

R E P O R T
OF THE
METEOROLOGICAL COUNCIL
TO THE
ROYAL SOCIETY,

For the Year ending 31st of March 1885.

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



LONDON:
PRINTED BY EYRE AND SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY,
FOR HER MAJESTY'S STATIONERY OFFICE.

1886.

[C.—4603.] *Price 4s. 4d.*

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THE METEOROLOGICAL COUNCIL,

1884-85.

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

Professor GEORGE HOWARD DARWIN, M.A., LL.D., F.R.S.,
(appointed February 19, 1885).

MR. WARREN DE LA RUE, D.C.L., F.R.S. (resigned February 19,
1885).

Captain Sir FREDERICK J. O. EVANS, K.C.B., F.R.S., Hydro-
grapher of the Admiralty (resigned June 30, 1884).

MR. FRANCIS GALTON, M.A., F.R.S.

Professor GEORGE GABRIEL STOKES, LL.D., F.R.S.

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

Captain WILLIAM J. L. WHARTON, Hydrographer of the Ad-
miralty (appointed July 1, 1884).

REPORT

OF THE

METEOROLOGICAL COUNCIL

TO THE

ROYAL SOCIETY,

For the Year ending March 31, 1885.

Two changes have taken place in the Council during the year. Introductory.
 At the beginning of July Sir F. J. O. Evans retired on the expiration of his term of office as Hydrographer of the Admiralty. In January Mr. Warren de la Rue, who had been one of the original members of the Meteorological Committee of the Royal Society intimated his desire of resigning his seat on the Council in consequence of failing health. The Council cannot but record their sincere regret at the termination of their official connexion with these gentlemen, of whom the former had for ten years, the latter for eighteen, taken an active part in the management of the Office. The vacancy caused by Sir F. J. O. Evans's retirement was filled by the appointment of his successor in the post of Hydrographer, Captain W. J. L. Wharton, and Professor George H. Darwin was appointed by the Royal Society to take the place of Mr. de la Rue. The executive officers continue as before:—

Mr. R. H. Scott, M.A., F.R.S., Secretary.

Captain H. Toynbee, F.R.A.S., Marine Superintendent.

Navigating-Lieutenant C. W. Baillic, F.R.A.S., Assistant do.

The present Report is as usual arranged under three headings:—

- I. Ocean Meteorology.
- II. Weather Telegraphy.
- III. Land Meteorology of the British Isles.

PART I.

OCEAN METEOROLOGY.

Collection of Information.—A concise account of the practice at present followed by the Office as regards its dealing with observers at sea will be found in Appendix I. (p. 25). Collection of information.

In one particular the Office has modified its system. Several captains who have sent in very complete records on the forms supplied in connexion with the synchronous work in the Atlantic

Collection of
information.

have expressed their readiness to continue observing for the Office, on condition of their not being expected to keep complete logs, such as would be required if they had received a set of instruments on loan. Ten captains have accordingly been supplied with logs, rough book, and instructions on the understanding that they will use their own instruments. These observations will not be confined to the North Atlantic.

A form (Appendix XIII., p. 88) has been prepared for circulation amongst the captains of fast steamers trading to New York and Boston, for the entry of observations of gales, ice, and derelict ships met with during the passage to America. These forms are to be handed on arrival at the American port to the agent of the Chief Signal Office, who telegraphs any important matter to London, as explained in Part II. (p. 16).

Presentation
of charts to
observers.

