermometers were kept in good order for hygrometrical observations.

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	°	°	°	°	°	°
Ochtertyre	61·8	0·0	0·0	—	0·0	+0·1
Ardrossan	58·7	−0·3	−0·4	—	0·0	+0·2
Rothesay	60·4	0·0	0·0	—	+0·1	+0·2
Poltalloch	56·0	0·0	0·0	—	−0·1	0·0
Laudale	62·1	−0·1	−0·1	—	0·0	−0·3
Fort William	64·9	−0·3	−0·3	—	−0·1	+0·1
Fort Augustus	59·9	−0·1	−0.1	—	−0·1	+0·3
Nairn	61·4	−0·8	−0·9	−0·2	−0·2	0·0
Stornoway	69·9	−0·6	−0·6	+0·4	+0·3	+0·2
Lairg	62·3	−0·1	0·0	—	+0·1	−0·1
Dunrobin	60·8	0·0	0·0	—	−0·1	+0·1
Deerness	60·9	−0·1	−0·1	—	+0·8	+0·4
Dunrossness	55·5	−0·6	−0·6	−0·2	0·0	−0·3
Wick	58·7	−0·4	−0·5	—	0·0	+0·1
Cullen	59·0	+0·1	+0·1	—	—	—
Aberdeen	58·8	−0·1	−0·1	—	−0·1	−0·1
Dundee	59·6	+0·6	+0·6	—	−1·4	+0·4
Marchmont	54·8	+0·1	+0·1	—	0·0	+0·1
Ladylaw	55·5	0·0	+0·3	—	+0·1	+0·2
Wolfelee	53·2	+0·2	+0·1	—	−0·2	+0·2
Leith	58·8	−0·2	−0·3	—	+0·1	+0·3
Edinburgh	56·7	−0.1	−0·1	—	0·0	0·0

HYGROMETERS.

As on previous inspections, much attention was given to the state of the dry and wet bulbs which at all the stations were read, as they hang in the screen, immediately when the screen was opened. I have pleasure in reporting that in all cases these thermometers were kept in good order for hygrometrical observations.

NOTES OF INSPECTION OF THE STATIONS.

Ochtertyre, August 1st, 1898.—The instruments continue to be kept in excellent order, and the observations are made correctly and with much intelligence.

Ardrossan, August 8th.—The instruments are well attended, and correctly observed by Mr. Mayes. The assistant observer read the barometer 0·016 inch too low, from a faulty setting of the vernier—a mistake, it may be mentioned, not likely to recur.

Rothesay, August 8th.—The instruments were all in very good order, and the observations are well and intelligently made.

Poltalloch, August 9th.—The observations are carefully made, and the instruments are well kept.

Laudale, August 11th.—The instruments are all in excellent order, and the observations are made carefully and expeditiously.

Fort William, August 12th.—The thermometer screen had just been painted. All the instruments are well attended to, and the observations are made with exactness and fulness.

Fort Augustus, August 13th.—The instruments are in excellent order, and the observations are made correctly and with scrupulous punctuality.

Nairn, August 15th.—The rain gauge has been repaired since last inspection, but the thermometer screen requires repainting. The minimum thermometer was out of order, about a degree of the spirit being lodged near the top of the tube. When pointed out, Miss Penny set it right. Otherwise, the instruments were in good order, and all the observations are well attended to.

Stornoway, August 17th.—I took a new barometer to this station, which, after being some time beside the inspector's standard barometer, was found to be in good order. All the instruments were in very good order, and the observer shews remarkable skill and intelligence in making the observations.

Lairg, August 18th.—The instruments were in good order and the observations are well made. The barometer has been transferred to an adjoining house for a few weeks, and the transference had been very carefully done, as shewn by the comparison with the inspector's standard.

Dunrobin, August 19th.—The instruments continue to be kept in very good order and the observations carefully and intelligently made.

Deerness, August 20th.—The rain gauge had been repaired, and a low, light wooden fence placed round it for protection since last inspection. All the instruments were in excellent order, and much attention and intelligence are bestowed on making the observations.

Dunrossness (Sumburgh Head), August 23rd-24th.—The thermometer screen was a good deal out of repair, parts being quite rotten; the stand, however, was good, but requiring to be repainted. A new screen is required. Otherwise, the instruments were in good order and well attended to, and the observa-

tions are made with great care by all the three observers. Particular attention was given to explain those readings of the barograph which are required to be added to the daily telegraphic report. These will, in future, be added.

Wick, August 25th.—The new thermometer screen requires repainting, and a new bottom is required for the receiver of the rain gauge; both ordered to be done. Otherwise the instruments were in very good order.

Cullen, August 27th.—This place was visited in view of it becoming one of the stations of the Office. The only instruments, however, were a thermometer screen and a dry and wet bulb hygrometer, and there is no probability of other instruments being procured. It is not recommended, in the circumstances, that Cullen be accepted as a station.

Aberdeen, August 29th.—The self-recording rain gauge was removed from its old position and is now placed in the University grounds in the same grass plot as the other instruments. The change was necessitated by the growth of shrubs in too great proximity to it in the old position. The sunshine recorder and all the instruments were in excellent order, and the most scrupulous accuracy and punctuality are shewn in making the observations. I called on the postmaster and the head of the telegraphing department with reference to the late arrivals of the daily telegraphic report on Sundays, who promise to do all in their power to rectify it.

Dundee, August 30th.—All the instruments were in very good order, and much care is given to ensure correctness in the work of observation.

Marchmont, September 30th.—The instruments are in remarkably good order, and the observations continue to be carefully and correctly made.

Ladylaw, September 30th.—The observer, Mr. W. R. Wilson, who was in good health at the time of my inspection in 1896, died suddenly a few days thereafter. His son, Mr. Thomas Wilson, at once began to make the observations, and the state of the instruments and the quality and fulness of the observations shew that the high standard of his father's work of observation will, in his hands, be fully maintained.

Wolfelee, October 1st.—Mr. Cockburn, the late observer, died in the beginning of the year, and the observations were temporarily suspended till Mr. Gordon went to Wolfelee in May. He at once began to observe the thermometers, the rain gauge, and the wind. At the time of my inspection he was taught to read the barometer and to make the other observations required. He promises to be a very good observer. The instruments were all in good order.

Leith, October 5th.—The instruments were all in very good order, and the observations are very carefully made.

Edinburgh, October 7th.—The instruments were in excellent order, and the care and enthusiasm with which the observations have been conducted is continued by the observer. The inspector's barometer was unfortunately broken just before the inspection commenced.

ALEXANDER BUCHAN.

Reports of Inspection of English Stations, 1898.

Report by Mr. F. Gaster.

Newcastle, Second Order Station inspected on September 27th.—Instruments very good, but thermometer screen is on a roof, and is sheltered from sun's rays by a still higher part of the building on its south side. Position for screen on the ground is not obtainable at present.

Cockle Park Tower, near Morpeth, inspected on September 28th.—Instruments excellently placed and easily reached. Exposure of thermometers, rain-gauge, and sunshine recorder as good as can be desired, but a *slight* further adjustment in the azimuth of sunshine recorder seemed necessary. Gave all necessary instructions.

Seaham, inspected on September 29th.—Thermometers and screen have all been removed from the cemetery to a position on the railway platform, near Mr. Aird's office. Exposure good, and instruments read accurately. Observer when away from town is represented by his son.

Durham Observatory, inspected on September 30th.—Everything in good order, but the trees complained of last year as sheltering the sunshine recorder at certain hours had not been lopped, nor were they likely to be till certain structural alterations in the building were completed; these were in progress.

Telegraphic Reporting Stations.

York, inspected on October 1st.—Barometer (marine) in good order, and thermometers agreeing well with inspector's instrument. New dry-bulb required for telegraphic reporting instruments. Sunshine recorder (on roof at Bootham) well exposed, but means of ascent and descent very unprotected and dangerous. Arrangements for recording sunshine in holiday time not satisfactory, and I regret that I could not secure promise of improvement.

Spurn Head, inspected on October 3rd.—Instruments all in good order and carefully read, but drifting of sand over the out-door instruments causes serious trouble to observer.

Corrections for Barometers.

Stations.	Reporting Barometer.	Check Barometer.	Notes.
Newcastle	+·004	There is none	Standard was Adie B. T. 451 throughout.
Morpeth (Cockle Hill Park)	+·003	„	
Durham Observatory ..	+·011	„	
Seaham	+·004	„	
York	+·002	„	
Spurn Head	+·001	−·003	Attached thermometer found broken on reaching station.

Corrections for Thermometers.

Stations.	Dry Bulb.	Wet Bulb.	Maximum.	Minimum.	Spare.	Notes.
	°	°	°	°	°	
Newcastle	−0·5	−0·5	−0·3	0·0	None	No. 3805 used as Standard thermometer throughout.
Morpeth (Cockle Hill Park.)	−0·3	−0·3	−0·1	+0·7	Grass −0·7	
Durham Observatory	−0·2	−0·2	−0·3	+0·3	None.	
Seaham	−0·6	−0·8	0·0	+0·6	+0·6	
York (2nd Order ..	−0·6	−0·6	−0·6	−0·5	None.	
York (Tel. Reporting	..	−0·7	−0·5	−0·5	None	No Dry Bulb.
Spurn Head	−0·5	−0·5	−0·5	−0·5	−0·9	Scale of "Spare thermometer" broken.

Report by Mr. R. H. Curtis.

Telegraphic Reporting Stations.

North Foreland.—I found the instruments at this station in good order, and they appeared to be well attended to. The responsible observer is apparently Coastguard Signalman Heighton, the nominal observer, Mr. Jenkins, junior, being only a lad, about 15 to 16 years of age, and, in my judgment, not fitted to undertake the work; he, however, read the barometer correctly.

Dungeness.—The observer here, Mr. Batten, will probably be shortly removed from this station; there are, however, others of the staff well able to take up the work. The instruments are in good order, but I found the barometer read about ·024 below my standard corrected. I made several sets of comparisons, at considerable intervals, with the same result.

Hurst Castle.—The instruments were in good order, except the rain gauge, which is quite worn out; the rim was, however, circular. It was neither firm nor level, and I therefore moved it slightly, and secured it properly in its new position. The observer did not use his tables for reducing the barometer quite correctly, but otherwise he did the work correctly, if somewhat slowly. The legs of the thermometer screen are quite decayed below ground, and instructions were given for new supports to be fitted to them.

St. Aubins, Jersey.—The observer here is assisted by his son, a lad of 16 or 17 years of age. The position of the instruments—and particularly the rain gauge—is not very good, but no better appears to be available. For observation of wind and of sea disturbance the position is decidedly bad. The instruments were all in good order, and the work seems to be fairly well done.

Prawle Point.—The observer here has very much improved since my last visit, and he is a good deal interested in his work. All the

instruments were in excellent order, and the condition of his wet-bulb left nothing to be desired. The thermometer screen is worn out.

STATIONS OF THE SECOND ORDER.

Bramley.—The day of my visit was a very hot one, and I found that the top of the thermometer screen—a single top—was quite warm on the inside, notwithstanding that it had been partially protected by a small mat laid upon it. On this occasion the maximum temperature would, without doubt, be too high, and it is a question how far a similar effect may have been produced before, during hot calm days. The instruments were all in good order, but the position of the station in a wooded valley makes it unsuitable for wind observations.

Cooper's Hill.—Everything at this station was in perfect order, and the observations are made with great care. Professor McLeod promised to see whether any arrangements could be made for taking 9 p.m. observations, but he was not very hopeful that he would succeed.

Eastbourne.—The observer had dismounted his wet-bulb before my arrival. The barometer is not in very good order; the vernier pinion is damaged, and the mercury in the cistern a good deal oxidised. I think the observer does his work conscientiously.

Epsom.—The wet-bulb was in a very bad state; there was no muslin on the bulb, but merely a piece of tape tied round the stem close to the bulb, and the water vessel was nearly dry. The grass minimum has a very large error which I failed to reduce.

Parkstone.—The observations here are most carefully made, and the equipment of instruments is very complete. When testing the maximum thermometer I found a curious error; at about 70° its error increased, but at just over 72° the mercury suddenly shot up from 3 to 5 degrees, generally in one, but occasionally in two, quick pulses; the instrument was changed for another.

Plymouth.—This station is now in a very complete condition as regards its equipment of instruments, and the observations appear to be most carefully made. A pressure-tube anemometer has been recently erected on a steel mast at the top of the Smeaton Tower, on the Hoe. A house has also been erected for the barometer, as an office, and above it are placed the sunshine recorder, in an excellent position, and a self-recording wind vane; a Beckley rain-gauge is also at work near the other instruments. All the instruments were in very good condition.

St. Leonards.—There are two stations here, the new one being close to the sea at the extreme western end of the Parade, where the instruments have an excellent exposure; at both stations they were in good order, and the observations are carefully made. The lens of the sunshine recorder was not in good adjustment, and the instrument had to be dismounted to put this right. Unfortunately the lens is not a good one, and is full of striæ, which cause a considerable diffraction of the sun's rays.

Southampton.—Everything at this station was in excellent order.

Watergate (Emsworth).—Since the last inspection a rain-gauge has been added to this station. It was, however, in a very unsatis-

factory position, a suitable site was selected for it, and also for a Stevenson screen, which, I was told, Mr. Christy proposes to obtain. I was asked to specially examine the sunshine recorder at this station. The ball appeared to be a trifle too small for the bowl, but to be properly adjusted within it; but the observer is convinced that it does not give a full record of sunshine. Its position is very good.

Newquay.—The stand of the sunshine recorder here had become a good deal decayed, and the instrument was unsecured upon it. I readjusted it and again made it fast in its new position.

Bournemouth.—The adjustment of the sunshine recorder here was not good, and was altered; but the instrument is of the "Universal" pattern, which is very liable to get out of order through the lens slipping. Owing to trees the position of the instrument is very unsatisfactory, but Mr. Primavesi hopes soon to get a better site for it. I found that hitherto the traces have not been properly measured.

Jersey (Fort Regent).—A railing has recently been placed around the recorder to prevent the cards being interfered with. The post on which it stands had moved a little owing to the removal of some earth close by; it has now been wedged up into its proper position.

Margate.—The sunshine recorder here was badly out of adjustment, and much trouble was experienced in setting the lens, and in getting the instrument in proper position; this was partly due to the frame having become loose and partly to the noon mark being out of the meridian of the instrument. When it was finally set I was unable to fix it permanently, and had to leave this for the observer, who was unfortunately absent from home.

Corrections for Barometers.

Station.	Standard corrected for Instrumental Error.	Reporting Barometer uncorrected.	Check Barometer uncorrected.	Difference Standard—Reporting.
North Foreland	30·384	30·380	30·370	+ ·004
Dungeness	·334	·310	·308	+ ·024
Hurst Castle	·168	·150	·150	+ ·018
Jersey	30·418	30·412	30·402	+ ·006
Prawle Point	29·894	29·875	29·880	+ ·019
Bramley	·880	·870	—	+ ·010
Cooper's Hill	29·635	29·634	—	+ ·001
Eastbourne	30·167	30·168	—	- ·001
Epsom	29·375	29·350	—	+ ·025
Parkstone	30·041	30·044	30·044	- ·003
Plymouth	30·168	30·166	—	+ ·002
St. Leonards	30·028	30·024	—	+ ·004
Southampton	30·118	30·104	—	+ ·014

Corrections for Thermometers.

Station.	Standard (corrected).	Dry.	Wet.	Spare Therm.	Maximum.	Minimum.	Grass Minimum.
North Foreland	61°4	62°3	61°8	62°0	62°2	62°2	—
Dungeness	59·4	59·8	59·7	—	59·9	59·6	—
Hurst Castle	61·6	62·4	61·8	—	62·0	62·0	—
St. Aubins, Jersey..	66·4	67·3	67·5	66·5	67·1	66·5	—
Prawle Point	61·1	61·5	61·2	61·8	61·2	61·3	—
Bramley	70·1	70·0	70·0	—	70·0	69·0	—
Cooper's Hill	54·4	55·0	55·0	—	55·0	54·4	54·6
Eastbourne	65·4	65·6	65·6	—	65·6	65·5	—
Epsom	55·3	55·8	55·6	—	55·2	55·5	52·1*
Parkstone	65·1	—	—	—	65·9†	—	64·8
					65·0		
Plymouth	56·1	56·5	56·2	—	56·9	55·5	56·0
St. Leonards—							
Gensing Gardens	66·4	67·0	67·1	—	66·6	66·4	66·3
West Marina	69·9	70·0	70·0	—	70·0	69·8	—
Southampton	64·1	64·5	64·4	—	65·4	64·2	63·9

* This reading is correct; a small quantity of spirit at top of tube had previously been dislodged by warming.

† This thermometer has now been discarded for the one whose reading is given below.

Report by Mr. J. A. Curtis.

Telegraphic Reporting Stations.

Cambridge, September 17th.—The station was in good order, and the observer seems both competent and careful. The wind-vane appeared to work stiffly, but I oiled it well, and left it working freely.

Loughborough, September 30th.—There was a considerable deposit of lime on the wet-bulb. With this exception, everything was in excellent order.

Stations of the Second Order.

Belvoir Castle, September 21st.—I found everything in good order at this station. A "Stevenson" screen, as recommended last year, has now been supplied. It stands at present over bare earth, but it was promised that turf should be laid down at once. As requested, I paid particular attention to the barometer comparison. The correction of the observer's instrument as determined by me was — ·001. That at present in use is — ·003.

Crawley Farm, Ridgmount, September 15th.—This is a new station, established by the Royal Agricultural Society in connection with their new experimental laboratory. The outfit of instruments is very good and they are excellently exposed. The observer, Mr. H. H. Mann, B.Sc., F.I.C., has taken up the work with great enthusiasm, and from the returns already received I anticipate a valuable series of observations from this station.

Edgbaston, September 24th.—Everything was in excellent order at this station. The self-recording "Osler" rain-gauge has now been completed and is at work. The wind, pressure, rainfall and sunshine are now automatically registered at this station. The sunshine is however, at present recorded by a "Jordan" instrument.

Fulbeck, September 19th.—The work at this station has greatly improved, although it is not yet quite up to standard in every detail. The instruments were clean, and the observations are, I think, taken with care, the thermometer screen has been shifted as recommended on last inspection. The new position is decidedly better. The observer, Rev. Vere F. Willson, M.A., has arranged to place a new rain-gauge on Lincoln Heath. This should yield very interesting results.

Hollesley Bay, September 16th.—This station is very well equipped and the exposure of the outdoor instruments is perfect. The returns are, however, not quite complete—*e.g.*, there are no observations of cloud, either of form or direction, or of weather "since last observation." I spoke of this, and there will be, I hope, some improvement in the future.

Tealby, September 20th.—I found all in good order at this station, except that the wet-bulb was furred. The observer takes great interest in the work and reads the instruments very carefully. As requested, I made special enquiry as to the hygrometric observations, and as the result of a long conversation with the observer I incline to the opinion that this station is exceptionally damp.

Sunshine Stations.

Cambridge, September 17th.—The instrument was clean and in good order, and although the ball is not quite concentric with the bowl, the error is small and not enough to make it worth while to dismount the instrument, which is now firmly cemented in its place.

Harpenden, September 14th.—Recorder clean and in good order in every way.

Hollesley Bay, September 16th.—The recorder has been removed 150 yards to the south-west of its former position. It is now fixed on the top of a specially built brick pillar 10 feet high, to the top of which it is firmly cemented. The adjustment was very good, and the exposure of the instrument is practically perfect. The ball was quite clean and the card properly set.