Appendix II. (p. 27) contains a list of all the observers who have contributed "excellent" logs during the past year. Some of them have regularly co-operated with the Office for many years; the names which now appear in the list for the first time are as follows:—

Captain's Name.	Ship.
Boynes, Mr. W. C. (First Officer)	- "Carn Marth."
Burton, George	- S.S. "British Prince."
Davidson, H.	- S.S. "Oceanic."
Donaldson, R.A.	- S.S. "Glenavon."
Dyke, Lieut.-in-Command H. H., R.N.	- H.M.S. "Sylvia."
Fullarton, D.	- "Timaru."
Gadd, C.	- S.S. "Parramatta."
Graham, W. Vincent	- "Bowfell."
Griffin, E. J.	- S.S. "Spartan."
Halley, E.	- "City of Madras."
Hayward, P. M.	- S.S. "Dacia."
Holloway, John	- S.S. "Bombay."
Howard, Lieut. W. Vansittart, R.N.	- H.M.S. "Flying Fish."
Hurrell, A. A.	- "Carn Marth."
Irving, P. J.	- S.S. "Republie."
Kellett, Arthur	- S.S. "Calabria."
McFee, J. R.	- "Great Victoria."
Mallandaine, Frederick	- "Imberhorne."
Marshall, Frederick	- "Wiltshire."
Messum, Lieut. S. V. S. S., R.N.	- H.M.S. "Dart."
Moffat, Thomas	- "Westland."
Nowell, S.	- S.S. "British Prince."
Savage, Lieut. W. M., R.N.	- L.H. Tender "Richmond."
Simpson, A.	- S.S. "Australasian."
Smith, J.	- "Crosshill."
Trant, W. H.	- S.S. "Venetian."
Travers, H. de la Cour	- S.S. "Tartar."
Trott, Samuel	- S.S. "Minia."
Watson, Alexander	- "Elvira."
Wheaton, N. J.	- "Eliza."
White, Elijah	- "Marathon."
Wilson, William	- "Horsa."

The Council regret deeply to have to record the death of Captain James Lawson who was an "excellent" observer.

The following is the total number of logs received from April 1, 1884, to March 31, 1885, and the number of logs which have been classed as "excellent":—

Proportion of "excellent" to total number of logs received.

Total No. of Logs received.	No. of Excellent Logs.	Per-centage of Excellent Logs.
190	148	78

The average number of logs received annually during the five years, 1879-83, was 155, and the per-centage of excellent logs among these was 69.

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

On the 31st of March 1885 the ships observing for the Office were pursuing the following voyages:—

Districts from which observations are obtained.

To Baffin's Bay or Greenland	-	-	-	6
„ North America, East Coast	-	-	-	21
„ „ „ West „	-	-	-	8
Off East Coast of North America	-	-	-	4
To South America, East Coast	-	-	-	18
„ „ „ West „	-	-	-	7
„ Australia and New Zealand, via Cape of Good Hope	-	-	-	20
„ „ „ „ Suez	-	-	-	6
„ India, via Suez	-	-	-	2
„ India, via Cape of Good Hope	-	-	-	21
„ China Seas, via Cape of Good Hope	-	-	-	5
„ „ „ Suez	-	-	-	2
In the Red Sea	-	-	-	3
To Mediterranean Ports	-	-	-	5
„ Cape of Good Hope	-	-	-	5
„ West Indies	-	-	-	7
Between British Ports	-	-	-	3
Unknown	-	-	-	9
Total number of ships	-	-	-	152

Appendix III. (p. 30) supplies a list of the logs and of all the documents from stations abroad received at the Office during the year.

In the Report of the Meteorological Committee of the Royal Society for the period of 17 months ending 31st May 1877, an index was given of the information existing in the Office for the Ocean, at that date. The Council append to the present Report a series of 12 maps showing the amount of such information existing on the 31st December 1884.

North Atlantic Weather Charts.—The investigation of the weather over the North Atlantic Ocean for the 13 months, beginning August 1st, 1882, and ending August 31st, 1883, the period during which the International System of Circumpolar Observations was carried out, has still continued to employ nearly the whole Marine Branch of the Office.

Synchronous weather charts.

Steady progress has been made with the work; nearly 3,000 ships have co-operated, and 11,222 forms have been received,

Synchronous
weather
charts.

yielding an average of 863 for each of the 13 months, and upwards of 400 observations for each day. These figures are exclusive of the returns from land stations, which number about 250. Inasmuch as several of the circumpolar stations fell within the limits of the charts 30° E. to 120° W., their observations have been incorporated, and have rendered the charts for the higher latitudes far more complete than they would otherwise have been.