Weekly Weather Report Stations.

Harpenden, September 14th.—Instruments clean and in good order, and observations carefully taken.

Duddington, September 22nd.—Mr. Coventry was unfortunately absent from home on the day of my visit, but he had arranged for every assistance to be given me. The instruments have been removed

from Ketton Hall to Duddington since the last inspection. They are now fairly well exposed. They were clean and in good order, and, I think, carefully observed.

Stations of the Third Order.

Colley Weston, September 22nd.—This is a rainfall station only. On the last inspection it was recommended that the gauge should be moved. This has now been done, and the present position is satisfactory. The gauge was properly fixed and the register appears to be carefully kept.

Duddington, September 22nd.—A complete monthly summary is received from this station, but the barometer readings cannot be accepted as accurate, the instruments being unverified, and with only a sliding vernier. The thermometers are good and properly exposed, but the wet-bulb read too low. The work appears to be very carefully done.

Harpenden, September 14th.—I found that the 9 p.m. observations at this station have been dscontinued, thus reducing the station to one of the third order. This is greatly to be regretted. The instruments were clean and in good order, but the thermometer screen, which is of the "Glaisher" pattern, is too crowded.

Market Rasen, September 20th.—The rain-gauge was not firm, but I wedged it up tight, and left it secure.

Rugby, September 23rd.—A lattice screen has been placed to protect the barometer from the morning sun. This is a great improvement, and seems to have the desired effect. The wet-bulb thermometer was dirty and a good deal furred. I impressed on the observer the importance of using only rain-water to moisten the bulb in future.

I append the usual tables showing the results of the comparison of the instruments at the various stations:—

Corrections for Barometers.

Stations.	Inspector's Standard corrected.	Reporting Barometer uncorrected.	Check Barometer uncorrected.	Remarks.
	Telegraphic Reporting Stations.			
Cambridge	29·969	29·970	—	
Loughborough	29·809	29·814	—	
	Second Order, and Weekly Weather Report Stations.			
Belvoir Castle	29·813	29·812	—	
Crawley Farm	30·190	30·185	—	
Duddington	30·079	30·130	—	
Edgbaston	29·620	29·632	—	
Fulbeck	29·957	29·954	—	
Harpenden	29·963	29·930	—	
Hollesley Bay	30·246	30·250	—	
Tealby	29·813	29·810	—	
Rugby	29·913	29·902	—	

Corrections for Thermometers.

Stations.	Inspector's Standard corrected. (No. 3870.)	Correction to be applied to the readings of						Remarks.
		Dry Bulb.	Wet Bulb.	Maximum.	Minimum.	Grass.	Spare.	
Telegraphic Reporting Stations.								
Cambridge	66·4	−0·6	−0·6	−1·4	+0·6	—	—	
Loughborough ..	56·9	−0·3	−0·3	−0·9	−0·3	0·0	—	Spare min +0·3.
Second Order, and Weekly Weather Report Stations.								
Belvoir Castle ..	62·5	−0·6	−1·0	−0·3	−0·6	−0·1	—	Spare min. −0·6.
Crawley Farm ..	—	—	—	—	—	—	—	New insts
Duddington ..	54·8	−0·2	+0·6	−0·4	−0·1	—	—	
Edgbaston	60·2	−1·0	−1·0	−0·2	−0·4	0·0	—	
Fulbeck	62·3	−0·8	−0·6	−0·7	−0·6	—	—	
Harpenden ..	66·2	0·0	−0·1	−0·9	+0·3	+1·7	—	Spare grass min. +1·4
Hollesley Bay ..	67·9	−0·6	−0·4	−0·1	+0·1	0·0	—	
Tealby	57·4	−0·7	−0·6	−1·6	−0·3	—	−0·8	
Rugby	56·6	−0·3	−0·4	−0·3	−0·3	+0·2	—	

Report by Mr. F. J. Brodie.

Stations of the Second Order.

Manchester (Oldham Road).—September 13th.—The instruments here were all in good order, the sunshine recorder having been carefully adjusted since the inspection of last year. The wind-vane is still badly exposed.

St. Helens, September 14th.—The condition of things here was, upon the whole, very satisfactory. The terrestrial radiation thermometer read a degree too low, but there were no signs of any evaporated spirit in the tube. The authorities are thinking of purchasing a Dines anemometer, and I suggested a good site for this on the tower of the disused dwelling-house in the centre of the park. Dr. Harris fears that for the present it will be impossible to supply 9 p.m. observations, as it would involve the payment of an evening observer. He promised, however, to bring the matter before the notice of the Health Committee.

Darwen (Gillibrand Meteorological Observatory), September 15th.—This is quite a new station. The Observatory is a small wooden erection of octagonal form in the public park, the latter situated on the slope of a rather steep hill leading from the town to the summit of the Darwen moor. The station, though unfavourable for wind observation, is exceptionally well equipped, possessing, in addition to the ordinary outfit of a second order station, a Richard barograph and thermograph, a Dines anemometer, and a self-registering rain-gauge. The instruments are all of the best description and are admirably exposed. A comparison of the barometer (a Fortin standard) with my own showed, however, a large error (about —0·07 inch), and it was therefore suggested that the instrument should be sent back to Kew for re-examination. Mr. Mainland, the observer, is the curator of the Observatory. He seems to take much interest, not only in the work, but in meteorology generally.

Lytham, September 16th.—This also is a new station, in the care of Dr. Jenkins, medical officer of health. The outdoor instruments are well exposed in a railed inclosure on the sea front, and include a set of thermometers in a Stevenson screen, an earth thermometer at a depth of 1 foot, a rain-gauge and a Campbell-Stokes sunshine recorder. The sunshine recorder is placed on a stone pedestal, but at the time of my visit was not properly adjusted. This was carefully done, and the instrument was then firmly cemented on to the pedestal. The only barometer at this station is a Fishery barometer, supplied many years ago by the National Lifeboat Institution, and publicly exposed near the entrance to the pier. The importance of procuring a more accurate instrument was urged very strongly upon the observer. He promised to bring the matter before the Town Council, but did not seem very sanguine as to the result.

Heysham Hall, September 17th.—The thermometer screen in use here is not of the recognised Stevenson pattern, and the temperatures recorded must, I should think, be somewhat too high. The thread of mercury in the dry-bulb thermometer had become detached, and after repeated efforts I failed to get it to re-unite; observer will in future use spare thermometer No. 4849 as a dry bulb. In the maximum thermometer the mercury was divided into three portions, and for some time past the readings from this instrument must have been from one and a half to two degrees too high. In this case the defect was easily remedied. The height of the barometer above M.S.L. is still somewhat doubtful, the nearest bench mark being too far away for the level to be accurately determined without proper instruments. Observer promised to get the true height from the local surveyor and to communicate it at once.

Gilcrux, September 20th.—The instruments were all in excellent order, but I have learnt lately that the station has been abandoned owing to the illness of the observer.

Telegraphic Reporting Station.

Hawes Junction, September 21st.—The observer, Mr. Bunce, was away on annual leave, the observations being taken in his absence by his daughter, whom I was unable to see. The instruments were in good order, and an examination of the observation book seemed to show that the deputy observer was fully equal to the work.

Corrections for Barometers.

Stations.	Inspector's Standard corrected. (M.O. 451.)	Reporting Barometer uncorrected.	Check Barometer uncorrected.	Reporting Barometer. Correction required to reduce to Inspector's Standard.	Remarks.
	ins.	ins.	ins.	ins.	
Manchester .. (Oldham Rd.)	29·900	29·892	—	+·008	
St. Helens ..	30·138	30·132	—	+·006	Another set of readings taken two hours later gave practically the same result.
Darwen	29·685	29·620	—	+·065	
Lytham	—	—	—	—	This is only a Fishery barometer in wooden frame.
Heysham Hall	29·831	29·820	—	+·011	
Gilcrux	29·722	29·722	29·720	·000	
Hawes Junction	28·885	28·875	—	+·010	

Corrections for Thermometers.

Stations.	Standard corrected. No. 3805.	Dry Bulb.	Wet Bulb.	Max.	Min.	Grass Min.	Remarks.
	°	°	°	°	°	°	
Manchester .. .. (Oldham Road.)	64·8	−0·2	−0·2	0·0	0·0	−0·3	
St. Helens	64·4	+0·3	+0·3	+0·1	+0·3	+1·4	
Darwen	57·8	+0·3	+0·3	+0·1	+0·3	−0·2	
Lytham	65·4	+0·4	+0·4	−0·1	+0·9	—	
Heysham Hall ..	66·4	+0·2	+0·2	0·0	+0·4	+0·2	
Gilcrux	59·4	+0·2	+0·3	+0·2	+0·3	+0·4	
Hawes Junction ..	55·5	−0·3	−0·5	+0·3	+0·5	—	

Inspection of the Observatories and Anemometers, &c.

Report by Mr. T. W. Baker.

Stonyhurst, September 20-21.—All the instruments at this observatory were found in good condition and working satisfactorily.

Since the last inspection the observatory roof has been re-covered with sheet lead, and Father Sidgreaves has had a lead covering fitted

to the iron box containing the reducing gear of the anemometer, which forms a further protection in keeping the apparatus dry.

The cups and pointer have been re-gilded and holes have been tapped and fitted with screws for the purpose of oiling the worm of the direction vane, &c.

In March last one of the cup stays was broken, but this has been satisfactorily repaired, and the instrument is now sound and in good order. The orientation was duly examined and found correct. As regards the rain-gauge, this instrument was going well, and "squeezes" of both the self-recording and spare funnels were taken and are sent in with this report.

The barograph and thermograph were cleaned generally and some stray light was blocked out of both dry and wet recording thermometers by means of lamp-black, after which the zero lines of the thermograph were changed to the winter position.

Glasgow, September 23-24.—The weather being favourable at the time of my visit, I was enabled to entirely take down the external portions of the anemometer and thoroughly clean all parts. The oil in the direction well was in very fair condition, though there was a slight sediment at the bottom. This was removed and fresh asbestos lubricant applied to all bearings, no sperm oil having been sent down from the Meteorological Office.

Since the last inspection a new worm spindle and bearings have been fitted to the direction fans, which appear quite satisfactory.

The clock and recording parts of the instrument were oiled and the orientation was tested and found correct. The usual cleaning of the lenses of both barograph and thermograph was duly performed and the intensity of the light as shown by the photographic traces was much improved.

The rain-gauge clock was taken to pieces and cleaned, and a new line attached to the weight, after which "squeezes" were taken of both the self-recording and spare funnels.

Prof. Becker stated that he has succeeded in adjusting the sunshine recorder by the sun. It was impossible to do so accurately by levelling the frame carrying the cards, as this was found to be not true.

Fort William, September 27-28.—Here I found the various instruments working well. The barograph was dismounted, the clock taken to pieces and cleaned, and a new line attached to the weight. Also the thermograph clock was cleaned, and an additional weight added to the lever of light stop in order to improve its action.

Mr. Rankin reported that the thermograph screen had been painted in the spring. The rain-gauge was in excellent order, but I cleaned the clock and put in a new line for the weight, after which "squeezes" were taken of both funnels. As regards the sunshine recorder, the weather was too cloudy at the time of my visit to see to the adjustment, but Mr. Rankin stated that he had been endeavouring to adjust the instrument by the sun, as he found that when levelling by the cusps of metal bowl, the trace marked did not run parallel with the centre line of card.

Deerness (Orkney), October, 1-3.—The glass case sent out from the Office in March last, to cover the recording apparatus and clock, I found to fit very well, with the exception of the side door, which could not be closed tightly owing to the framework touching the clamping screw of clock. Mr. Spence was of opinion that the stoppage of the clock on one or two occasions was due to this. I had the cover taken off and cut away the framework, so that the door can now be safely closed without any fear of touching the clamping screw. Whilst seeing to this I noticed that the clock itself was not firmly screwed down to the slate slab, and in consequence the gearing of the driving wheel of the clock and cylinder would vary from time to time, so that it is just possible that this would account for the peculiarity frequently shown in the velocity trace at starting.

I entirely dismounted the exterior portion of the anemometer, and found that the oil in the direction well had become very thick and dirty; this was removed, and all bearings thoroughly cleaned and replenished with the sperm oil recently sent out by the Office.

The endless screw of the direction spindle has become very much worn, as well as the *lignum vitæ* bearings for the fans, and new ones are required at the earliest opportunity.

I took the clock to pieces and cleaned it, and attached a new line to the weight. The orientation was duly examined and the sheet marked.

Aberdeen, October 5-7.—As usual at this observatory, all the instruments were found in excellent order.

The barograph and thermograph clocks were taken to pieces and cleaned, but not those of the anemograph or rain-gauge, which did not require it.

The external parts of the anemometer were dismounted, and the oil in the direction well was found quite good, but I had it removed and fresh local sperm oil added to all the bearings, after which the orientation was tested and found correct.

The repairs suggested by the Inspector last year have been satisfactorily carried out by Mr. Munro.

In December last Mr. Boswell shifted the self-recording and spare rain-gauges from the old site to the grounds immediately adjoining the College. I found that both instruments had been carefully fitted up, and the exposure is quite open on three sides, the nearest building being about 100 feet distant to the south, and from 25 to 30 feet in height. Rubbings of both funnels were taken and the papers are sent in with this report. The Stevenson screen has been painted in accordance with Dr. Buchan's instructions to Mr. Boswell.

Alnwick Castle, October 10.—At the date of my visit Mr. Willyams was absent, but he had very kindly left instructions for his assistant to help in examining the anemometer. I found that the exterior portions were all well oiled, and the instrument is carefully attended to by the resident mechanic, under the supervision of Mr. Revall, the

architect. The registering apparatus is in excellent order, the clock having been cleaned just prior to my arrival by a local watch-maker. I oiled the clutches of both the direction and velocity pencils, as well as the escapement of clock. The orientation was examined and found satisfactory. The assistant reported that the last tracing sheets received from the Office were a little smaller in scale than the printed sheets, which would account for the extra overlapping at the top and bottom of the tracing sheets.

North Shields, October 11th-12th.—The anemometer here was working very well indeed, and is in excellent order. With the assistance of the mechanic who attends to the periodical oiling of the instrument, under the direction of Captain Harrison, we entirely dismounted the instrument, and found that the oil in the direction well was in such excellent condition that I did not think it necessary to remove it. The other parts, however, were cleaned and lubricated with fresh sperm oil. The clock was taken to pieces and cleaned and the recording apparatus received due attention, after which the orientation was examined and found correct.

Yarmouth, October 14th-15th.—At the date of my visit to this station the weather was unfortunately rough and stormy, and in consequence it was not easy to dismount the anemometer entirely. I found, however, that the instrument was in good order, well oiled and carefully kept. The registering apparatus I cleaned and oiled, and carefully examined the velocity pencil to try and discover the cause of the "kink" which is shown in the trace between the 40 and 50 mile space. The spiral pencil did not appear to be indented, but I lightly rubbed it with a fine emery buff and am in hopes that this may improve the traces. There is considerable play in the gearing of the velocity pencil owing to the length of shafting, which will account for the uneven marking of the trace at times.

The orientation was examined and the sheet containing the result is forwarded with this report.

Telegraphic Reporting and Climatological Stations.

Stonyhurst, September 21st.—Here all the instruments were in good order.

Alnwick Castle, October 10th.—At this station the rain-gauge (5 inch) is almost worn out and a new one is much needed. The thermometers were found in good order, excepting that the muslin covering to the wet bulb was rather soiled; this I had changed.

North Shields, October 12th.—Since the last inspection Mr. Irvine has left, and the station is now under the charge of Mr. Clarke. I found all the thermometers in excellent order, but a new rain-gauge is wanted, the present one being old and much worn. Mr. Clarke and I agreed very well in reading off the barometer and thermometers.

Yarmouth, October 15th.—The various thermometers and rain-gauge were all found in excellent order.

CORRECTIONS FOR THERMOMETERS.

Station.	Temperature of water. Ther. No. 721.	Dry Bulb Stand.	Wet Bulb Stand.	Maximum Thermometer.	Minimum Thermometer.	Additional Thermometers.	
						Description.	Correction.
	°	°	°	°	°		°
Aberdeen ..	50	*-0·1	*-0·6	+0·1	+0·4	Barograph thermometer Standard bar. attd. ther.	-2·2 -0·4
Alnwick	53	-0·2	-0·4	-0·1	+0·3	.. ..	—
Fort William ..	55	* 0·0	*-0·2	+0·1	+0·6	Barograph thermometer Standard bar. attd. ther.	-2·1 -0·3
Glasgow	56	*-0·1	*-0·1	0·0	0·0	Barograph thermometer Grass minimum ther. ..	-0·8 0·0
North Shields ..	54·1	-0·1	-0·3	-0·2	+0·6	.. ..	—
Stonyhurst ..	55	*-0·1	*-0·4	-0·1	+0·4	Barograph thermometer Standard bar. attd. ther.	-0·6 -0·8
Yarmouth ..	54·6	-0·1	-0·2	-0·5	+0·5	.. ..	—

* These instruments are in the Thermograph screens.

REPORT BY MR. E. G. CONSTABLE.

Holyhead, July 21st-23rd.—The four anemometers at this station were inspected, and, speaking generally, were in good condition and evidently well looked after.

The "Robinson" was dismounted and overhauled. I found that the upper part of the cups spindle had worked loose, and there was decided "play." This was put right, and two of the direction fan blades which had broken away were repaired. The sperm oil was in very good condition, it was replaced with fresh sperm oil supplied from the Office.

On examining the recording part I noticed that the upright dwarf spindle supporting the direction mitre wheel and tube was loose, this was screwed home. Endeavours were made to reduce the "play" noticed in the traces, but there is not space enough to alter the lugs sufficiently, but it was improved somewhat by reducing the thickness of the frame, and gearing in the cylinder driving wheel a little closer.

The orientation was good, and the check lines will be found on the curves Nos. 202 and 203.

The "Dines" anemometer was apparently working satisfactorily. The casing and float were carefully removed and the interior examined.

The water was clear, and the white deposit (noted in my 1896 report), although present, was by no means so considerable, but the soldered joint of the cover is giving out at the bottom.

Everything was thoroughly cleaned. By the help of ladders and assistance I was able to have the vane removed. The inner surface of the tube had a thin wet deposit. Both the tube and the spindle of the vane were dried and cleaned and left in better condition. The cylinder clock belonging to this instrument I had cleaned locally, as it had not been done for some time, and the balance spring needed a little regulating.

The "Bridled" anemometer appeared to be in good order. The oil in the bearings, both inside and outside, was decidedly thinner and better than it was at the time of my last visit. All parts were cleaned and freshly lubricated, but the clock had only recently been cleaned, and so did not require much attention.

Mr. Davis seems very satisfied with the working of the tracing-wheel pen now used with this instrument.

The "Pressure-plate" anemometer was also examined. The "plate" seemed to run rather jerkily, so the chain was removed and the pulleys cleaned. There was a considerable deposit—apparently of iron rust—on the ratchet and toothed scale. This was removed, and the moving parts lubricated.

The hut and anemometers on Salt Island are now enclosed with a 6-foot stone wall, which is a decided improvement, and should help to protect the instruments from wilful damage.

Fleetwood, July 25th-26th.—The weather during my visit here was dry and calm, and I was thus enabled to have the anemometer dismounted both inside and outside the building.

The lubricant (sperm oil) was fluid, but very discoloured.

Here, as at Holyhead, the upper part of the velocity spindle, taking cups and oil well, was loose. I fitted a new pin and tightened up the joint.