The principal features of the method adopted for carrying out the investigation, with specimen charts, will be found at pp. 8-10 of the Report for 1884. It is proposed to issue the charts with three days on a page, two pages facing one another, so as to show six days on an opening.

The labour and time occupied in carrying out this investigation and in preparing the charts, which are essential for the purpose, have been much greater than had been anticipated, but the progress already made gives sure indications that the results obtained from it will be of great value and interest, and will further be altogether new to science, and of a nature that could not be obtained in any other way.

The following statement shows the stage at which the work had arrived by the end of March 1885:—

The charts for two months, August and September 1882, were ready for reduction by eidograph.

The whole of the observations for sea and land, up to July 1, 1883, had been entered on the charts.

The isobars and isotherms up to the end of April 1883 had been drawn.

The generalized wind arrows had been entered, and the weather areas drawn up to the end of October 1882.

South Atlantic Weather Charts.—In the beginning of the year 1884 the Council received an application from Dr. Neumayer stating that his office, the Deutsche Seewarte, at Hamburg, intended to prepare daily charts of the South Atlantic for the period above mentioned, and requesting a copy of any data existing in the Meteorological Office for that area, and for the period under examination. The Council readily acceded to the request, and about 13,000 sets of observations have been copied and sent to Hamburg.

Charts of
barometrical
pressure.

Charts of Barometrical Pressure for the Atlantic, Pacific, and Indian Oceans.—These were referred to in the Report for 1884; they correspond to the sea-surface temperature charts recently published, and have been nearly completed, the whole of the data contained in the office logs having been examined for this purpose.

Valuable additions are now being made to the charts from the Remark Books kept by the officers on board H.M. Ships. These observations are especially useful over those parts of the sea which are not frequented by vessels of the Mercantile Marine. It is also intended to use all available observations found in records of the old voyages and in the published documents of foreign countries. This additional work has already made considerable progress, and it is hoped that the whole of the charts will be in the hands of the engraver during the year.

Contributions to our Knowledge of the Meteorology of the Arctic Regions.—Parts I., II., and III. of this work have been noticed in previous Annual Reports. Part IV. is now in the press and will complete the first volume. The last-named Part deals with documents relating to the following wintering stations, and closes the series of expeditions sent in search of the Franklin Expedition :—

Wintering Stations.	Ships.	Commanders.	Year.	Information already published.
Prince of Wales's Strait.	H.M.S. "Investigator"	Sir R. McClure.	1850-1	} Monthly means of meteorological elements are given in Sir W. Armstrong's "Personal Narrative."
Mercy Bay -	Do.	Do.	1851-3	
Dealy Island -	H.M.S. "Resolute" and "Intrepid."	Sir H. Kellett.	1852-3	} Abstracts in Capt. McDougall's "Voyage of the 'Resolute.'"
Melville Sound -	Do. do.	Do.	1853-4	
Beechey Island -	H.M.S. "North Star"	W. J. S. Pullen.	1852-4	Nothing published.

The Barometer Manual for Seamen.—This work, which, as explained in last Report, appeared in the year 1884, has already been translated into German by Herr W. von Freeden and published by the Schulzesche Buchhandlung in Oldenburg. The Council have received and acceded to an application from Italy for the publication of a translation in that country.

Barometer
Manual for
Seamen.

Supply and Stock of Instruments.—In Appendix IV. (p. 45) will be found a list of the meteorological instruments supplied by the Office to ships in the Royal Navy during the year, with a statement of the entire stock and distribution of instruments standing on the books, to the account of the Admiralty, on the 31st March 1885.

Instruments
belonging to
the Office.

Appendix V. (p. 46) gives similar information with regard to the disposal of the other instruments belonging to the Office, which are mainly supplied to the Mercantile Marine.

PART II.

WEATHER TELEGRAPHY.

Telegraphic Reporting Stations.—The service has not been subject to any serious interruption during the year now under review.

Reporting
stations.

Some changes in the arrangements for the receipt of intelligence which were indicated in the last Report have been duly carried out, and the additional information thus obtained has produced a marked improvement in the quality and amount of the data on which the weather forecasts are based.

The station at Dungeness in place of Dover was organised in the month of June, and the reports from the latter station were discontinued at the end of the month.

In the month of July the instruments were forwarded to Belmullet, co. Mayo, in the extreme north-west of Ireland, and the observations from that station have been published since

Reporting
stations.

October 1st. Malin Head was not supplied with instruments until the beginning of October, on the occasion of the Inspector's visit, and the reports from thence did not appear in the Daily Weather Charts until January.

In order to relieve the Office from some portion of the extra expense caused by the establishment of these two new stations, it was resolved to discontinue the transmission by wire of the reports from Hawes Junction; the observations at that station are still kept up, and the results forwarded by post, but the experience which the Office has had during four years of the practical value of these reports has led the Council to consider that the expense of telegraphing them might well be dispensed with.

In order to secure a more perfect record of the changes in atmospheric pressure which may occur in the intervals between the observations taken for the telegraphic reports, the Council have resolved to supply self-recording aneroids, on Richard's principle, to some of the outlying stations. These instruments will be issued in the course of the summer of 1885.

A list of the telegraphic reporters will be found in Appendix VI. (p. 47).

Inspection
of the stations.

Inspection of the Telegraphic Reporting Stations.—The telegraphic reporting stations have been inspected during the year, in England (including Jersey and the Isle of Man) by the Rev. W. Clement Ley and Mr. D. W. Barker, who undertook part of the duty during the temporary illness of Mr. Ley; in Scotland by Mr. Buchan; and in Ireland and Wales by Mr. Scott. The reports submitted by the Inspectors to the Council, which are printed in Appendix VII. (p. 48), show that the efficiency of the service has been fairly maintained.

Discussion of
the reports.

Discussion and Publication of the Information received.—A description of the practice of the Office in the collection, discussion, and dissemination of the meteorological information received by telegraph is given in Appendix VIII. (p. 67). A list of the institutions and persons who received the Daily Weather Reports and Charts free of cost in 1884-5 forms Appendix IX. (p. 77).

Forecasts.

Weather Forecasts.—There has been no material change in the system of preparation and issue of the forecasts during the year.

Forecasts are issued twice a day, at 11 a.m. and at 8h. 30m. p.m. The Forecast prepared at 11 a.m., on the information derived from the 8 a.m. reports, refers to the probable weather between noon on the day of issue and noon on the day following, and is publicly posted up in several places in London,* and supplied to the after-

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

noon editions of the newspapers. The forecasts prepared at 8h. 30m. p.m. are for the newspapers only.

Owing to the additional information afforded to the public by the appearance in so many of the daily papers of the Forecasts now prepared, the number of special inquiries has been small. The inquiries received through the Post Office during the year amounted to 62, and the personal applications to 28. The rules of the Office relating to such inquiries continue the same as in previous years, and are given in Appendix VIII. (p. 75). Inquiries at the Office.

The results of a comparison of the Forecasts issued at 8.30 p.m. during the year with the weather actually experienced is given in Appendix XII. (p. 83), and the following summary of successes and failures, estimated in the manner explained in that Appendix, shows that the average of success over the whole United Kingdom has been 82 per cent. Testing of the forecasts.

SUMMARY OF RESULTS.

Districts.	Percentages.				Total percentage of Success.
	Complete Success.	Partial* Success.	Partial* Failure.	Total Failure.	
SCOTLAND, N. - -	51	33	11	5	84
„ E. - -	54	29	12	5	83
ENGLAND, N.E. - -	52	31	11	6	83
„ E. - -	50	34	11	5	84
MIDLAND COUNTIES -	53	31	11	5	84
ENGLAND, S. - -	55	32	9	4	87
SCOTLAND, W. - -	45	29	16	10	74
ENGLAND, N.W. -	49	30	13	8	79
„ S.W. - -	52	29	11	8	81
IRELAND, N. - -	49	32	11	8	81
„ S. - -	46	33	12	9	79
Summary -	51	31	11	7	82

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

Hay Harvest Forecasts.—The Council renewed in 1884 the offer made in the four previous years to the Royal Agricultural Society, the Royal Dublin Society, and the Highland Society to send daily Forecasts *gratis* during the hay season to a number of observers selected by the Councils of those Societies, on the two conditions, that the information should be made as widely known as possible, and that a record should be kept of the value of each prediction and sent in weekly to the Office. The Societies again Hay Harvest Forecasts.