Some blades of the direction fans were loose; these were soldered down.

The orientation was tested, both before and after disturbing instrument, and was satisfactory in both cases, and the markings will be found on the Fleetwood curves, Nos. 206 and 207.

The "back-leash" with the worm on the direction fan-spindle is rather marked, and tends to slow down the vane.

The driving line of the clock was wearing out; I fitted a new and stouter cord, cleaned the escapement, and altered the bob a shade, the clock showing a tendency to gain.

The outside portion of the instrument needs a coat of paint, and Mr. Gaulter promised to have that done if possible during the autumn.

Armagh, July 27th-28th.—Dr. Dreyer was absent at the time of my visit, but all necessary assistance was given me.

The anemometer was in good order, and the asbestos lubricant was in most excellent condition, and could probably have gone for another year; it was removed, and replaced with fresh oil. After the experience at Holyhead and Fleetwood with the velocity cups shaft, I gave additional attention to that shaft here, but there was no indication whatever of any dislocation.

The pin from one end of the direction fan spindle was missing; this was supplied. The clock, &c., was cleaned and the orientation tested, and the sheet is attached to this report.

The trees from about S.W. to N.W. considerably shelter the anemometer, but I was given to understand that they would be "polled" during the early winter.

Examination of the Beckley rain-gauge shewed that the clock would be improved by cleaning, &c. This was done, and the bob of pendulum raised, to allow for the lengthening of the "Willesden" sheets. The attention of the observer was drawn to the necessity of making a datum line daily when starting each curve.

The hawthorn hedge to the N. has been cut much lower, which is certainly an advantage as to the exposure of the gauge.

Dublin (Phœnix Park), July 29th-30th.—The anemometer at this station appeared to be working satisfactorily, but examination shewed that it required attention, especially the clock, so all parts were taken down.

The lubricant for the vane head was clean and fluid, and the ball bearings bright. The oil in the brake-box was fluid, but of a dark green colour; this was removed, and box refilled with fresh sperm oil.

The clock was dismounted and thoroughly cleaned, and all left in good order.

The orientation was satisfactory, and the sheet is sent herewith.

The silver helices appear to be a decided improvement upon the old pencils.

The exterior column, brake-box, and clock case require painting, and Col. Hellard agreed to have this done.

Dublin time is kept at this station.

Valencia, August 2nd-4th.—The self-recording instruments at this Observatory evidently continue to receive regular and careful attention.

The thermograph was in good order and the light-shutter working well; the clock, lenses, &c., were cleaned.

The light-shutter of the barograph has been uncertain and irregular in its action for some time, despite Mr. Cullum's endeavours to improve it.

Inspection of the shutter work failed to reveal anything radically wrong with it, but finally I increased the weight on the locking-arm and altered the leverage of the lifter, and had part of the casing chiselled out, as there was a suspicion that the weight grazed against the side.

The shutter was working properly when I left and the action will now, I believe, be more certain, but should the improvement not prove permanent I would suggest that Mr. Cullum be asked to try the effect of closing in the screw holes in the back plate, as the threads are rather worn and this may cause the arm to cant over during the drop.

Examination was made of the barometer tube, diaphragm and lenses, but no definite cause could be found for the penumbra which occurs on the photographic sheets when the column falls below 29·3 inches. Endeavours were made by altering the tube, and by trials of the lamp and condenser at various heights, &c., to remedy the defect, but of course the result cannot be ascertained until after the barometer has fallen to this low point.

The "temperature-bar" was taken out and cleaned, as the knife edges were becoming rather dirty.

The anemometer was dismounted. The asbestos lubricant although dirty was fluid, and considering that it had been in use for two years its condition was certainly satisfactory. It was removed, and fresh asbestos lubricant put in.

Three of the direction-fan blades had broken away from the wire stays; these were soldered down. The cups and their upper cross stays are shewing evident signs of "wearing."

The recording part was in good order, but the chain from barrel to fusee of the clock had broken at times, causing several links to be lost,

and so had become rather too short, so I got the local watchmaker to fit another fusee chain, and the clock is now in good condition again.

The rain-gauge clock also required cleaning, which was done, and as some difficulty is always experienced in attending to this particular clock owing to the cover not being bevelled off to clear the levelling screws, I had two semi-circular pieces cut out of the base, which will avoid in future dislocating the entire instrument whenever the clock or pendulum demands attention.

Falmouth, August 8th-10th.—The self-recording instruments here were in their usual satisfactory condition.

There was nothing in the barograph or thermograph calling for special notice; they received the customary cleaning.

The boarding under the thermograph clock—probably owing to warping—was dangerously near the end of the rating nut, so I had it channelled out to allow of a safe distance.

The asbestos lubricant in the anemometer was in good condition; it was removed, and the new sperm oil supplied by the Office used. All parts were cleaned and lubricated.

The upper piece of cup spindle had loosened a little. This was put right, and a couple of direction blades which were also loose were repaired.

The worm on the direction-fan-spindle is worn extremely thin, causing considerable side-shake, with a liability to bend up with sudden oscillations in direction. A new worm-spindle would be a decided improvement.

The recording pencils, clock escapement, &c., received the usual attention.

Orientation was checked and found good, and sheet shewing same is sent herewith.

The building operations, to which I drew attention on my last visit here, have been continued, but the ground landlord has agreed with the Observatory Committee not to allow the erection of any more houses in the vicinity, and a piece of ground to the S.E. has been taken on lease, in order to assist in preserving the exposure. The aspect from S.E. to N.N.E. is still clear and unobstructed.

The Beckley rain-gauge was working satisfactorily, but the clock required cleaning. New wooden steadying pegs were fitted to the check-gauge, the old ones being worn out.

St. Mary's, Scilly Isles, August 12th-to-14th.—The Robinson and the Dines anemometers at this station appeared to be working properly. They were both dismounted and examined.

In the Robinson, the oil for the roller bearings of the vane was clean and fluid, but in the brake-box it was very dark, with a slight sediment on the bottom of the case. This was cleared out, fresh sperm oil put in, and the instrument left in good order. I found the floor of the frame, on which the brake-box is fixed, covered with water, and so was also the sunk upper surface of the spur wheel on vane shaft. As the doors of the frame were thoroughly screwed home, puttied up and painted, the rain could not have got through there, and it is very probable that it drives in under the lip at the top of the column supporting vane, which is rather shallow.

The clock and recording apparatus was cleaned, and I left with Mr. Hicks a little Kelly's clock oil, as he appears of late to have been using ordinary sperm oil for the clock, which is not good enough. The orientation was satisfactory, and the sheet is sent herewith.

The "Dines" was in good order. The water proved to be clean, and with but a very slight deposit. The interior, float, &c., were thoroughly cleaned and dried, and fresh water introduced. The clock was removed from the cylinder and oiled.

The vane was dismounted. The inside of the tube was wet, and with a thin deposit, but I could not detect any signs of serious wear or scoring. It was dried and cleaned.

The War Department are erecting huts and buildings to the S. and S.W. of the anemometers, but they are too distant at present to at all interfere with the exposure of the two instruments.

Radcliffe Observatory, Oxford, September 16th-17th.—The self-recording meteorological instruments at this Observatory were in first-class order. The barograph and thermograph had been recently cleaned, the light-shutters were acting well, and the photographic curves were very good.

Examination of the Robinson anemometer proved it to be well oiled, and the asbestos-lubricant for the direction-roller bearings was, this year, in a very satisfactory state, clean, and fluid, and did not require removal.

The orientation was tested and found correct.

The Beckley rain-gauge was taken down and found to be in good order, but another Richard pen—unmounted—and a supply of "encre spéciale," is required for this instrument.

Telegraphic and Second-Order Stations.

Holyhead, July 20th.—The meteorological instruments were in good condition, but the supports of the Stevenson screen were becoming rotten, and Mr. Chope was doubtful if they would last another winter.

I therefore had them strongly repaired, and also new hinges fitted to door, and the screen is now in good condition again.

Mr. Chope has hitherto had some difficulty in finding a reliable substitute, but has now made arrangements for the continuity of the observations during any occasional absence.

Armagh, July 28th.—The thermometers and screen were in good order, but the grass minimum might with advantage be removed a little further from the Stevenson screen.

I experienced trouble with the mercurial minimum, owing to the index becoming deranged through the tube slipping in the water used for testing, but I hope it was put in order again before leaving.

Dublin (*Phœnix Park*), July 30th.—The thermometers here were in good order, and the Stevenson screen is now firmly fixed, with four extra struts. The maximum, as fitted up, obstructed a clear view of the dry and wet thermometers, so I altered both the maximum and minimum tubes. Sergeant Blight, who has been the observer for several months, was absent at the Curragh at the time of my visit,

but at Colonel Hellard's request I went again on August 6th, on my return from Valencia, and was then able to take comparative observations of all the instruments with the observer, which proved satisfactory.

St. Mary's, Scilly Isles, August 13th.—The Stevenson screen, thermometers, and barometer, at this telegraphic station were in good order and condition.

The Richard barograph was recording slightly too high. This was corrected to the standard.

CORRECTIONS FOR THERMOMETERS.

Station.	Temperature of water. Ther. No. 720.	Dry Bulb Stand.	Wet Bulb Stand.	Maximum.	Minimum.	Additional thermometers.	
						Description.	Correction.
Armagh	56	−0·3	−0·2	−1·0	+0·1	Grass minimum	+0·6
Dublin .. .. (Phœnix Park).	60	−0·4	−0·5	−0·4	+0·2	„ „	+0·1
Falmouth ..	60	* −0·5	* 0·0	−0·5	+0·2	Barometer thermometer	−0·9
Holyhead ..	63	−0·2	−0·2	−0·3	+0·4	Spare tube	−0·2
Scilly Isles .. (St. Mary's).	62	−0·7	−0·5	−0·5	0·0	„ „	0·0
Valencia	60	* −0·7	* −0·4	0·0	+0·3	Barometer thermometer	0·0
Oxford .. .. (Radcliffe Observatory).	64	* −0·2 −0·3	* −0·2 −0·2	−0·4	+0·1	Grass minimum .. .. Ther. attached to bar. No. 17249. Ther. attached to bar. No. 1708. Dry Bulb Ther. 1710 .. Wet Bulb Ther. 1709 ..	+0·4 −0·8 −0·4 −0·3 −0·2

* These instruments are in the Thermograph screens.

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.

The Office receives, when the telegraphic communications are perfect, sixty reports each morning, eighteen each afternoon (except on Sundays), and twenty-nine each evening, the arrangement of which is explained in the Annual Reports for recent years, but a reduction of the number of stations is in consideration.

The change made in the Daily Weather Report during 1894, by the insertion of Reports from the Azores (forwarded by the courtesy of the Portuguese Meteorological Authorities), is still in force. The Report fills four large quarto pages, as it has for several years past.

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

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

The subscription for the Report is—

For delivery by hand, where feasible, £2 *per annum;*
„ *by book post* £1 „

N.B.—Subscriptions are payable in advance, Annually or Quarterly; those for a Quarter end at the Official Quarter days, *e.g.*, March 31, June 30, &c.

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, and is steadily increasing in value. It is published regularly on Thursdays, and is illustrated by three maps for each day, which, like those in the Daily Reports, show the outline of the land and surface of the sea in blue, while the daily information is in black. The maps show (1) for 8 a.m., the temperature, weather, and sea disturbance; and (2) for 8 a.m. and (3) for 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 consists of observations of Temperature and Rainfall made at 78 stations, the individual values for which are given on the second page of the Report. Sunshine records taken at 60 stations are given on the second and sixth pages of each Report.

Tables of *Accumulated Temperature*, designed to give persons engaged in agriculture better means for 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 still 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 the base (42° F.) continued for 24 hours, or any other number of degrees for an inversely proportional number of hours.

The following are the rules for computing, for a weekly period, from the observed maxima and minima, the accumulated temperature above or below 42° F.:—

1. Obtain the mean temperature, from the means of the seven observed maxima and minima, suitably corrected for non-periodic changes of temperature.

2. In obtaining the accumulated temperature four cases may occur, to which the following rules will apply:—

Conditions of Temperature.	To obtain the daily Accumulated Temperature.	
	Above 42° F.	Below 42° F.
If the minimum is *above* 42° F., or *equal* to 42° F.	Subtract 42° F. from the mean.	There is none.
If the minimum is *below* 42° F., but the mean for the day is *above* 42° F.	From the difference between the mean for the day and the minimum deduct the accumulated temperature below 42° F., calculated as stated in the next column.	The required quantity is the excess of 42° F. over the minimum, multiplied by the coefficient 0·4.
If the mean for the day is *below* 42° F., but the maximum is *above* 42° F.	The required quantity is the excess of the maximum over 42° F., multiplied by the coefficient 0·4.	From the difference between the mean for the day and the minimum deduct the accumulated temperature above 42° F., calculated as stated in the preceding column.
If the maximum is *below* 42° F., or *equal* to 42° F.	There is none.	Subtract the mean from 42° F.

In each of the above cases the result will be the average *daily* value, and must be multiplied by 7 in order to obtain the value for the whole week.

The coefficient varies with the duration of the period, and also with the base temperature.

The co-efficient given above, in Rules 2 and 3, is for a weekly period, and for the base temperature 42° F. The following are its values for other base temperatures,—for 32° F., 0·4; for 52° F., 0·33; for 62° F., 0·25.*

* A full explanation of the principles on which these rules are based will be found in Appendix II. to the Quarterly Weather Report for 1878.

In addition to the reports from the Telegraphic Reporting Stations, and the returns from certain self-recording Observatories, weekly schedules from 56 volunteer observers are used, the names of the stations and observers being given in Appendix XI., p. 89.

An early copy of 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.

Summaries and Appendices to the Weekly Weather Reports.

Two Appendices, I. and II., have appeared, similar to those for several recent years.

The *Monthly Summary Supplement* gives the average values for Pressure, Temperature, Rainfall, and Bright Sunshine of the current month, and the difference between these values and the means for the corresponding months in a long series of years, together with the number of days on which rain, snow, hail, thunder, &c., &c. occurred, and the number of days on which the wind blew from the eight principal points of the compass, and a brief *résumé* of the principal features which have marked the weather of the month. It is illustrated by four maps, showing the distribution of the average pressure and temperature and of the rainfall for the period, and the movements of the principal depressions which have passed over the British Islands and their neighbourhood.

ISSUE OF FORECASTS.

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 places (see note on 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 supplied to a few newspapers and a copy is exhibited regularly at the door of the Meteorological Office. During the Hay Harvest they are telegraphed to about 28 well-known agriculturists, to be made known in their neighbourhood (see p. 11).

(3.) At 8.30 p.m. (from the 8 a.m., 2 p.m., and 6 p.m. reports), for the civil 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, Christmas Day, and Bank Holidays 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 (and English Channel).
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 will 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 (Ireland), 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. p.m. The information can be easily read from the street.

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

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

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 2*s.* 6*d.* being charged for an official quarter or any part thereof, in addition to the cost of the telegrams. These are supplied only to Agriculturists, or to persons making public use of them.

* Good Friday, Christmas Day, and Bank Holidays are reckoned as Sundays.

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 to themselves.

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

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, with regard to the weather in any district, or 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, or the latest forecast for any district of, the United Kingdom by payment of a fee of one shilling *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 any 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 1898 will be found on pp. 11-14.

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 Light-house 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.

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* Good Friday, Christmas Day, and Bank Holidays are reckoned as Sundays.

APPENDIX VII.

REPORT ON THE COMPARISON OF THE FORECASTS ISSUED AT 8h. 30m. p.m. WITH THE WEATHER SUBSEQUENTLY EXPERIENCED, for the 12 Months April 1898 to March 1899. The results are for the United Kingdom as a whole.

The letters used have the following signification:—

a=complete success.
b=partial (more than half) success.
c=partial failure.
d=total failure.

The checking has been conducted on the same system as that employed in previous years, *i.e.*, each forecast has been considered under the separate headings of "Wind" and "Weather," but the results of the 8.30 p.m. Forecasts only are here published.

The first column gives the percentage of success in "Wind," the second in "Weather," and the third the average of the other two.

The Summary for the various districts is given at page 11.

Months.		Percentages. Wind.	Weather.	Average.	a + b.
April	a	43	58	51	83
	b	33	31	32	
	c	20	9	14	
	d	4	2	3	
May	a	53	61	57	85
	b	28	27	28	
	c	15	8	11	
	d	4	4	4	
June	a	59	59	59	85
	b	26	25	26	
	c	11	11	11	
	d	4	5	4	
July	a	59	59	59	82
	b	24	21	23	
	c	13	14	13	
	d	4	6	5	
August	a	41	45	43	79
	b	38	34	36	
	c	16	17	17	
	d	5	4	4	
September	a	51	65	58	86
	b	33	22	28	
	c	12	8	10	
	d	4	5	4	
October	a	50	66	58	84
	b	28	23	26	
	c	16	9	12	
	d	6	2	4	
November	a	46	58	52	84
	b	32	31	32	
	c	18	3	10	
	d	4	8	6	
December	a	43	60	52	86
	b	39	30	34	
	c	16	8	12	
	d	2	2	2	
January	a	45	57	51	81
	b	30	29	30	
	c	18	11	14	
	d	7	3	5	
February	a	56	57	57	79
	b	20	25	22	
	c	18	13	16	
	d	6	5	5	
March	a	52	66	59	82
	b	25	20	23	
	c	18	10	14	
	d	5	4	4	
The entire year	a	50	59	55	83
	b	30	27	28	
	c	16	10	13	
	d	4	4	4	

APPENDIX VII.

REPORT ON THE COMPARISON OF THE FORECASTS ISSUED AT 8h. 30m. p.m. WITH THE WEATHER SUBSEQUENTLY EXPERIENCED, for the 12 Months April 1898 to March 1899. The results are for the United Kingdom as a whole.

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April	a	43	58	51	83
	b	33	31	32	
	c	20	9	14	
	d	4	2	3	
May	a	53	61	57	85
	b	28	27	28	
	c	15	8	11	
	d	4	4	4	
June	a	59	59	59	85
	b	26	25	26	
	c	11	11	11	
	d	4	5	4	
July	a	59	59	59	82
	b	24	21	23	
	c	13	14	13	
	d	4	6	5	
August	a	41	45	43	79
	b	38	34	36	
	c	16	17	17	
	d	5	4	4	
September	a	51	65	58	86
	b	33	22	28	
	c	12	8	10	
	d	4	5	4	
October	a	50	66	58	84
	b	28	23	26	
	c	16	9	12	
	d	6	2	4	
November	a	46	58	52	84
	b	32	31	32	
	c	18	3	10	
	d	4	8	6	
December	a	43	60	52	86
	b	39	30	34	
	c	16	8	12	
	d	2	2	2	
January	a	45	57	51	81
	b	30	29	30	
	c	18	11	14	
	d	7	3	5	
February	a	56	57	57	79
	b	20	25	22	
	c	18	13	16	
	d	6	5	5	
March	a	52	66	59	82
	b	25	20	23	
	c	18	10	14	
	d	5	4	4	
The entire year	a	50	59	55	83
	b	30	27	28	
	c	16	10	13	
	d	4	4	4	

APPENDIX VIII.

Storm Warnings.

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 to which storm-warning telegrams are sent:—

NORTHERN.	WESTERN.	SOUTHERN.	EASTERN.
Scotland, N.E.	Ireland, S.W.	England, S.W.	England, N.E.
Lerwick.	Tuskar L.H.	The Lizard.	Berwick-on-Tweed.
Scalloway.	New Ross.	Falmouth.	Cullercoats.
Dunrossness.	Dunmore East.	Pendennis.	Tynemouth.
Sumburgh Hd. L.H.	Dungarvan.	Mevagissey.	South Shields.
Noup Head L.H.	Minehead L.H.	Mount Batten.	Souter Point L.H.
Stromness.	Youghal.	Plymouth.	Sunderland.
Kirkwall.	Queenstown.	Devonport.	Hartlepool.
Cantick Head L.H.	Cork.	Prawle Point.	Middlesborough.
Holborn Head.	Passage.	Teignmouth.	Redcar.
Dunnet Head.	Kinsale.	Exmouth.	Flamborough Hd
Wick.	Do. (Old Head).		Whitby.
Tarbet Ness L.H.	Galley Head L.H.		Filey.
Avoch.	Castletownshend.		Bridlington.
Inverness.	Fastnet Rock L.H.		Hull.
Nairn.	Brow Head.		Goole.
Burghead.	Tralee.		Grimsby.
Lossiemouth.	Limerick.		Boston.
Buckie.	Loophead L.H.		
Port Knockie.	Galway.		
Cullen.			
Portsoy.	Ireland, N.W.		
Banff.			
Fraserburgh.	Killybegs L.H.		
Peterhead.	Tory Island L.H.		
Aberdeen.	Lough Swilly L.H.		
Girdleness L.H.	Rathmullan.		
	Malin Head.		
	Portrush.		
	Port Ballintrae.		

[*Continued.*

NORTHERN.	WESTERN.	SOUTHERN.	EASTERN.
SCOTLAND, E.	IRISH SEA.	ENGLAND, S.	ENGLAND, E.
Stonehaven.	Belfast.	Guernsey.	Sutton Bridge.
Montrose.	Donaghadee.	St. Helier's (Jersey).	Lynn.
Scurdy Ness L.H.	Burr Point.	Gorey „	Sheringham.
Broughty Ferry.	Howth.	Weymouth.	Cromer.
Dundee.	Kingstown.	Anvil Point L.H.	Great Yarmouth.
St. Andrews.	Pt. of Ayre (I. of M.)	Poole.	Southwold.
Anstruther.	Ramsey „	Southampton.	Orford Ness L.H.
Pittenweem.	Douglas „	Hamble.	Ipswich.
Buckhaven.	Castletown „	Yarmouth.	Harwich.
Methil.	Silloth.	Cowes.	Gunfleet L.H.
Wemyss, West.	Maryport.	Ryde.	
Burntisland.	Workington.	St. Catherine's Pt.	
Grangemouth.	Whitehaven.	Portsmouth.	
Bo'ness.	Barrow.	Littlehampton.	
Granton.	Walney Is. L.H.	Brighton.	
Newhaven.	Morecambe.	Newhaven.	
Leith.	Fleetwood.		
Fisherrow.	Blackpool.		
Dunbar.	Lytham.		
Cockburnspath.	Southport.		
St. Abb's Head.	Formby.		
Eyemouth.	Liverpool.		
	Runcorn.		
	Hoylake.	ENGLAND, S.E.	
	New Brighton.	Eastbourne.	
	Connah's Quay.	Hastings.	
	Penmaenmawr.	Rye.	
SCOTLAND, N.W.	Port Penrhyn.	Sandgate.	
Fair Isle L.H.	Point Lynas L.H.	Folkestone.	
C. Wrath L.H.	Skerries L.H.	Dover.	
Stourhead L.H.	Holyhead.	Deal.	
Port of Ness.	South Stack L.H.	Ramsgate.	
Stornoway.	Caernarvon.	Margate.	
Island Glass L.H.	Port Dinorwic.	Faversham.	
Portnaguiran.		Sheerness.	
	ST. GEORGE'S CHANNEL.	Chatham.	
	Aberystwyth.	Greenhithe.	
	Milford.		
	BRISTOL CHANNEL.		
SCOTLAND, W.	Small's L.H.		
Glasgow.	Caldy L.H.		
Greenock.	Pembrey.		
Rothesay.	Llanelly.		
Lamlash.	Swansea.		
Carradale.	Briton Ferry.		
Campbelton.	Porthcawl.		
Rhuvaal L.H.	Nash L.H.		
Mull of Cantire L.H.	Penarth.		
Rhinns of Islay L.H.	Cardiff (Bute Dock).		
Ardrossan.	Do. (Barry Dock).		
Girvan.	Newport.		
Ballantrae.	Weston-super-Mare.		
Cairn Ryan.	Burnham.		
Corsewall Point L.H.	Bridgewater.		
Mull of Galloway L.H.	Lundy Island.		
	Ilfracombe.		
	Bull Point L.H.		
	Barnstaple.		
	Appledore.		

[*Continued*

NORTHERN.	WESTERN.	SOUTHERN.	EASTERN.
	BRISTOL CHANNEL —*cont.*		
	Hartland Pt. L.H.		
	Boscastle.		
	Port Isaac.		
	Newquay.		
	Hayle.		
	Godrevy L.H.		
	St. Ives.		
	St. Sennen.		
	Newlyn, West.		
	Penzance.		
	Scilly.		

APPENDIX IX.

Fishery Barometers.

List of Places supplied with Fishery Barometers.

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

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

Scotland, east coast.—Duncansbay, Freswick, Auchengill, Keiss, Ackergill, Staxigoe, Wick, Lybster, Dunbeath, Inver, Portmahomack, Ballintore, Cromarty, Avoch, Nairn, Burghead, Portessie, Port Knockie, Portsoy, Whitehills, Gardenstown, Rosehearty, Pitullie, Fraserburgh, Inverallochy, Pointlaw, Findon, Portlethen, Skateraw, Stonehaven, Arbroath, East Haven, Broughty Ferry, St. Andrews, Crail, Cellardyke, St. Monance, Burntisland, 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, Felixstowe, Harwich, Brightlingsea, West Mersea, Maldon, Leigh, Margate, Deal, Kingsdown, Dover.

England, south coast.—Bognor, Ryde, Bembridge, Brixton, Atherfield, Ventnor, Yarmouth (Isle of Wight), Gorey (Jersey), Haslar Hospital, Poole, Weymouth, Portland, Budleigh Salterton, Exmouth, Cawsand, Mevagissey, Gorranhaven, Devoran, Portscatho, Penryn, Durgan, Porthallow, Falmouth, Coverack, Newlyn (2), Mousehole, Penberth, Porth Guarra.

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

Wales.—Briton Ferry, Swansea, Angle, Milford, Aberystwyth, 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), Lawrence Cove, Ballydonegan, Ballycrovane.

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

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

Scotland, west coast.—Lamlash, Tarbert (Loch Fyne), Loch Ranza, Campbeltown, Carradale, Portnahaven and Portwemyss (Islay), Portree and Armadale (Isle of Skye), Isle of Soay, Plockton, Ardneaskan, Shieldaig, Gruinard, Badachro, Ullapool, East Mey, Gills, Stroma (2).

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

APPENDIX X.

Methods followed in dealing with Meteorological Returns from Land Stations in the British Isles.

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

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

Returns from observatories.

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.

Examination of returns.

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 the 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.

Results of examination and report to Council.

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 tabulations are eventually bound and stored with the curves in the Office.

General supervision of observatory work.

In connection 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.

Method of dealing with the Numerical Results from the Self-recording Observatories.

Interpolations.

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.

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 Five Observatories under the Meteorological "Council." The volumes for 1895 and 1896 are in the press. See p. 18.

It will be noticed that this publication includes results from only five observatories, while on page 16 seven observatories are mentioned. This is owing to the fact that since the year 1884 the records at Glasgow and Stonyhurst have not been fully published by the Office (although the stations are partially subsidized by it, in order to maintain the record established in 1868 and published for the years 1869 to 1883), where, however, the curves are stored for future use if required.

Returns from both these observatories are published in "Returns from Stations of the Second Order," and meteorological results for Stonyhurst and Falmouth are printed independently by the College authorities, and by those of the Royal Cornwall Polytechnic Society.

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

Anemographs.

The anemograms received from Alnwick Castle, Armagh, Deerness, Dublin, Fleetwood, Holyhead, North Shields, Scilly, and Yarmouth are regularly examined and tabulated in the Office (except those for Armagh, which are tabulated at the Observatory), and the sheets bound up in volumes. Besides special inquiries on legal and other points which arise from time to time, 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.—*Barographic Stations at which the Atmospheric Pressure is continuously recorded.*

Barographs.

These stations are for the most part either telegraphic reporting stations or stations of the second or third orders. The instrument in most general use is Richard's self-recording aneroid. At the telegraphic stations the record is first used to indicate to the observers the changes which have occurred since the last observing hour, and these changes, when large, are reported by wire to London, and are used in preparing the forecasts. The curves themselves are forwarded to the Office weekly and are stored for future use.

IV.—*Sunshine Stations at which the duration of Bright Sunshine is continuously recorded.*

Sunshine records.

The daily sunshine cards which are now received from 60 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, dated and then stored in the Office. It should, however, be added, that returns of sunshine are received from other stations, at which the original records are retained.

A tabulation of most of the curves is published in the Weekly Weather Report, mentioned in Appendix VI., 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." Hourly tabulations are made in the Office of the returns from the observatories, and the mean hourly amounts are published in the volumes of "Hourly Means." 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.

V.—*Telegraphic Reporting Stations.*

These are 30 in number in these islands, and the particulars as to the observations taken at them, and the methods adopting in dealing with them, will be found fully detailed in Appendix VII. to the Report for 1888-89, and in Appendix VI. to the present volume.

VI.—*Land Stations.*

Ever since the year 1866 returns of more or less completeness have been received from land stations in the United Kingdom. Origin and progress of system.

The number of stations has gradually increased until at the end of March, 1899, the total number was 161, including 16 belonging to the Royal Meteorological Society and 19 belonging to the Scottish Meteorological Society. Copies of these latter returns are sent to the Office under special arrangements with both Societies.

The Stations of the Second Order are 84 in number, and distributed as follows:—46 in England, 3 in Wales, 25 in Scotland, and 10 in Ireland.

The methods followed with regard to the examination and publication 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 of "Returns from Stations of the Second Order" for 1895 contained returns from 72 stations and that for 1896, now in the Press, will contain returns from 75 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.

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 New stations

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; for instance, Wales, the northern coasts of Cornwall and Devon, Somersetshire, Essex, the south-east of Ireland, &c., and any information for these districts would be valuable.

VII.—*Land Stations of the Third Order.*

These are 77 in number. The information supplied from them is, in some cases, similar to that supplied by a station of the second order, but taken only once daily, or at irregular hours, or perhaps less complete. At other stations less detail is given; for instance, 43 stations furnish only the daily rainfall. All the information thus afforded is utilised in some way or other, though it is not all included in the Office publications. The rainfall values are copied and supplied to Mr. Symons, F.R.S., for publication in "British Rainfall."

Inspection.

All the Stations supplying information to the Office are inspected. Some of them are visited every year, but the less important stations are not visited so frequently. Extracts from the reports of the inspectors will be found in Appendix V., p. 50.

List of Stations.

In Appendix XI., page 89, 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, 1899.

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 following the name of the station, 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. *Anemographic Stations.*—Continuous record of the direction and velocity (or force) of the wind.

C. *Barographic Stations.*—Continuous record of pressure.

D. *Second Order Stations.*—Monthly sheets, containing the 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 received in 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 hours other than 9 a.m. and 9 p.m.

R. *Rainfall Stations.*—Monthly sheets containing the 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 received at 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 Information supplied.	Page where Inspector's Report for 1898 will be found.
Aberdeen Observatory ..	57 10	2 6 W.	46	Prof. C. Niven ..	A. T. C	55, 67
„ Cove Bay	57 9	2 5 „	—	Coastguard	W.	—
Aberdovey	52 33	4 4 „	—	John Edwards ..	S.	—
Alnwick Castle	55 25	1 43 „	210	Humphry Willyams for the Duke of Northumberland.	B. F.	68, 69
Ardrossan, Ayrshire ..	55 38	4 50 „	15	J. W. Mayes	T.	54
Arlington Court (Barnstaple)	51 8	3 58 „	613	Lady Chichester ..	F.	—
Armagh Observatory ..	54 21	6 39 „	196	J. L. E Dreyer ..	B.D.F.S.	70, 73
Arran, North, Galway ..	53 6	9 40 „	—	Coastguard	G. W.	—
Aspley Guise, Beds.	52 1	0 38 „	410	E. E. Dymond ..	S.	—
Aysgarth Vicarage, 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.	—
Ballydonegan, Co. Cork ..	51 38	10 3 „	—	„	G. W.	—
Ballyglass, Co. Mayo ..	54 17	9 52 „	—	„	W.	—
Baltimore, Co. Cork	51 28	9 22 „	—	„	G.	—
Bantry	51 41	9 27 „	—	R. Brennan	R.	—
Belmullet, Co. Mayo ..	54 13	9 59 „	40	Miss E. Tolan ..	T.	50
Belvoir Castle (Grantham)	52 54	0 47 „	259	W.H. Divers, for the Duke of Rutland.	D.	60
S Ben Nevis	56 48	5 0 „	4,405	A. Rankin, for Directors Ben Nevis Observatory.	A. E. S.	—
M Bennington, Herts.	51 54	0 5 „	407	Rev. J. D. Parker ..	E.	—
M Berkhamsted	51 46	0 34 „	400	E. Mawley	E.	—
Bidston Observatory (Liverpool).	53 24	3 4 „	188	W. E. Plummer ..	D. T.	—
Birr Castle (Parsonstown)	53 6	7 55 „	175	J. Spooner and T. Colvin, for the Earl of Rosse.	D. S. T.	51
M Blackpool	53 48	3 3 „	31	A. J. Anderson ..	F. S.	—
Blacksod Point, Co. Mayo ..	54 6	10 4 „	—	Coastguard	W.	—
Bognor	50 47	0 40 „	—	H. C. E. Morris ..	S.	—
Bolton	53 35	2 27 „	389	W. W. Midgley ..	G.	—
Bournemouth	50 43	1 53 „	—	Messrs. Primavesi, for Town Council.	S.	59
S Braemar	57 0	3 24 „	1,111	J. Aitken	D. F. S.	—
Bramley, Surrey	51 11	0 33 „	148	J. Bartlett	D.	58
Bray, Co. Wicklow	53 12	6 6 „	—	Coastguard	G.	—
Brighton	50 49	0 8 „	—	A. Newsholme ..	S.	—
Burford, Oxon	51 48	1 38 „	420	M. Jacobs	R.	—
Burnmouth (Ayton, Berwick)	55 51	2 4 „	—	Coastguard	W.	—
Burntisland	56 4	3 14 „	—	„	W.	—
M Buxton	53 14	1 54 „	987	H. Harrison and H. L. Apthorpe.	E.	—
Caernarvon Bay Lightship	53 6	4 45 „	—	Light-keepers ..	W.	—
Cambridge	52 13	0 6 E.	88	Miss A. Walker ..	T. S.	60, 61
Campden, Glos.	52 5	1 46 W.	524	Capt. W. Wright, R.A.	R.	—
Cardigan Bay Lightship ..	52 25	5 1 „	—	Light-keepers ..	W.	—
S Cargen	55 2	3 37 „	72	A. Peacock	E.	—
Carrigallen, Co. Leitrim ..	53 58	7 38 „	350	Mrs. J. Godley and Miss Morrow.	R.	—
Castletown, Bere	51 39	9 54 „	—	Coastguard	G.	—
Castletownshend, Co. Cork	51 32	9 11 „	—	Coastguard	G.	—
Chatham	51 23	0 32 E.	136	The Instructor in Surveying.	G.	—
M Cheadle	52 58	1 57 W.	646	J. C. Philips	E. F.	—
M Cheltenham	51 54	2 3 „	184	R. Tyrer	E.	—
Chester	53 12	2 54 „	59	Rev. J. Cairns Mitchell.	D.	—
Churchill, Oxon	51 56	1 34 „	509	Giles Edmonds ..	R.	—
M Churchstoke	52 31	3 5 „	538	P. Wright	D. F. S.	—
Cirencester	51 43	1 57 „	446	Prof. Ohm	F. S.	—
Cleggan, Co. Galway ..	53 33	10 8 „	—	Coastguard	W.	—
Clifton	51 27	2 37 „	330	D. Rintoul	F.	—
Colly Weston	52 37	0 31 „	280	Miss A. Tasker ..	R.	62
Colwyn Bay	53 17	3 43 „	—	R. E. Lord	S.	—
Coningbeg Lightship ..	52 2	6 40 „	—	Light-keepers ..	W.	—
Cooper's Hill (Egham) ..	51 26	0 34 „	279	Prof. H. McLeod ..	G.	58
Cranleigh	51 8	0 29 „	—	Rev. G. C. Allen ..	F.	—
Cromarty	57 41	4 0 „	—	Coastguard	W.	—
Cronkbourne (Douglas) ..	54 10	4 29 „	137	A. W. Moore	D. F. S.	—
Crookhaven	51 28	9 13 „	—	Coastguard	G.	—
Crosshaven	51 48	8 18 „	—	„	G.	—
Cuckfield, Sussex	51 1	0 9 „	389	John Howe	R.	—