Hay Harvest
Forecasts.

cordially accepted the proposal, and the following list of recipients was prepared:—

LIST of those who received HAY HARVEST FORECASTS
in 1884.

Districts.	To whom sent.	Address.
0. SCOTLAND, N.	Rev. Dr. Joass - Major Smith -	Golspie. Munlochy, Inverness.
1. SCOTLAND, E.	G. Johnstone - W. S. Macdonald - A. F. Leslie -	Glamis, by Forfar. Craigielaw, Longniddry. Braco Grange, Banffshire.
2. ENGLAND, N.E.	J. Wilson - J. Turner -	Chillingham Barns, Belford, Northumberland. The Grange, Ulceby.
3. ENGLAND, E.	W. Birkbeck - Sir J. B. Lawes, Bt., and J. H. Gilbert, Ph.D.	High House, Thorpe, Norwich. Rothamsted, Harpenden.
4. MIDLAND COUNTIES	Royal Agricultural College. The Duke of Somerset	Cirencester. Gerrard's Cross, Bucks.
5. ENGLAND, S.	C. Whitehead - E. P. Squarey -	Barning House, Maidstone. The Moot, Downton, Wilts.
6. SCOTLAND, W.	W. Calder - M. J. Stewart - J. S. R. Ballingal	Castle Hill, Dalkeith, Dum- barton. Ardwell, Stranraer. Eallabus House, Islay.
7. ENGLAND, N.W.	G. W. Wray - The Earl of Derby - The Lord Egerton of Tatton.	Leyburn, Yorkshire. Knowsley Hall, Prescot. Tatton Park, Knutsford.
8. ENGLAND, S.W.	Colonel J. B. Turbervill The Earl of Ducie - T. Dyke - R. Neville -	Ewenny Priory, Bridgend, Glamorganshire. Whitfield, Falfeld, R.S.O. Long Ashton, Clifton, Bristol. Butleigh Court, Glastonbury.
9. IRELAND, N.	Viscount Massereene and Ferrard. Rev. A. Brown - E. F. Farrell -	Antrim Castle, Antrim. The Manse, Hollymount, Co. Mayo. Moyalty, Co. Meath.
10. IRELAND, S.	D. A. McCready D. A. Milward - W. Talbot Crosbie, D.L.	Larehvale, Moneygall, King's Co. Lavistown, Kilkenny. Ardfert Abbey, Tralee, Co. Kerry.

The general result of this repetition of the experiment of 1879 is shown by the subjoined table, which has been compiled solely from the reports of the above-mentioned gentlemen, and is entirely independent of any estimate formed within the Office itself:—

SUMMARY of RESULTS.

Hay Harvest
Forecasts.

Districts.	Names of Stations.	Percentages.				Total percentage of Success.
		Complete Success.	Partial Success.	Partial Failure.	Total Failure.	
SCOTLAND, N.	Golspie and Munlochy - - -	39	43	16	2	82
" E.	Glamis, Longniddry, and Grange -	38	45	15	2	83
ENGLAND, N.E.	Uiceby and Chatton, Northumberland -	48	35	14	3	83
" E.	Thorpe and Rothamsted - - -	56	38	4	2	94
MIDLAND COUNTIES	Cirencester and Gerrard's Cross -	48	44	11	2	87
ENGLAND, S.	Maidstone and Downton - - -	53	42	5	—	95
SCOTLAND, W.	Islay, Dumbarton, and Strauraer -	50	37	12	1	87
ENGLAND, N.W.	Leyburn, Prescott, and Knutsford -	41	40	15	4	81
" S.W.	Bridgend (Glamorgan), Falfield, Clifton, and Glastonbury.	31	47	16	6	78
IRELAND, N.	Antrim, Hollymount, and Moyalty -	32	49	13	6	81
" S.	Moneygall, Kilkenny, and Ardfort Abbey (Tralee).	37	42	18	3	79
Mean for all districts, 1884 - - -		43	42	12	3	85
" " 1883 - - -		53	35	10	2	88