	Station.	Lat.	Long.	Height in feet above M.S.L.	Observer	Nature of Information supplied.	Page where Inspector's Report for 1898 will be found.
		° ′	° ′				
	Cullen	57 41	2 49 W.	18	R. A. J. Glover ..	D.	55
M	Cullompton	50 51	3 23 „	202	T. Turner	F. S.	—
	Currygrane (Edgeworthstown), Co. Longford.	53 45	7 39 „	267	J. M. Wilson .. .	D. F.	—
	Darwen, Lancashire ..	53 41	2 28 W.	710	G. Mainland	S.	64
	Deerness, Orkney Islands ..	58 56	2 45 W.	160	M. Spence	B. D. S.	54, 67
	Disserth (Llandrindod) ..	52 13	3 24 „	711	Rev. J. Le Herbert ..	R.	—
	Dolmelynllyn (Dolgelly) ..	52 47	3 53 „	—	W. Simmonds, for C. R. Williams.	R.	—
	Donaghadee	54 38	5 32 „	26	T. MacGowan ..	T.	50
	Doneraile, Co. Cork	52 13	8 34 „	266	Captain Evans ..	R.	—
	Dover	51 7	1 18 E.	198	H. E. Stilgoe ..	R.	—
	Dublin, Botanic Gardens ..	53 23	6 16 W.	67	F. W. Moore	D.	50
	„ City	53 20	6 15 „	47	J. W. Moore	D. F.	50
	„ Phœnix Park ..	53 22	6 21 „	155	Col. Hellard, R.E ..	B. D. S.	71, 74
	Duddington	52 36	0 32 „	152	Fred Coventry ..	F. R.	61, 62
S	Dundee	56 28	2 56 „	160	J. Carnochan ..	D. S.	55
	Dungeness	50 55	0 59 E.	26	W. Grimmer ..	T.	57
S	Dunrobin Castle	57 59	3 56 W.	12	D. Melville, for the Duke of Sutherland.	D.	54
	Durham	54 46	1 35 „	336	H. J. Carpenter ..	D. F. S.	56
	Dursley (Farnley), Glos. ..	51 41	2 21 „	250	R. W. Pinney ..	R.	—
	Eastbourne	50 46	0 17 E.	39	R. Sheward .. .	D. S.	58
	East Goodwin Lightship ..	51 13	1 36 „	—	Light-keepers ..	W.	—
	East Dereham	52 41	0 57 „	158	G. H. H. Cooper ..	R.	—
	Edgbaston (Birmingham) ..	52 28	1 56 W.	534	Alf. Cresswell ..	D. S.	61
	Edinburgh	55 57	3 12 „	253	R. C. Mossman ..	D. S.	55
	English and Welsh Grounds Lightship.	51 27	3 0 „	—	Light-keepers ..	W.	—
	Ennis, Co. Clare	52 51	8 59 „	38	Miss A. L. Scott ..	R.	—
	Falmouth	50 9	5 4 „	167	E. Kitto	A. F.	72
	Felixstow	51 58	1 22 E.	—	Rev. J. G. Munday	F. S.	—
	Fleetwood	53 56	3 1 W.	—	M. S. Gaulter ..	B.	70
	Forgandenny, Perth ..	56 21	3 29 „	175	C. L. Wood	C.	—
	Forrest Row, Sussex ..	51 7	0 2 E.	619	J. Bryce	R.	—
S	Fort Augustus	57 8	4 40 W.	68	Rev. J. M. Wall ..	E. F. S.	54
	Fort William	56 49	5 7 „	31	A. Rankin, for Directors, Ben Nevis Observatory.	A. F.	54, 66
	Foynes, Co. Limerick ..	52 37	9 7 „	108	Lord Monteagle ..	F.	—
	Fulbeck, Lincolnshire ..	53 3	0 37 „	185	Rev. Vere F. Willson	C. D.	61
	Geldeston (Beccles)	52 28	1 31 E.	37	E. T. Dowson ..	D. F. S.	—
	Gilcrux (Maryport)	54 44	3 23 W.	261	J. Monkhouse ..	D. F. S.	64
	Glasgow	55 53	4 18 „	180	Prof. L. Becker ..	A. D. F.	66
S	Glencarron	57 30	5 14 „	489	D. D. Munro	E. F.	—
S	Glenlee	55 5	4 12 „	203	W. Melville	E. F.	—
S	Gordon Castle	57 37	3 5 „	101	C. Webster, for the Duke of Richmond and Gordon, K.G.	E.	—
	Gorleston (Gt. Yarmouth)	52 35	1 43 E.	—	R. J. C. Day	G.	—
	Haslar Hospital, Hants. ..	50 47	1 7 W.	—	R. Harring	G.	—
	Hawes Junction	54 19	2 18 „	1,135	W. H. Bunce	G.	64
	Hesley Hall (Bawtry) ..	53 27	1 4 „	65	B. I. Whitaker ..	F.	—
M	Hereford	52 5	2 45 „	295	C. S. Morrison ..	F.	—
	Heysham Hall, Lancashire	54 3	2 54 „	95	S. Lomas, for Miss L. Grafton.	D.	64
M	Hillington	52 48	0 33 E.	88	Rev. H. E. B. Ffolkes	D. F. S.	—
	Hollesley Bay, Suffolk ..	52 3	1 27 „	38	Prof. C. G. F. Thonger.	D. S.	61
	Holyhead, Harbour Office ..	53 18	4 39 W.	57	F. M. Cotton ..	B. W.	69
	„ Sailors' Home ..	53 18	4 39 „	48	T. Chope	T.	73
	Hoylake, Cheshire	53 23	3 12 „	—	T. Foster	S.	—
	Hurdlestown (Broadford), Co. Clare.	52 48	8 38 „	157	Lieut.-Col. W. O. Bentley, R.A.	R.	—
	Hurst Castle	50 42	1 33 „	12	E. T. Tremble ..	T.	57
	Kearsney Abbey (Dover) ..	51 8	1 17 E.	?100	C. W. Curtis .. .	R.	—
	Ketton Hall (Stamford) ..	52 38	0 32 W.	—	J. H. Browett ..	R.	—
	„ Vicarage	52 38	0 32 „	109	Rev. A. Swire ..	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 Ormonde.	C. F.	51

Station.	Lat.	Long.	Height in feet above M.S.L.	Observer.	Nature of Information supplied.	Page where Inspector's Report for 1898 will be found.
M Killarney	° ′ 52 4	° ′ 9 30 W.	86	Ven. Archdeacon Wynne.	G. F.	—
Killiney, Co. Dublin ..	53 16	6 7 „	249	R O'Brien Furlong	R.	—
Kirkby Lonsdale	54 12	2 36 „	—	J. K. Picard	R.	—
Kirkwall	58 59	2 57 „	—	Coastguard	W.	—
Kish Bank Lightship ..	53 19	5 55 „	—	Light-keepers ..	W.	—
Ladylaw (Hawick)	55 28	2 47 „	447	T. Wilson	D.	55
Lahinch, Co. Clare	52 55	9 21 „	52	Miss J. Bowes ..	R.	—
S Lairg	58 1	4 22 „	335	Rev. D. Macrae ..	E. F.	54
Lamlash, Isle of Arran ..	55 32	5 8 „	—	Coastguard	G. W.	—
Laudale, Argyleshire ..	56 41	5 41 „	14	A. Fletcher, for T. H. G. Newton.	D. F.	54
Lawrence Cove, Co. Cork ..	51 38	9 50 „	—	Coastguard	G.	—
S Lednathie	56 45	3 7 „	719	W. Morrison, for P. Stormonth Darling.	E.	—
Leith	55 58	3 10 „	20	T. Richardson ..	T.	55
Leman and Ower Lightship	53 8	2 2 E.	—	Light-keepers ..	W.	—
Lerwick	60 9	1 8 W.	—	Coastguard	W.	—
Limerick	52 39	8 36 „	—	A. W. Shaw	R.	—
Liscannor, Co. Clare ..	52 56	9 23 „	—	Coastguard	W.	—
S Lissan, Co. Tyrone	54 41	6 45 „	300	The late Sir N. Staples, Bt.	E.	50
Llandinam, Montgomery ..	52 29	3 26 „	509	John Owens	R.	—
Llandovery	51 59	3 48 „	217	J. Watkins	F.	—
M Llandudno	53 21	3 50 „	88	J. Nicol	E. F.	—
„	53 21	3 51 „	? 20	Wm. Little	S.	—
London, Brixton	51 27	0 8 „	77	F. Gaster	T.	—
„ City	51 31	0 5 „	80	Messrs. de la Rue ..	S.	—
„ Hampstead ..	51 34	0 10 „	—	H. R. Beeton ..	C.	—
„ Pall Mall	51 30	0 7 „	—	Athenæum Club ..	C.	—
„ Westminster ..	51 30	0 8 „	76	The Staff of the Met. Office.	C. G.	—
„ Westminister Training College.	51 30	0 8 „	—	H. A. Reatchlous ..	S.	—
Londonderry	55 0	7 19 „	67	J. Conroy	D. F.	—
Loughborough	52 47	1 12 „	169	W. Berridge	T.	60
Lowestoft	52 29	1 44 E.	—	C. J. Heppell ..	G.	—
M Lowestoft	52 29	1 44 „	85	S. H. Miller	E.	—
Lytham	53 44	2 58 W.	21	J. H. Jenkins ..	D. S.	64
Maidenhead	51 30	0 43 „	99	G. H. Palmer ..	G.	—
Malin Head, Co. Donegal ..	55 23	7 24 „	230	J. Williams	T. C.	50
Manchester	53 29	2 13 „	190	J. Niven	D.	63
S Marchmont	55 44	2 25 „	498	J. A. Wood	E. F. S.	55
M Margate	51 24	1 24 E.	83	J. Stokes	S.	59
Market Rasen	53 23	0 20 W.	83	W. B. Jevons ..	R.	62
Markree Castle, Co. Sligo ..	54 11	8 27 „	122	F. W. Henkel, for Col. Cooper.	D. F. S.	50
Minard, Co. Kerry	52 7	10 8 „	—	Coastguard	W.	—
Morpeth	55 13	1 41 „	324	G. P. Berry	D. S.	56
Mount Callan (Inagh), Co. Clare.	52 53	9 16 „	479	Lt.-Col. Tottenham	R.	50
Nairn	57 36	3 52 „	84	Miss Penny	T.	54
Newarp Lightship	52 45	1 53 E.	—	Light-keepers ..	W.	—
Newcastle, Co. Wicklow ..	53 5	6 6 W.	256	B. H. Steede	D.	50
Newcastle-on-Tyne ..	54 59	1 36 „	152	N. H. Martin ..	G. S.	56
Newmarket-on-Fergus ..	52 46	8 53 „	—	W. W. FitzGerald ..	R.	51
Newport, Monmouth ..	51 35	3 0 „	—	C. Cullum	R.	—
Newquay, Cornwall ..	50 25	5 4 „	? 250	J. Pearce	S.	59
„ „ ..	50 25	5 5 „	—	Coastguard	W.	—
Northallerton	54 20	1 26 „	129	W. Stead	R.	—
North Foreland	51 23	1 27 E.	115	S. Jenkins	T.	57
North-West Lightship ..	53 31	3 31 W.	—	Light-keepers ..	W.	—
M Norwood	51 26	0 6 „	220	W. Marriott	E.	—
S Ochtertyre	56 23	3 53 „	329	G. Croucher, for Sir P. K. Murray, Bt.	E. F.	54
Omagh	54 36	7 19 „	300	Col. Buchanan ..	F.	50
Oswaldkirk, Yorkshire ..	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 ..	T. S.	73
Parkstone, Dorset	50 43	1 56 „	197	R. H. Barnes ..	D.	58
Penbedw (Mold)	53 12	3 11 „	650	H. W. Buddicom ..	C.	—
Pennant Bay (Aberdour) ..	57 40	2 16 „	—	Coastguard	W.	—

	Station.	Lat.	Long.	Height in feet above M.S.L.	Observer.	Nature of Information supplied.	Page where Inspector's Report for 1898 will be found.
		° ′	° ′				
S	Pinmore (Girvan)	55 12	4 49 W.	187	P. Donald, for Capt. Hamilton.	E.	—
	Plumstead	51 29	0 6 E.	—	J. G. Waller	S.	—
	Plymouth, The Hoe	50 22	4 8 W.	116	H. Victor Prigg ..	D. F. S.	58
S	Poltalloch	56 8	5 30 „	132	D. S. Melville, for Lord Malcolm.	E.	54
	Portrush	55 13	6 40 „	—	Coastguard	W.	—
	Port Talbot	51 34	3 45 „	—	J. Hollingworth, for Miss Talbot.	S.	—
	Prawle Point	50 12	3 43 „	332	T. Howse	T.	57
	Prestwich (Manchester) ..	53 32	2 17 „	320	T. R. H. Clunn ..	D. F. S.	—
	Quin, Co. Clare	52 48	8 52 „	—	Mrs. Hallam Studdert.	R.	—
	Rede Court (Rochester) ..	51 24	0 29 E.	224	W. H. Tingey ..	D.	—
	Ridgmont	52 1	0 36 W.	291	H. A. Mann	D.	61
	Roche's Point, Co. Cork ..	51 47	8 15 „	42	W. Kennedy ..	T.	—
	Rochford (Tenbury) ..	52 18	2 36 „	316	Rev. John Tomson	C. R.	—
S	Rosewell	55 51	3 7 „	690	R. B. Mitchell ..	E.	—
	Rothamsted	51 48	0 22 „	368	Sir J. B. Lawes and Sir J. H. Gilbert.	F. S.	—
S	Rothesay	55 50	5 4 „	115	J. Kay	E.	54
M	Rounton, Yorkshire ..	54 24	1 18 „	249	Sir I. L. Bell, Bart. ..	E.	—
M	Rousdon, Devon	50 43	3 0 „	515	Sir C. E. Peek, Bart.	E.	—
	Roxborough, Co. Limerick	52 35	8 36 „	111	A. W. Shaw	R.	—
	Royal Sovereign Lightship	50 43	0 27 E.	—	Light-keepers ..	W.	—
	Rugby	52 22	1 15 W.	379	E. Kitchener ..	G.	62
	St. Ann's Head, Pembroke	51 41	5 11 „	150	H. T. Knott	T. S. W.	51
	St Aubin's, Jersey	49 12	2 11 „	25	J. Fisher	T.	57
	St. David's, Pembrokeshire	51 53	5 16 „	215	W. P. Propert ..	D.	51
	St. Helen's, Lancashire ..	53 28	2 45 „	151	F. Drew Harris ..	G.	63
	St. Heliers, Jersey	49 11	2 6 „	—	Signal Officer, Fort Regent.	S.	59
	St. Leonard's	50 51	0 33 E.	178	H. Colborne	D. F. S.	58
	„ (West Marina)	50 51	0 32 „	—	T. Eldridge	G.	58
	St. Peter Port, Guernsey ..	49 32	2 32 W.	—	F. E. Carey	S.	—
	Salcombe, Devon	50 14	3 46 „	—	Coastguard	W.	—
	Sandgate, Kent	51 4	1 9 E.	56	A. Robert Bowles ..	R.	—
M	Scarborough	54 18	0 24 W.	159	E. W. Ellerbeck ..	D. F. S.	—
	„	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. C.	72, 74
	Seafield, Co. Clare	52 48	9 30 „	—	Coastguard	W.	—
	Seaham Harbour	54 50	1 19 „	148	G. H. Aird	D.	56
	Seven Stones Lightship ..	50 4	6 5 „	—	Light-keepers ..	W.	—
M	Shaftesbury	51 1	2 12 „	—	Miss L. Wand ..	F.	—
	Shambles Lightship ..	50 31	2 20 „	—	Light-keepers ..	W.	—
	Sheffield	53 23	1 29 „	429	E. Howarth	D. S.	—
	Sheephaven (Dunfanaghy)	55 11	7 58 „	—	Coastguard	W.	—
	Shields, North	55 0	1 27 „	97	W. B. Clark	T.	69
	Shields, North, High Lighthouse.	55 0	1 27 „	—	Captain Harrison ..	B.	68
	Shipwash Lightship ..	52 2	1 38 E.	—	Light-keepers ..	W.	—
	Shirley (Birmingham) ..	52 25	1 49 W.	460	B. Boothroyd ..	F.	—
	Skipton	53 58	2 9 „	567	W. Farrer	G.	—
	Solway Lightship	54 48	3 32 „	—	Light-keepers ..	W.	—
	Southampton	50 55	1 24 „	78	J. T. Cook, for Dir. Gen. of Ordnance Survey.	D. F. S.	58
	Southport	53 39	2 59 „	37	J. Baxendell	S.	—
	South Rock Lightship ..	54 25	5 22 „	—	Light-keepers ..	W.	—
	Spiddal, Co. Galway ..	53 15	9 17 „	—	Coastguard	G.	—
	Spurn Head	53 34	0 7 E.	19	G. Freeman	T.	56
	Spurn Lightship	53 34	0 13 „	—	Light-keepers ..	W.	—
	Stokesay (Craven Arms) ..	52 26	2 52 W.	370	Miss M. A. Digues La Touche.	D.	—
	Stonyhurst College	53 51	2 28 „	375	Rev. W. Sidgreaves	A. D. F.	65, 69
	Stornoway	58 11	6 22 „	28	J. Mackenzie ..	T. S. C.	54
	„	58 11	6 22 „	—	Coastguard	W.	—
	Stranraer	54 54	5 2 „	—	„	G.	—
	Strathpeffer-Spa, N.B. ..	57 37	4 28 „	253	J. Tregelles Fox ..	D. S.	—
	Sumburgh Head (Shetlands).	59 51	1 17 „	126	Rev. W. Brand ..	T. C.	54
	Sunderland	54 54	1 23 „	—	Coastguard	W.	—
	Symbister, Shetlands ..	60 14	1 25 „	—	J. S. Nicolson ..	G.	—
	Syston, Leicester	52 43	1 5 „	178	S. K. Daniels ..	R.	—

Station.	Lat.	Long.	Height in feet above M.S.L.	Observer.	Nature of Information supplied.	Page where Inspector's Report for 1898 will be found.
	° ′	° ′				
Tealby, Lincolnshire ..	53 24	0 16 W.	251	Rev. S. Lewin ..	D.	61
Teelin, Co. Donegal	54 38	8 39 „	—	Coastguard	W.	—
Temple Bruer, Lincolnshire	53 4	0 30 „	—	Mrs. Morley	R.	—
Tenby	51 41	4 42 „	79	W. T. Balmer ..	D. S.	—
Thurcaston (Leicester) ..	52 42	1 10 „	253	Rev. T. A. Preston ..	S.	—
Tixover Hall	52 35	0 33 „	129	Capt. H. E. Hotham	R.	—
Torquay	50 28	3 31 „	286	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.	—
Uzon (Montrose)	56 40	2 28 „	—	Coastguard	W.	—
Valencia Observatory, Cahirciveen.	51 56	10 15 „	30	J. E. Cullum	A. T. C.	51, 71
„ Island, Glanleam	51 56	10 20 „	—	Miss E. FitzGerald	R.	—
„ „ Knightstown	51 55	10 20 „	—	Coastguard	G.	—
Ventnor	50 36	1 13 „	80	Miss M. Gibson ..	S.	—
Wakefield	53 41	1 30 „	96	H. Clarke	E.	—
Waterford	52 16	7 7 „	—	Harbour Authorities	C.	—
Watergate (Emsworth) ..	50 56	0 55 „	236	W. M. Christy ..	R. S.	58
Wealdstone	51 37	0 20 „	179	G. E. Eland	R.	—
Westbourne, Sussex	50 52	0 55 „	—	Rev. L. B. Birkett ..	S.	—
Westray, Orkney	59 17	3 0 „	—	J. Hewison	G.	—
Whitehurch	50 32	4 6 „	593	E. E. Glyde	E.	—
Wick	58 27	3 6 „	80	J. Sinclair	T.	55
„	58 27	3 6 „	—	Coastguard	W.	—
Wolfelee	55 23	2 39 „	587	W. Gordon	D.	55
Woolacombe (Devon) ..	51 10	4 12 „	59	E. Henshall	D.	—
Worksop	53 22	1 5 „	56	H. Mellish	S.	—
Yarmouth	52 37	1 43 E.	10	G. T. Watson ..	B. T. C.	68, 69
„ Isle of Wight ..	50 42	1 29 W.	—	Coastguard	G.	—
Ynis-y-bro (Newport) ..	51 38	3 3 „	115	C. Cullum	R.	—
York, Bootham	53 57	1 5 „	—	E. B. Collinson ..	S.	56
„ The Museum	53 57	1 5 „	56	H. M. Platnauer ..	D. T.	56

In addition to those already mentioned, reports are received daily from the following Continental Stations.

Station.	Authority.	Station.	Authority.
Haparanda	Meteorological Office, Stockholm.	†The Helder	Bureau Central Météorologique, Paris.
Hernösand		Brussels	
†Stockholm		Cape Gris Nez	
Wisby		†Brest (St. Mathieu) ..	
Karlstad		Lorient (Ile de Groix) ..	
Bodö	Meteorological Institute, Christiania.	*†Rochefort (Ile d'Aix) ..	
†Christiansund		†Biarritz	
*†Skudesnaes		†Paris	
Færder		Belfort	
		Lyons	
		Nice	
†The Scaw	Meteorological Institute, Copenhagen.	Perpignan	Cent. Met. Inst. of Germany.
Fanö		Berlin	
Cuxhaven	Deutsche Seewarte, Hamburg.	Wiesbaden	
		Munich	
		Corunna	Observatory, Lisbon.
		†Lisbon	
		Azores (P. Delgada) ..	

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

LIST OF BRITISH STATIONS ARRANGED UNDER COUNTIES.

County.	Station.	County.	Station.
England :—		England—*cont.*	
Bedford... ...	Aspley Guise.	Lancashire ...	Darwen.
	Ridgmont.		Fleetwood.
Berkshire ...	Maidenhead.		Heysham.
Buckingham ...	—		Lytham.
Cambridge ...	Cambridge.		Manchester.
Cheshire ...	Bidston.		Prestwich.
	Chester.		St. Helens.
	Hoylake.		Southport.
Cornwall ...	Falmouth.		Stonyhurst.
	Newquay.	Leicester ...	Belvoir Castle.
	Scilly.		Loughborough.
Cumberland ...	Gilcrux.		Syston.
Derby	Buxton.		Thurcaston.
Devon	Arlington.	Lincoln ...	Fulbeck.
	Cullompton.		Market Rasen.
	Plymouth.		Tealby.
	Prawle Point.		Temple Bruer.
	Rousdon.	Middlesex ...	London :
	Salcombe.		City.
	Tavistock.		Hampstead.
	Torquay.		Pall Mall.
	Woolacombe.		Westminster.
Dorset	Parkstone.		Wealdstone.
	Shaftesbury.	Monmouth ...	Newport.
Durham ...	Durham.		Ynis-y-bro.
	Seaham.	Norfolk... ...	East Dereham.
	Sunderland.		Geldeston.
Essex	—		Hillington.
Gloucester ...	Campden (Hidcote)		Yarmouth.
	Cheltenham.	Northampton ...	Colly Weston.
	Cirencester.		Duddington.
	Clifton.	Northumberland	Alnwick Castle.
	Dursley.		Morpeth.
Hampshire ...	Bournemouth.		Newcastle.
	Haslar.		North Shields.
	Hurst Castle.	Nottingham ...	Hesley Hall.
	Southampton.		Worksop.
	Totland Bay.	Oxford	Burford.
	Ventnor.		Churchill.
	Yarmouth.		Oxford.
Hereford ...	Hereford.	Rutland ...	Ketton Hall.
Hertford ...	Bennington.		Do. Vicarage.
	Berkhamsted.		Tixover Hall.
	Rothamsted.		Uppingham.
Huntingdon ...	—	Shropshire ...	Stokesay.
Kent	Chatham.	Somerset ...	—
	Dover.	Stafford... ...	Cheadle.
	Dungeness.	Suffolk	Felixstow.
	Kearsney.		Gorleston.
	Margate.		Hollesley Bay.
	North Foreland.		Lowestoft.
	Plumstead.	Surrey	Bramley.
	Rede Court.		Brixton.
	Sandgate.		Cooper's Hill.
Lancashire ...	Blackpool.		Cranleigh.
	Bolton.		Kew.
			Norwood.

County.	Station.
England—*cont.*	
Sussex	Bognor.
	Brighton.
	Cuckfield.
	Eastbourne.
	Forrest Row.
	St. Leonards.
	Do. West Marina.
	Watergate Park.
	Westbourne.
Warwick ..	Edgbaston.
	Rugby.
	Shirley.
Westmoreland ...	Kirkby Lonsdale.
Wiltshire ...	—
Worcester ...	Rochford.
Yorkshire ...	Aysgarth.
	Hawes.
	Northallerton.
	Oswaldkirk.
	Rounton.
	Scarborough.
	Sheffield.
	Skipton.
	Spurn Head.
	Wakefield.
	York.
Wales :—	
Anglesey ...	Holyhead.
Brecknock ...	—
Cardigan ...	—
Carmarthen ...	Llandovery.
Carnarvon ...	Llandudno.
Denbigh ...	Colwyn Bay.
Flint	Penbedw.
Glamorgan ...	Port Talbot.
Merioneth ...	Aberdovey.
	Dolmelynllyn.
Montgomery ...	Churchstoke.
	Llandinam.
Pembroke ...	St. Ann's Head.
	St. David's.
	Tenby.
Radnor	Disserth.
Islands :—	
Isle of Man ...	Cronkbourne.
Jersey	St. Aubin's.
	St. Heliers.
Guernsey ...	St. Peter Port.
Scotland :—	
Aberdeen ...	Aberdeen.
	Braemar.
	Pennant Bay.
Argyll	Laudale.
	Poltalloch.
Ayr	Ardrossan.
	Ballantrae.
	Pinmore.

County.	Station.
Scotland—*cont.*	
Banff	Cullen.
	Gordon Castle.
Berwick ...	Burnmouth.
	Marchmont
Bute	Lamlash.
	Rothesay.
Caithness ...	Wick.
Clackmannan ...	—
Cromarty ...	Cromarty.
	Strathpeffer Spa.
Dumbarton ...	—
Dumfries ...	—
Edinburgh ...	Edinburgh.
	Leith.
	Rosewell.
Elgin	—
Fife	Burntisland.
Forfar	Dundee.
	Lednathie.
	Uzon.
Haddington ...	—
Inverness ...	Ben Nevis.
	Fort Augustus
	Fort William.
Kincardine ...	Cove Bay.
Kinross	—
Kirkcudbright	Cargen.
	Glenlee.
Lanark	Glasgow.
Linlithgow ...	—
Nairn	Nairn.
Orkney	Deerness.
	Kirkwall.
	Westray.
Peebles	—
Perth	Forgandenny.
	Ochtertyre.
Renfrew ...	—
Ross	Glencarron.
	Stornoway.
Roxburgh ...	Ladylaw.
	Wolfelee.
Selkirk	—
Shetlands ...	Lerwick.
	Sumburgh Head.
	Symbister.
Stirling... ...	—
Sutherland ...	Dunrobin Castle.
	Lairg.
Wigton	Stranraer.
Ireland :—	
Antrim	Portrush.
Armagh ...	Armagh.
Carlow	—
Cavan ...	—
Clare	Ennis.
	Hurdlestown.
	Kilcredane.
	Lahinch.
	Liscanor.

County.	Station.	County.	Station.
Ireland—*cont.*		Ireland—*cont.*	
Clare	Mount Callan.	Kerry	Minard.
	Newmarket-on-Fergus.		Valencia.
			Do. Glanleam.
	Quin.		Do. Knightstown.
	Seafield.	Kildare	—
Cork	Ballydonegan.	Kilkenny ...	Kilkenny.
	Baltimore.	King's Co. ...	Birr Castle.
	Bantry.	Leitrim	Carrigallen.
	Castletown Bere.	Limerick ...	Foynes.
	Castletownshend.		Limerick.
	Crookhaven.		Roxborough.
	Crossbaven.	Londonderry ...	Londonderry.
	Doneraile.	Longford ...	Currygrane.
	Lawrence Cove.	Louth	—
	Roches Point.	Mayo	Ballyglass.
	Schull.		Belmullet.
	Union Hall.		Blacksod Point.
Donegal ...	Malin Head.	Meath	—
	Sheep Haven.	Monaghan ...	—
	Teelin.	Queen's Co. ...	—
Down	Donaghadee.	Roscommon ...	—
Dublin	Dublin (City).	Sligo	Markree Castle.
	Do. (Mountjoy Barracks.)	Tipperary ...	—
	Glasnevin.	Tyrone	Lissan.
	Killiney.		Omagh.
Fermanagh ...	—	Waterford ...	Waterford.
Galway	Arran.	Westmeath ...	—
	Cleggan.	Wexford ...	—
	Spiddal.	Wicklow ...	Bray.
Kerry	Killarney.		Newcastle.

APPENDIX XII.

LIST OF DOCUMENTS received from FOREIGN AND COLONIAL LAND STATIONS during the year ending March 31st, 1899.

Place.	Observer.	Nature of Observations.
Antigua	Francis Watts and K. McDonald ...	Observations twice daily, 1898, March to December; 1899, January, February.
Ascension (Garrison)	... ...	Lighthouse Register, 1898 August to December.
Bahamas (Abaco)	Lightkeepers...	,, ,, ,, January to December.
,, (Cat Cay)	A. S. Haigh	Barometer diagrams, 1898, March to October.
,, (Cay Lobos)	Lightkeeper	Lighthouse Register, 1898, January to December.
,, (Cay Sal)	,, ...	,, ,, ,, ,, ,,
,, (Inagua)	,, ...	,, ,, ,, ,, ,,
,, (Nassau)	J. A. Kerr	Observations once daily, 1898, February to December; 1899, January and February.
,, (Watling Island) ...	Lightkeeper	Lighthouse Register, 1898, January to December.
Barbados	J. R. Bovell	Monthly summary of observations twice daily, 1898, January to December; 1899, January.
Beyrout (Lee Observatory) ...	R. H. West, M.A.	Observations twice daily, 1898, March to September.
Brumana (Mount Lebanon) ...	T. Little	,, ,, ,, October 1892 to February 1898.
Cape Pembroke(Falkland Islands)	G. K. Broom, Lightkeeper	Lighthouse Register, 1898, January to December.
Cape Spartel (Tangier)	J. J. Emmott, Lloyd's Signalman	Observations twice daily, 1898, March to December; 1899, January, February.
Colon, Isthmus of Panama ...	Rev. S. P. Hendrick	Observations twice daily, 1898, March to December; 1899 January, February.
Cyprus (Famagusta)	G. Eliades	Observations twice daily, 1898, January to December.
,, (Kyrenia)	P. Michaelides	,, ,, ,, ,, ,, ,,
,, (Larnaca)	C. Perini	,, ,, ,, ,, ,, ,,
,, (Limassol)	Luigi Béraud	,, ,, ,, ,, ,, ,,
,, (Nicosia)	P. Nicopoulos	,, ,, ,, ,, ,, ,,
,, (Papho)	E. A. Malliotis and M. Theodorides	,, ,, ,, ,, ,, ,,

George Town (British Guiana)...	Robert Ward...	Observations twice daily, 1898, January to December; 1899, January.
" " " " ...	" "	Daily record of sunshine, " " " " "
Gibraltar	Sergeant J. Power, Med. Staff Corps.	Observations twice daily, 1898, March to December; 1899, January, February.
Gold Coast (Aburi)	Assistant Colonial Surgeons ...	Observations twice daily, 1898, January to December; 1899, January.
" " (Accra)	" " " ...	" " " " " " " "
" " (Adda)	" " " ...	" " " " " " " "
" " (Axim)	" " " ...	" " " " " " " "
" " (Cape Coast Castle)	" " " ...	" " " " " " " "
" " (Kwitta)	" " " ...	" " " " " " " "
Havana (R. Colegio de Belen) ...	... ...	Three-hourly observations of clouds, May 1, 1896, to July 31, 1897.
Kambole (Tanganyika)	J. G. Mackay	Observations of rainfall and temperature, 1898, January to March.
Lagos	T. B. Wright	" twice daily, 1898, February to December; 1899, January.
Las Palmas (San Augustin) ...	... ...	Results of observations for 1893–1896.
Malden Island	... ...	Observations twice daily, February to December 1896.
Mojanga (Madagascar)	S. C. Knott	" " " 1898, January to April.
Namirembe, Mengo, Uganda ...	Rev. A. J. Pike	" once daily, 1898, January.
St. Helena	H. S. Hands and A. L. C. Hands ...	" " " " to December.
"	" " ...	Continuous record of wind (direction and velocity), 1898, January to December.
" (James Town) ...	P. Clifford and A. E. Broadway ...	Daily rainfall, 1898, January to December; 1899, January.
" (Mount Pleasant) ...	T. C. Barker	" " " " " "
Sierra Leone	Z. Grant	Observations twice daily, 1898, March to December; 1899, January, February.
Sombrero	J. A. Richardson and A. L. Richardson.	Lighthouse Register, 1897, April to December; 1898, January to September.
Teneriffe (Sitio de Cullen) ...	A. F. Perry	Observations twice daily, 1898, March to December; 1899, January.
" " " ...	"	Continuous record of pressure, 1898–1899.
" " " ...	"	" " temperature, 1898–1899.

APPENDIX XIII.

ADDITIONS TO THE LIBRARY DURING THE YEAR ENDING 31ST MARCH, 1899.

Aachen, Meteorologische Station.—Deutsches meteorologisches Jahrbuch für 1897. Meteorologische Station I. Ordnung in Aachen. Ergebnisse der meteorologischen Beobachtungen. Herausgegeben . . . von P. Polis. Jahrg. 3. la. 4°. Karlsruhe, 1898.

——— ——— Ergebnisse der 1898 in Aachen von der meteorologischen Station Aachen des Königl. Preuss. Meteorologischen Instituts angestellten Beobachtungen. sm. f°. Sheet.

Adelaide Observatory.—Meteorological observations made at the Adelaide Observatory, and other places in South Australia and the Northern Territory, during the year 1895, under the direction of C. Todd. sm. f°. Adelaide, 1898.

[———] Rainfall in South Australia and the Northern Territory during 1896; with weather characteristics of each month. By Sir C. Todd. f°. Adelaide, 1898.

Aldous, J. C. P.—An elementary course of physics. sm. 8°. London, 1898.

[Algiers, Service Météorologique du Gouvernement Général de l'Algérie.]—Bulletin météorologique de l'Algérie. 1898, Jan. 1—Dec. 31. sm f°. Sheets.

[Allahabad, Meteorological Office.]—Administration report of the Meteorological Reporter to Government, North-Western Provinces and Oudh, for the year 1897-98. sm. f°. s.l.e.a.

[——— ———] Brief sketch of the meteorology of the North-Western Provinces and Oudh and adjacent parts of Rajputana and the Punjab, for the year 1897. sm. f°. s.l.e.a.

Amsterdam, Kon. Nederlandsch Aardrijkskundig Genootschap. Tijdschrift. Tweede serie. Deel 15. 8°. Leiden, 1898.

* **Angot, A.**—Traité élémentaire de météorologie. la. 8°. Paris, 1899.

Archibald, [E.] D.—Weather types in relation to long-period forecasting. 8°. London, 1898.

Azambuja, G. A. de.—Annuario do Estado do Rio Grande do Sul, 1899 Anno 15. sm. 8°. Porto Alegre, 1898.

* **Banfield, F.**—Weather-making. la 8°. (*Cassell's Mag.*, 1899, *Jan.*, *p.* 231.)

[Bangalore, Mysore Government, Meteorological Department.]—Meteorology in Mysore for 1897, being the results of observations at Bangalore, Mysore, Hassan and Chitaldrug, by John Cook. la. 4°. Bangalore, 1898.

——— ——— ——— Report on rainfall registration in Mysore for 1895-97. By J. Cook. 3 vols. la 4°. Bangalore, 1896-98.

‖ **Baracchi, P.**—Cloud observations in Victoria. 8°. (*Austral. Assoc. Advanc. Sc.*, 7, 1898.)

Barcelona, Granja Experimental de Barcelona.—Observaciones meteorológicas. 1896, Dec.—1898, Dec. la. 8°. Barcelona, s a.

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.

Barcelona, Granja Experimental de Barcelona.—Resumen de las observaciones meteorológicas y fenológicas. 1896, Dec.–April, 1898. la. 8°. Barcelona, s.a.

——— ——— Red meteorológica de Cataluña y Baleares. 1898, May–Dec. la 8°. Barcelona, s.a.

Bathurst, Gambia.—Comparative rainfall, colony of the Gambia, 1894–1898 and meteorological observations, 1898. sm. f°. Sheet.

* **Bebber, W. J. van.**—Die Wettervorhersage. Eine gemeinverständliche praktische Anleitung zur Wettervorhersage auf Grundlage der Zeitungs-Wetter-Karten und Zeitungs-Wetterberichte für alle Berufsarten. Zweite verbesserte und vermehrte Auflage. la 8°. Stuttgart, 1898.

* **Begg, J. S.**—Snowed up in June! An interesting account of the observatory on the summit of Ben Nevis, . . . la 8°. (*Pearson's Mag.*, 6, 1898, *Sept.*, *p.* 242.)

Belize, St. Joseph's Observatory.—Summary of meteorological observations, 1898, Jan.–Dec. 4°. Sheets. (*The Angelus*, *Belize*, 1898-99.)

Ben Nevis.—Meteorological observations on Ben Nevis. Report of the Committee. . . . Drawn up by Dr. Buchan. 1893–1897. 5 papers. 8°. (*Rep. Brit. Assoc. Adv. Sc.*, 1894–1898.)

‖ ——— Reports of the Committee . . . appointed for the purpose of co-operating with the Scottish Meteorological Society in making meteorological observations on Ben Nevis. 1889, 1891. 2 parts. 8°. (*Rep. Brit. Assoc. Adv. Sc.*, 1890–1892.)

Berlin.—Verhandlungen der Konferenz der Vorstände Deutscher Meteorologischer Centralstellen zu Berlin vom 13. bis 17. Oktober, 1897. la 8°. Berlin, 1897.

——— **Hydrographisches Amt der Admiralität.**—Segel-Handbuch für die Nordsee. 1. Heft. Meteorologische und klimatologische Verhältnisse, magnetische Elemente, physikalische und Strömungs-Verhältnisse des Nordseegebiets. la 8°. Berlin, 1883.

——— **Königlich Meteorologisches Institut.**—Die Feier des fünfzigjährigen Bestehens des Königlichen Meteorologischen Instituts am 16. Oktober 1897. 4°. Berlin, 1898.

——— **Königlich Preussisches Meteorologisches Institut.**—Bericht über die Thätigkeit . . . im Jahre 1897 von W. von Bezold. la 8°. Berlin, 1898.

——— ——— Ergebnisse der Gewitter-Beobachtungen in den Jahren 1895 und 1896. la 4°. Berlin, 1898.

——— ——— Ergebnisse der meteorologischen Beobachtungen in Potsdam. 1896. la 4°. Berlin, 1898.

‖ ——— ——— Witterung nach den Beobachtungen des königlichen meteorologischen Instituts. 1898, Jan.–Dec. la 4°. (*Statist. Korresp.*)

——— **Reichs-Marine-Amt.**—Segel-Handbuch für die Ostsee. 1. Abtheilung Meteorologie, Klimatologie und physikalische Verhältnisse des Ostseegebiets. Bearbeitet von der Seewarte. Zweite Auflage. la 8°. Berlin, 1891.

——— ——— Segel-Handbuch für die Küste von Deutsch-Ostafrika und die Insel Zanzibar. la 8°. Berlin, 1895.

Bermuda, Registrar General's Office.—Report of the Registrar General for the year 1897. sm. f°. s.l.e.a.

Berne, Eidgenössisches Oberbauinspectorat, Hydrometrisches Bureau.—Graphische Darstellung der schweizerischen hydrometrischen Beobachtungen sowie der Lufttemperaturen und Niederschlags-höhen für das Jahr 1897. la f°. Sheets.

In the French language also.

Birmingham, Observatory of the Birmingham and Midland Institute.—Records of meteorological observations taken at the Observatory of the Birmingham and Midland Institute. By A. Cresswell, 1897, 1898. 2 vols. 8°. (*Proc. Birmingham Nat. Hist. Soc. xi., and Proc. Birmingham and Midland Inst. Sc. Soc.*)

‖ **Bjerknes, V.**—Ueber einen hydrodynamischen Fundamentalsatz und seine Anwendung besonders auf die Mechanik der Atmosphäre und des Weltmeeres. la 4°. Stockholm, 1898. (*K. Svensk. Vetensk. Akad. Handl.*, 31, *No.* 4.)

‖ **Black, W. G.**—On meteorology at the seaside. Read at the congress of the Institute held at Worcester, Sept. 27th, 1889. 8°. (*Trans. San. Inst.*, 10.)

Bolton.—Annual report of the Museums and Meteorological Observatory for 1898. 8°. Bolton, s.a.

Bombay, Government Observatory.—Report on the condition and proceedings of the Government Observatory, Colába, for the year 1896-97. f°. (Bombay), s.a.

[—— **Meteorological Office.**]—Brief sketch of the meteorology of the Bombay Presidency in 1897-98. f°. s.l.e.a.

Borghini, N.—Il fulmine. Modificazioni scientificopratiche sulla costruzione e collocazione dei parafulmini. 3ª ed. Corredata da incisioni. sm. 8°. Arezzo, 1899.

‖ **Börnstein, R., und Less, E.**—Die Temperaturverhältnisse von Berlin. sm. f°. (*Meteor. Zeitschr.*, 1898, *Sept.*, *p.* 321.)

* **Boyer, J.**—La photographie et l'étude des nuages. sm. 8°. Paris, 1898.

Bremen, Meteorologische Station I. Ordnung. — Deutsches meteorologisches Jahrbuch. Ergebnisse der meteorologische Beobachtungen. Herausgegeben von P. Bergholz. Jahrg. 8, 1897. la 4°. Bremen, 1898.

Brisbane, Post and Telegraph Department, Meteorological Branch.—Brisbane Observatory, Wickham Terrace. Meteorological synopsis. 1897, Jan.-Dec. f°. Sheets. (*Suppl. Queensland Gov. Gazette.*)

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* **British Almanac, The,** and Family Cyclopœdia. 1899. 72nd year of issue. sm. 8°. London, s.a.

British New Guinea.—Annual reports on British New Guinea. 1892-93—1894-95; 1896-97. 4 vols. sm. f°. Brisbane, 1894-98.

Brown, W. P.—The Glyder thermometers and winter temperature on mountain summits. la. 8°. (*Climbers' Club Journ.*, *i.*, 1899, *No.* 3, *p.* 80.)

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‖ **Buchan, [A.]**—The mean atmospheric pressure and temperature of the British Islands. la. 8°. (*Journ. Scott. Met. Soc.*, *3rd ser.*, 11, 1898.)

Bucharest, Institutul Meteorologic al Romaniei.—Analele . . . de S. C. Hepites. Tom. 12, 1896. la. 4°. Bucuresti, 1898.
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—— —— Buletin meteorologic. Anul 4, 1898. Jan. 1-Dec. 31. la. 4°. Sheets.

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Buck, R. C.—A manual of algebra. sm. 8°. London, 1898.

Budapest, Magyar Kir. Országos Meteor. Intézet.—Meteorologiai feljegyzesek. 1897, 1898. Jan.-Dec. and year. oblong la. 8°. Sheets.

* **Bullen, F. T.**—The working of the Weather Office. la. 8°. (*Good Words*, 1898, *July*, *p.* 491.)

Cairo, Ministère de l'Intérieur. Administration des Services Sanitaires et d'Hygiène Publique.—Bulletin hebdomadaire 13me. année, 1898, Nos. 1-52. Suppl. au Journ. Officiel, 1898-99. la. 4°.

Calcutta, Meteorological Office, Bengal.—Administration report of the Meteorological Reporter to the Government of Bengal for the year 1897-98. f°. s.l.e.a.

Calcutta, Meteorological Office, Bengal.—Bay of Bengal and Bengal daily weather report. 1898. sm. f°. Sheets.

These reports are only published during the rainy season.

[——— ——— ———] Bay of Bengal weather chart. 1898, Jan. 1-Dec. 31. sm. f°. Sheets.

From May to October this is combined with the "Bengal daily weather report."

(——— ——— ———) Meteorological and rainfall table of the Province of Bengal for the months of January to December, 1898, with annual tables, sm. f°. Sheets.

——— ——— ——— Meteorological summary for the monsoon period of 1898. sm. f°. s.l.e.a.

[——— ——— ———] Summary of the meteorology of Bengal for the year 1897. sm. f°. s.l.e.a.

——— ——— **India.**—Abstract of the results of meteorological observations taken at the Alipore Observatory in the months of Jan.-Dec., 1898. sm. f°. Sheets.

Discontinued.

——— ——— ——— Abstract of the results of the barometric and thermometric observations taken at the Meteorological Office, Chowringhee. 1898, Jan.-Dec. 1899, Jan.-Feb. sm. f°. Sheets.

Discontinued.

——— ——— ——— India daily weather report. 1898. Jan 1-Dec. 31. 2 vols. f°. Simla, 1898-99.

[——— ——— ———] The India weather review for the year 1897. f°. Calcutta, 1898.

[——— ——— ———] Memorandum on the snowfall in the mountain districts bordering Northern India and the abnormal features of the weather in India during the past year, with a forecast of the probable character of the south-west monsoon rains of 1898. f°. (Simla, 1898.)

(——— ——— ———) Rainfall of India. 6th year. 1896. sm. f°. Calcutta, 1897.

(——— ——— ———) Report on the administration of the Meteorological Department of the Government of India in 1897-98. f°. s.l.e.a.

——— ——— ——— Results of the meteorological observations taken at the Alipore Observatory, from 2nd January to 31st December, 1898. sm. f°. Sheets.

——— ——— ——— Results of the barometrical and thermometrical observations taken at the Meteorological Office, Chowringhee, from 2nd January 1898 to 28th February 1899. sm. f°. Sheets.

Discontinued.

[——— ——— ———] Weather chart of the Indian monsoon area. 1897. Jan. 1-Dec. 31. f°. Sheets.

[——— **Surveyor General of India.**]—General report on the operations of the Survey of India Department . . . during 1896-97. sm. f°. Calcutta, 1898.

Callendar, H. L., and McLeod, C. H.—Observations of so temperatures with electrical resistance thermometers. 2 papers, la. 8°. (*Trans. R. Soc. Canada, 2nd series, section* 3, *ii.*, 1896, *p.* 109; *iii.*, 1897, *p.* 31.)

Cambridge (Mass.), Astronomical Observatory of Harvard College.—Annals. Vol. 42. Part 1. Observations made at the Blue Hill meteorological observatory, Mass., U.S A., in the year 1896. Under the direction of A. L. Rotch. la 4°. Cambridge, 1897.

——— **Philosophical Society.** Proceedings. Vol. 9. 1895-1898. 8°. Cambridge, 1898.

Cape Town, Department of Agriculture.—Agricultural weather forecasts in England and in South Africa. (By D. E. Hutchins.) la 8°. Cape Town, [1898]. (*Agric. Journ.*, 1898, *Feb.* 3, 17. *March* 3.).

——— **Meteorological Commission, Cape of Good Hope.**—Report of the Meteorological Commission for the year 1897. sm. f°. Cape Town, 1898.

* **Capron, J. R.**—A plea for the rainband, and the rainband vindicated. 8°. London, [1886].

Carlsruhe, Centralbureau für Meteorologie und Hydrographie.—Deutsches meteorologisches Jahrbuch. Grossherzogthum Baden. Die Ergebnisse der meteorologischen Beobachtungen im Jahre 1897. Zugleich ii. Theil des Jahresb. . . . la. 4°. Karlsruhe 1898.

——— ——— Jahresbericht . . . mit den Ergebnissen der meteorologischen Beobachtungen und der Wasserstandsaufzeichnungen am Rhein und an seinen grössern Nebenflüssen für das Jahr 1897. la. 4°. Karlsruhe, 1898.

——— ——— Niederschlagsbeobachtungen der meteorologischen Stationen im Grossherzogthum Baden. 1898, 1.-2. Halb. 2 vols. la. 4°. Karlsruhe, 1898-99.

——— ——— Uebersicht der Ergebnisse der an den badischen meteorologischen Stationen angestellten Beobachtungen, nebst Wasserstandsaufzeichnungen an den wichtigsten Hauptpegeln des Rheins. 1898, Jan.-Dez. f°. Sheets.

Chemnitz, K. Sächsisches Meteorologisches Institut.—Abhandlungen. Heft 3. Studien über Luftbewegungen von P. Schreiber. la 4°. Leipzig, 1898.

——— ——— Jahrbuch . . . für das Jahr 1895. Jahrg. 13 der neuen Reihe. Zugleich Deutsches meteorologisches Jahrbuch für 1895. Beobachtungssystem des Königreiches Sachsen. la 4°. Chemnitz, 1897.

‖ **Chree, C.**—Account of a comparison of magnetic instruments at Kew Observatory. 8°. (*Proc. R. Soc.*, 62, 1897, *p.* 155.)

‖ ——— Experiments on aneroid barometers at Kew Observatory, and their discussion. la 4°. London, 1898. (*Phil. Trans, series A*, 191, 1898, *p.* 441.)

‖ ——— Notes on thermometry. 8°. (*Phil. Mag., ser.* 5, 45, 1898, *pp.* 205, *and* 299.)

Christiania, Norsk Meteorologisk Institut.—Oversigt over Luftens Temperatur og Nedbøren i Norge. 1897. 8°. s.l.e.a.

——— **Norwegisches Meteorologisches Institut.**—Jahrbuch . . für 1897. Herausgegeben von H. Mohn. sm. f°. Christiania, 1898.

* ‖ **Christie, S. H.**—Discussion of the magnetical observations made by Captain Back, R.N., during his late Arctic expedition. 4°. London, 1836. (*Phil. Trans.*, 1836, *Part* 2, *p.* 377.)

‖ **Christy, Miller.**—Rockall. la 8°. (*Scott. Geogr. Mag.*, 1898, *Aug p.* 393.)

* **Ciel et Terre.**—Revue populaire d'astronomie, de météorologie, et de physique du globe. 19e année. 1898-99. 8°. Bruxelles, s.a.

Clarke, J. E.—The late summer, [1898]. la 8°. (*The Friend*, 1898, *Nov.* 18 *p.* 746.)

‖ **Clayton, H. H.**—Weather harmonies. 4°. (*Science, N.S.*, 7, 1898, *p.* 243.)

Colborne, H.—Annual report of meteorological observations [at Hastings] for the year 1897. 18°. St. Leonards [1898].

‖ **Colombo, Surveyor General's Office.**—Report on the meteorology of Ceylon for 1897. sm. f°. (*Ceylon Administr. Rep.*, 1897, *Part* ii.)

‖ ——— ——— Results of meteorological observations in Ceylon during the months of January to December, 1897. f°. Sheets. (*Suppl. Ceylon Gov. Gazette*, 1897-98.)

——— ——— Return of rainfall in Ceylon during 1897, and the means during different periods. la f°. Sheet. (*Suppl. Ceylon Gov. Gazette*. 1898, *June* 10.)

Copenhagen, Dansk Meteorologisk Institut.—Bulletin météorologique du Nord, publié par les Instituts météorologiques de Norvége, de Danemark et de Suède. Année 1898. oblong 8°. Copenhague, s.a.

——— ——— Maanedsoversigt over Vejrforholdene. 1898, Jan.-Dec. f°.

——— ——— Meteorologisk Aarbog for 1894. f°. Kjøbenhavn, 1895.

In the French language also.

Copenhagen, Dansk Meteorologisk Institut.—Nautisk-meteorologiske observationer 1897. la 4°. Kjøbenhavn, 1898.
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—— **Kongelige Danske Videnskabernes Selskab.**—Oversigt over det . . . . Forhandlinger. 1897. la 8°. Kjøbenhavn, 1897–98.

* —— **und Hamburg, Dänisches meteorologisches Institut und Deutsche Seewarte.**—Tägliche synoptische Wetterkarten für den nordatlantischen Ozean und die anliegenden Theile der Kontinente. 12. Jahrg., 1-4. Quart., Dez. 1892-Nov. 1893. 4 vols. f°. Copenhague et Hambourg, 1897.
In the French language also.

* **Cordeiro, F. J. B.**—The barometrical determination of heights. A practical method of barometrical levelling and hypsometry for surveyors and mountain climbers. sm. 8°. New York and London, 1898.

‖ **Cracow, C. K. Akademii Umiejętnósci w Krakowie.**—Materyaly do klimatografii Galicyi zebrane przez sekcyę meteorologiczną komisyi fizyograficznej . . . 1897. la 8°. Kraków, 1898. (*Odbitek ze Sprawozd Kom. fizyogr.*)

Cracow, K. K. Sternwarte.—Meteorologische Beobachtungen. 1898 la 8°. Krakau, 1898.

Cronander, A. W.—On the laws of movement of sea-currents and rivers la. 4°. Norrköping, 1898.

Croydon Microscopical and Natural History Club.—[Daily rainfall at stations in Kent and Surrey.] 1898, Jan.–Dec. 4°. Sheets.

‖ —— —— Report of the Meteorological Sub-Committee for 1897. 8°. (*Proc. and Trans. Croydon Microsc. Nat. Hist. Club*, 1897–98, *p.* 273.)

‖ **Cyprus.**—Meteorological observations. 1897. sm. f°. [*Cyprus Blue Book.*]

Darwin, G. H., Abney, W. de W., and Blanford, H. F.—Preliminary report on certain experiments with the boules conjuguées of M. Violle, by a sub-committee consisting of Prof. G. H. Darwin, Capt. W. de W. Abney, and H. F. Blanford, appointed for that purpose by the Committee for solar physics, at their 61st Meeting. la. 4°. Dated, 1895.

Davis, W. M., and Snyder, W. H.—Physical geography. sm. 8°. Boston and London, 1898.

Davos.—Davoser Wetterkarte. Nach dem Schema von Herrn C. Wetzel, Ingenieur, herausgegeben im Auftrag des Curvereins Davos-Platz vom amtl. Beobachter der Schweiz. meteor. Station Davos. 1898, Jan.–Dec. la f°. Sheets.
In the French and English languages also.

‖ **Dechevrens, M.**—Les variations de la température de l'air dans les cyclones, et leur cause principale. sm. f°. Roma, 1898. (*Mem. Pontif. Accad. Nuovi Lincei*, 14.)

‖ **Devon.**—Report of the Committee on the climate of Devon. Edited by A. Chandler. 16th, 3rd series, 1897. 8°. (*Trans. Devon. Assoc. Advanc. Sc.*, 30, 1898, *p.* 80.)

Doberck, W.—The law of storms in the Eastern seas. la 8°. Hong Kong, 1898.

Dorpat, Kaiserliche livländische gemeinnützige und ökonomische Sozietät.—Bericht über die Ergebnisse der Beobachtungen an den Regenstationen. 1897. la. 4°. Dorpat, 1898.

——, [**Meteorologisches Observatorium**]. Meteorologische Beobachtungen angestellt in Dorpat—Jurjew. 26.—30. Jahrg., 6. Bd. la 8°. Dorpat 1892, Jurjew, 1893–1897.

Dublin, General Register Office.—Quarterly returns of the marriages, births, and deaths registered in . . . Ireland ; . . . . 1898. 1st–4th quarters, Nos. 137–140. la. 8°. Dublin, 1898–99.

Dublin, General Register Office.—Weekly returns of births and deaths in Dublin (including its suburban districts), and in twenty-two of the principal urban sanitary districts in Ireland, 1898. la. 8°. Dublin, 1899.

Durban, Natal Observatory.—Report of the Government Astronomer for the year 1897. sm. f°. Pietermaritzburg, 1898.

Eastbourne.—Annual report of meteorological observations for the year 1897. (By R. Sheward.) la 8°. Eastbourne, s.a.

‖ **Eaton, H. S.**—Returns of rainfall, &c., in Dorset in 1897. 8°. Dorchester, 1898. (*Proc. Dorset Nat. Hist. Antiq. Field Club*, 19, 1898.)

[Eberswalde, Hauptstation des forstlichen Versuchswesen in Preussen.]—Beobachtungs-Ergebnisse der von den forstlichen Versuchsanstalten des Königreichs Preussen, des Herzogthums Braunschweig, der Reichslande und dem Landesdirectorium der Provinz Hannover eingerichteten forstlich-meteorologischen Stationen. Herausgegeben von A. Müttrich. 23. Jahrg., 1897 Jan.—Dec. 8°. Berlin, 1897.

* **Edinburgh "Challenger" Office.**—Report on the scientific results of the voyage of H.M.S. "Challenger," during the years 1873-1876, under the command of Capt. G. S. Nares and Capt. F. T. Thomson. Prepared under the superintendence of the late Sir C. W. Thomson and now of J. Murray. Physics and Chemistry, Vol. 1. la 4°. London, 1884.

Edinburgh, Royal Scottish Geographical Society.—The Scottish Geographical Magazine. Vol. 14, 1898. la. 8°. Edinburgh, 1898.

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‖ **Ekholm, N. und Arrhenius, S.**—Ueber den Einfluss des Mondes auf die Polarlichter und Gewitter. Geprüft von R. Rubenson und B. Hasselberg. la. 4°. Stockholm, 1898. (*K. Svenska Vet.—Akad. Handl.*, 31, No. 2.)

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APPENDIX XIV.

ACCOUNT of RECEIPTS and PAYMENTS for the year ending 31st March, 1899:—

RECEIPTS.	£	s.	d.	PAYMENTS.	£	s.	d.	£	s.	d.
Balance from year 1897–98	1,755	9	2	ADMINISTRATION:						
Parliamentary Vote ...	15,300	0	0	Council...	990	0	0			
Repayment of expenses charged under—				Secretary	800	0	0			
	£	s.	d.	Salaries and wages ...	930	0	0			
(1.) Incidental expenses ...	9	14	8	Rent, fuel, and lighting	717	19	1			
(2.) Observatories ...	25	8	2	Incidental and contingent expenses ...	191	3	3			
	35	2	10	Furniture and fittings	82	16	9			
SPECIAL RESEARCHES:				Expenses incidental to International Meteorological Congress	4	3	10			
Grant for investigation on Atmospheric Electricity	200	0	0	Pensions	144	0	0	3,860	2	11
SUPPLY OF INFORMATION:				SPECIAL RESEARCHES:						
Daily Weather Charts and Forecasts ...	284	4	2	Salaries and other charges	683	19	8			
6 p.m. Charts ...	25	0	0	Investigation on Atmospheric Electricity	102	8	9	786	8	5
Reports for Press Agencies, &c.	89	1	2	LAND METEOROLOGY:						
Telegrams sent abroad... ...	549	16	3	Observatories and stations, including remuneration of observers	2,291	12	1			
	948	1	7	Salaries :—Discussion and reduction of observations, &c. ...	1,332	14	10	3,624	6	11
SALE OF INSTRUMENTS, &c.:				WEATHER INFORMATION AND FORECASTS:						
Royal Navy account ...	16	16	0	Telegraphic reports and storm warnings, remuneration of observers, &c.	2,736	10	5			
Mercantile Marine account ...	39	2	6	Salaries :—Preparation and issue of reports and forecasts ...	1,901	0	7	4,637	11	0
"M.O." (Stations) account	32	10	3	INSPECTIONS:						
	88	8	9	Salaries and travelling expenses	...			431	17	4
Repayment of miscellaneous Commissions executed for Colonial and Foreign institutions, &c.	207	4	0	OCEAN METEOROLOGY:						
Commission charged on work done for Colonies, &c. ...	17	17	4	Salaries :—Discussion and reduction of observations ...	1,414	14	10			
				Expenses incidental to the supply of instruments :—						
				Proportion for care and issue of instruments ...	403	6	8			
				Royal Navy ...	529	9	7			
				Mercantile Marine	321	2	7			
				Distant island and coast stations ...	9	5	0	2,677	18	8
				Miscellaneous commissions executed for Colonial and Foreign institutions, &c. ...	..			266	2	10
				BALANCE:						
				Cash at Bank ...	2,203	15	0			
				„ at Office	64	0	7	2,267	15	7
£	18,552	3	8				£	18,552	3	8

In the year 1898–99 the sum of 1,726*l.* 0*s.* 5*d.* was paid to the Post Office on account of inland and foreign telegrams, allowances to telegraph clerks rental of private wires, &c.

APPENDIX XV.

LIST OF THE PRINCIPAL PAPERS PRINTED IN VARIOUS REPORTS ISSUED BY THE OFFICE FROM THE YEAR 1866.

I.—DAILY WEATHER REPORT.

Year.	Page.	——
1896 (July to Dec.).	1	Mean Values of Barometric Pressure for each Month and for the Whole Year, derived from Observations made at 8 a.m. daily during the 25 Years 1871–95.
1896	2 and 3	Mean Values of the Dry Bulb and Wet Bulb Temperatures for ditto, ditto.
,,	4 and 5	Mean Values of the Daily Maximum and Minimum Temperatures, and of the Maximum and Minimum combined, for the 25 Years 1871–95.
,,	6 and 7	Extremes of the Daily Maximum and Minimum Temperatures for ditto, ditto.
,,	8	Mean Rainfall for each Month and for the Whole Year—derived from Observations extending over the 30 Years 1866–95.
,,	9	Mean Numbers of Hours of Bright Sunshine, with the Percentages of Possible Duration, derived from Observations extending over the 15 Years 1881–95.

II.—WEEKLY WEATHER REPORT.

Year.	Page.	——
1884	V.	Table A.—Showing for each Degree of Latitude, from 49° N. to 58° N. the Total Number of Hours during which the Sun is above the Horizon, in each Month of the Four Quarters of the Year.
,,	VI.	Table B.—Showing similar information for each Week of the Year.
1895	VI.–VII.	Mean Values of the Daily Maximum and Minimum Temperatures, and of the Maximum and Minimum combined, for each Month and for the Whole Year, derived from Observations extending over the 25 Years 1871–95.
,,	VIII.	Mean Rainfall for each Month and for the Whole Year, derived from Observations extending over the 30 Years 1866–95.

Year.	Page.	—
1895	IX.	Mean Numbers of Hours of Bright Sunshine, together with the Per-centages of the Possible Duration, for each Month and the Whole Year, derived from Records extending over the 15 Years 1881–95.
,,	[17]	Table I.—Showing for each District, during each of the Three Lustra, and the whole Period comprehended in the 15 Years 1881–95, the Mean Aggregate numbers of rainy days from the beginning of the Year to the end of each week in the Year.
,,	[23]	Table II.—Showing in the same detail the Mean Aggregate Amounts of Rainfall.
,,	[27]	Table III.—Showing in the same detail the Mean Aggregate Values for Accumulated Heat above 42° F.
,,	[32]	Table IV.—Showing in the same detail the Mean Aggregate Values for Accumulated Heat below 42° F.
,,	[37]	Table V.—Showing in the same detail the Mean Aggregate Numbers of Hours of Bright Sunshine.
,,	[42]	Table VI.—Showing in the same detail the Mean Per-centages of the possible amount of Bright Sunshine.
,,	[47]	Table showing in Degrees Fahrenheit for each District, during each of the Three Lustra, and for the whole Period comprehended in the 15 Years 1881–95, the Mean Temperature of the Air, for each week in the Year.
1898	[1-9]	Summaries of Rainfall and Mean Temperature for the First, Second, Third, and Fourth Quarters, and for the Whole Year, during the 33 Years 1866–98. [The separate Yearly Values for 1866-85 are contained in the Reports for 1890, and previous Years.]

III.—Monthly Weather Report.

Year.	Page.	—
1884	[iii.]	Table showing for each Month and for each Degree of Latitude from 18° N. to 49° N. the Total Number of Hours during which the Sun is above the Horizon.
,,	[i.]	On London Rain. By W. J. Russell, Ph.D., F.R.S.
,,	[ii.]	On the Amount of Carbonic Acid in London Air. By W. J. Russell, Ph.D., F.R.S.
1885	[i.]	On the Impurities in London Air. By W. J. Russell, Ph.D., F.R.S.
,,	[ii.]	Table showing the Mean Monthly and Annual Rainfall at the Weekly and Monthly Weather Report Stations for the 20 Years 1866 to 1885.

IV.—Quarterly Weather Report.

Year.	Page.	—
1869	43	Factors for Calculation of Gradients.
,,	[1]	Notes on Easterly Gales, by R. H. Scott.
1870	iii.	Description of Observatories, with illustrations of thermometer screens.
,,	[23]	Bessel's Paper on the Determination of the Law of a Periodical Phenomenon. Translated from the Astronomische Nachrichten, 136, for May, 1828.
1871	[7]	Discussion of Anemometrical Results for Orkney, 1863-68.
,,	[59]	Constants for the Determination of the Monthly March of Atmospherical Pressure, &c. at the Seven Observatories for 1869-70.
1872	[13]	Discussion of the Anemometrical Results at Bermuda from 1st April 1859 to 31st March 1863.
1873	[13]	Rainfall of the London District for Sixty Years, 1813-72. By G. Dines, F.M.S. [with diagram].
1874	[26]	On the Winds at Liverpool. By W. W. Rundell.
1875	[1]	Observations taken at Nine Stations of the Second Order [1875].
,,	[89]	Mean Monthly Results for the Seven Observatories for the Lustrum, 1871-75.
1876	[13]	Report on the Reduction of Greenwich Curves for 1875 to a Common Standard with those of Kew [with 25 plates].
,,	[20]	Results of Observations made at the Pagoda, Kew Gardens, to Determine the Influence of Height on Temperature, &c. By R. H. Scott, F.R.S. [4 plates.]
,,	[39]	Comparison of Results obtained by means of the Harmonic Analyser, with similar Results got from Measurement and Numerical Calculation for the Seven Observatories.
1877	[13]	On the Diurnal Range of Rainfall at the Seven Observatories in connexion with the Meteorological Office, 1871-80. By R. H. Scott, F.R.S. [5 plates.]
,,	[35]	Report on Evaporimeters. By W. N. Shaw, M.A. [2 plates.]
1878	[13]	On the Computation of the Quantity of Heat in excess of any Fixed Base Temperature, received at any place during the course of the Year, &c. By Lieut.-Gen. Strachey, R.E., F.R.S.
1879	[41]	Report on Hygrometric Methods, &c. Part I. By W. N. Shaw, M.A.
1880	[13]	Report on Experiments made at the Kew Observatory with Thermometer Screens of different patterns during 1879, 1880 and 1881. By G. M. Whipple, Superintendent.
,,	[19]	Tables and Diagrams illustrating the Diurnal Range of Barometric Pressure in the British Isles during the Years 1876-80. By F. C. Bayard, LL.M., F.R. Met. Soc. [5 plates.]

V.—Report of the Meteorological Committee of the Royal Society.

Year.	Page.	—
1867	27	A Description of the Self-recording Instruments recently erected by the Meteorological Committee of the Royal Society in various parts of the United Kingdom [with plates].
1869	25	Note upon a Self-registering Thermometer adapted to Deep-Sea Soundings, by W. A. Miller, M.D., Treasurer and V.P.R.S., extracted from Proceedings of Royal Society, vol. XVII., p. 482.

Year.	Page.	—
1869	36	Description of a Self-recording Rain-gauge, invented by Robert Beckley, of the Kew Observatory; made by James Hicks, London.
1870	25	Description of the Process by which the Traces of the Self-registering Instruments are reduced suitably for publication.
1872	27	A Summary of the Results obtained from the Discussion of the Information for Square 3, being the Region of the Doldrums in the Atlantic. By Capt. H. Toynbee, Marine Superintendent.
1874	33	The International Maritime Conference.

VA.—REPORT of the METEOROLOGICAL COUNCIL.

Year.	Page.	—
1877–78	21	Account of the Experiments on Atmospheric Electricity conducted at Kew Observatory. By Prof. J. D. Everett.
1879–80	28	On the Effect of Sluggishness on the Readings of Marine Barometers on Shore, by Prof. Stokes.
,,	43	On the Methods available for the Determination of the Humidity of the Atmosphere, by Mr. W. N. Shaw.
,,	46	Memorandum as to the Employment of the Harmonic Analyser in the Meteorological Office, by Prof. Stokes.
1880–81	25	On the Working of the Harmonic Analyser. [Prof. Stokes.]
,,	27	Report on Fogs. [W. J. Russell.]
,,	28	,, ,, Hygrometers and Evaporimeters, presented to the Meteorological Council, May 10, 1881. [W. N. Shaw.]
1881–82	25	On fogs. [W. J. Russell.]
,,	29	Report on the Results of a Tentative Reduction of a Year's Electrograms at the Kew Observatory. [G. M. Whipple.]
1882–83	27	On the Results obtained by the use of the Harmonic Analyser.
1884–85	22	Note on Work done with the Harmonic Analyser.
1885–86	22	Memorandum on Cloud Photography, by Prof. Stokes, F.R.S.
1886–87	21	On the Distribution of Gales round the Coasts of the British Isles [for the 15 years, 1871–85].
1887–88	22	On the History of the Severe Storms which visited the British Isles between August 1, 1882, and September 3, 1883, as traceable from the Atlantic Charts published by the Office. By Robert H. Scott, F.R.S., Secretary.
,,	30	Abstract of Report on Hygrometric Methods, by W. N. Shaw, M.A., reprinted from the "Proceedings of the Royal Society," No. 262.
1888–89	22	Notes of some Results of an Examination of Atlantic Charts published by the Office, by R. H. Scott, F.R.S., Secretary.
,,	27	Memorandum on the Measurement of Squalls shown on the Traces yielded by Robinson Anemometers of the "Standard" Pattern, by R. H. Curtis.
1889–90	24	Code of Regulations, &c. for conducting the work at the First Class Observatories, and the Examination thereof. [*See* also Report, 1868.]
,,	36	Note on Experiments on Pressure of Wind made by Mr. W. H. Dines.
,,	46	Experiments with Violle's Actinometer Apparatus.
,,	47	On the Work done with the Harmonic Analyser at the Meteorological Office.

Year.	Page.	—
1890–91	22	On Mr. Dines' Anemometer Experiments.
1891–92	23	On Anemometer Comparisons carried out by the aid of a Grant from the Meteorological Council, by W. H. Dines, B.A.
1892–93	21	On the Construction of the Anemometer recently erected for trial on the roof of the Meteorological Office, by W. H. Dines, B.A.
,,	27	On the Harmonic Analysis of Hourly Observations of Air Temperatures at British Observatories, by Lieut.-Gen. R. Strachey, F.R.S.
1894–95	27	Report on the Comparisons made between two Pressure Tube Anemometers on the roof of the Meteorological Office, by Mr. R. H. Curtis.
1895–96	24	Note on Anemometer Experiments, by Mr. R. H. Curtis.
1897–98	21	Report upon Anemometer Experiments at Holyhead, by Mr. R. H. Curtis.
,,	28	Description of the Bridled Anemometer designed by Sir G. G. Stokes, Bart., F.R.S., by Mr. R. H. Curtis.

VI.—Hourly Readings of the Self-Recording Instruments of the Observatories in connexion with the Meteorological Office.

Year.	Page.	—
1883	[1]	Constants of formulæ expressing the mean daily range of temperature obtained by the use of the Harmonic Analyser.
1884	[1]	Tables and formulæ to facilitate the computation of harmonic coefficients. By Lieut.-General Strachey, R.E.

VII.—Hourly Means of the Readings obtained from the Self-Recording Instruments at the Five Observatories under the Meteorological Council.

Year.	Page.	—
1891	[1]	Tables of Hourly Sunshine Values, with Plates, for the Ten Years 1881–90, for Seven Observatories.

VIII.—Meteorological Observations at Stations of the Second Order.

Year.	Page.	—
1891	[186]	Results of Observations at Stations of the Second Order for the Fifteen years, 1876–90.

APPENDIX XVI.

LIST OF PUBLICATIONS 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.* eacn.
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*.
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. 24*s*.
28. Contribution to the Meteorology of Japan. By Staff-Commander Thomas H. Tizard, H.M.S. *Challenger*. 1*s*.
29. Report of the Meteorological Committee for 1875. 4*d*.
30. Quarterly Weather Report for 1875.—Parts I.—IV. 5*s*. each.
31. Report of the Meteorological Committee for 1876-7. 3*s*. 5*d*.
32. The Meteorology of the North Atlantic during August, 1873, with 31 Synoptic Charts. With Book of Charts. 15*s*.
33. Quarterly Weather Report for 1876 (New Series).—Part I., 6*s*.; Parts II., III., and IV., 5*s*. 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., 2*s*.; Part II., 10*s*.; Part III., 6*s*.; Part IV., 5*s*.; Part V., 6*s*.
35. Report of the Meteorological Council for 1877-8. 1*s*.
36. Report of the Proceedings of the Second International Meteorological Congress at Rome, 1879. 1*s*. 6*d*.
37. Report on the Meteorology of Kerguelen Island. By Rev. S. J. Perry, S.J., F.R.S. 3*s*.
38. Report of the Meteorological Council for 1878-9. 5*d*.
39. Meteorological Observations at Stations of the Second Order for the year 1878. 20*s*.
40. Aids to the Study and Forecast of Weather, by W. Clement Ley, M.A. 1*s*.
41. Report of the Meteorological Council for 1879-80. 1*s*.
42. Report of the Meteorological Council for 1880-81. 1*s*. 2*d*.
43. Meteorological Charts for the Ocean District adjacent to the Cape of Good Hope, with accompanying Remarks. Charts, 25*s*.; Remarks, 7*s*.
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. Toynbee, F.R.A.S. 7*s*. 6*d*.
45. Meteorological Observations at Stations of the Second Order for the year 1879. 20*s*.
46. Report on the Storm of October 13-14, 1881. By Robert H. Scott, F.R.S. 1*s*. 6*d*.
47. Rainfall Tables of the British Isles for 1866-80. Compiled by G. J. Symons, F.R.S. 7*s*. 6*d*.

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

LIST OF PUBLICATIONS—*continued.*

48. Report of the Meteorological Council for 1881-2. 1*s.*
49. Quarterly Weather Report for 1879. (New Series.) Parts I., II., and III., 6*s.* each; Part IV., 5*s.* 6*d.* Appendices and Plates. 27*s.*
50. Quarterly Weather Report for 1880. (New Series.) Parts I. and II., 6*s.* each; Part III., 4*s.*; Part IV., 6*s.* Appendices and Plates. 28*s.*
51.* Hourly Readings from the Self-Recording Instruments at the Seven Observatories under the Meteorological Council, 1881. (New Series.) Part I., 10*s.* 6*d.* Parts II., III., and IV., 21*s.* each.
52. Quarterly Weather Report for 1877. (New Series.) Part I., 10*s.*; Part II., 5*s.*; Part III., 4*s.* 6*d.*; Part IV., 6*s.* Appendices and Plates. 27*s.*
53. Meteorological Atlas of the British Isles. 5*s.* 6*d.*
54. Hourly Readings from the Self-Recording Instruments at the Seven Observatories under the Meteorological Council, 1882. Parts I. and II., 20*s.* each; Part III., 22*s.* 6*d.*; Part IV., 26*s.*
55. Quarterly Weather Report for 1878. (New Series.) Parts I., II., III., and IV., 6*s* each. Appendices and Plates, 28*s.*
56. Sunshine Records of the United Kingdom for 1881. 4*s.*
57. Meteorological Observations at Stations of the Second Order for the year 1880. 34*s.* 6*d.*
58. Report of the Meteorological Council for 1882-3. 10½*d.*
59. Charts showing the Surface Temperature of the Atlantic, Indian, and Pacific Oceans. 21*s.*
60. Principles of Forecasting by means of Weather Charts. By the Hon. Ralph Abercromby, F.R.Met.Soc. (Second edition, revised.) [Out of Print.]
61. A Barometer Manual for the Use of Seamen. With an Appendix on the Thermometer, Hygrometer, and Hydrometer. (Third Edition.) 6*d.* [A new Edition in the Press.]
62. Monthly Weather Reports for 1884. Jan., Feb., March, May—Nov., 1*s.* 6*d* each. April (with 2 Appendices), 2*s.* 6*d.* Dec., 1*s.* 9*d.*
63. Hourly Readings from the Self-Recording Instruments at the Seven Observatories under the Meteorological Council, 1883. Parts I., II., and III., 21*s.* each; Part IV., 30*s.*
64. Report of the Meteorological Council for 1883-4. 1*s.* 2*d.*
65. Monthly Weather Reports for 1885. Jan. to Dec., 1*s.* 6*d.* each.
66. Meteorological Observations at Stations of the Second Order for the year 1881. 35*s.*
67. Report of the Meteorological Council for 1884-5. 4*s.* 4*d.*
68. Monthly Weather Reports for 1886. Jan. to Dec., 1*s.* 6*d.* each.
69. Meteorological Observations at Stations of the Second Order for the year 1882. 35*s.*

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

70. **Hourly Readings from the Self-Recording Instruments at the Four Observatories under the Meteorological Council.** 1884. **Part I.**, 12*s.*; **Part II.**, 10*s.*; **Part III.**, 10*s.* 6*d.*; **Part IV.**, 15*s.*
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.) 17*s.* each part.
72. Report of the Meteorological Council for 1885-86. 8*d.*
73. Meteorological Observations at Stations of the Second Order for the year 1883. 30*s.*
74. Hourly Readings from the Self-Recording Instruments at the Four Observatories under the Meteorological Council, 1885. Parts I. and II., 11*s.* each; Part III., 10*s.* 6*d.* Part IV., 12*s.*
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. 5. Second Series. 4*d.* per week. With Appendices and Monthly Supplements, priced separately. Annual subscription, including Supplements and Appendices, post paid, 21*s.* 2*d.*
86. Weekly Weather Report for the year 1889. Vol. VI. Second Series. 6*d.* per week. With Appendices and Monthly Supplements, priced separately. Annual subscription, including Supplements and Appendices, post paid, 30*s.*
87. Weekly Weather Report for the year 1890. Vol. VII. Third Series. (For Price, &c., see No. 86.)
88. Meteorological Observations at Stations of the Second Order for the year 1886. 25*s.*

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* 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—*continued.*

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. (For Price, &c., see No. 86.)
97. Hourly Means of the Readings obtained from the Self-Recording Instruments at the Four Observatories under the Meteorological Council, 1888. 20*s.*
98. Ten Years Sunshine in the British Isles, 1881-90. 2*s.*
99. Report of the Meteorological Council for 1890-91. 5½*d.*
100. Weekly Weather Report for the year 1892. Vol. IX., Third Series. (For price, &c., see No. 86.)
101. Meteorological Observations at Stations of the Second Order for the year 1888. 22*s.*
102. Report of the International Meteorological Conference at Munich in 1891. 1*s.* 6*d.*
103. Hourly Means of the Readings obtained from the Self-Recording Instruments at the Four Observatories under the Meteorological Council, 1889. 15*s.*
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. 20*s.*
106. Meteorological Charts of the Red Sea. 21*s.*
107. Weekly Weather Report for the year 1893. Vol. X., Third Series. (For Price, &c., see No. 86.)
108. Meteorological Observations at Stations of the Second Order for the year 1889. 34*s.*
109. Report of the Meteorological Council for 1892-93. 8*d.*
110. Meteorological Observations at Stations of the Second Order for the year 1890. 34*s.*
111. Weekly Weather Report for the year 1894. Vol. XI., Third Series. (For Price, &c., see No. 86.)
112. Report of the Meteorological Council for 1893-94. 7½*d.*
113. Hourly Means of the Readings obtained from the Self-Recording Instruments at the Five Observatories under the Meteorological Council, 1891. 32*s.* 6*d.*
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