Remarks:—The result of the checking shows that the general per-centage of success (85) was 3 less than last year. The districts showing the highest figures were England, S., (95) and England, E., (94), while the smallest proportion of good forecasts (78) was in England, S.W.

Major Smith says that the forecasts were correct on the whole, particularly those from the 12th–16th August, the forecasts on those days being “very satisfactory,” and Messrs. Birkbeck and Dawson Milward both remark that “the forecasts have been very successful.”

The most practical proof of the utility of the service is furnished by the fact that the proposal to cease the forecasts was followed in several instances by a request for their further continuance, and in some by payment of the cost for some weeks.

Storm Warnings for the Coasts of the United Kingdom.—In Appendix XI. (p. 81) will be found the names of the stations which are furnished with signals for Storm Warnings, in accordance with Circular 717 of the Board of Trade issued in February 1874. Storm warn-ings.

These stations were, at the end of March 1885, 139 in number, situated:—

68 in England, 13 in Wales, 37 in Scotland, 15 in Ireland, 3 in the Isle of Man, and 3 in the Channel Islands.

Results of storm warnings in 1884.

The usual comparison has been instituted in the Office between the warnings issued in 1884 and the weather experienced on our coasts, the warnings being tested by the method explained in Appendix VIII. The results of the comparison are shown in the following tables:—

RETURN of the Result of the Comparison between the Warnings issued and the Weather experienced in 1884.

Coasts.	Total No. of Orders to hoist and repetitions.	Warnings justified by subsequent gales. Force 8 and upwards.	Warnings justified by subsequent strong Winds. Forces 7 and 7.	Warnings not justified by subsequent Weather.	Warnings late. Force 9 reached at two Stations before issue.	Warnings partially late. Force 9 reached at one Station before issue.	Warnings in Error owing to Telegraphic mistakes.	Storms for which no Warning was issued.
Ireland, South	59	43	8	5	—	3	—	
„ East	60	38	17	5	—	—	—	
Scotland, East	57	35	10	10	—	1	1	Oct. 28.
„ West	50	34	12	4	—	—	—	
England, North-west	56	46	3	7	—	—	—	
„ West	51	30	12	9	—	—	—	
„ South	52	34	11	7	—	—	—	Sept. 7,* Oct. 26.
„ South-east	32	19	10	3	—	—	—	
„ East	44	27	9	6	—	1	1	Oct. 28.†
Totals -	461	306	92	56	—	5	2	
Per-centages -		66·4	20·0	12·1	0	1·1	0·4	

* These gales were not severe.

† Not felt south of Hull.

With regard to the storms for which no warning was issued, it should be remarked that (1)—

The force of the wind experienced in “England, South,” on September 7th and October 26th, did not exceed 8 at any station on that coast, but that force was reached so very generally that the disturbance has been counted as a gale.

The omission to warn in the first case was caused by the fact that on the 6th the changes in pressure, wind, &c. gave reason for expecting that the storm would take a more northerly course than it did, and that the southern parts of the kingdom would escape with only a strong breeze. In the second case the depression proved to be so much deeper than could have been possibly foreseen at 6 p.m. on the 25th, and the gale (which, like that of September 7th, was duly warned for in other parts) spread further to the southward than was expected.

The only gale of importance which was not warned for during the year was that felt in the “Scotland, East,” and “England, East,” on October 28th. This was occasioned by numerous errors in the telegrams for 6 p.m. on October 27th. The isobars could not be accurately drawn in consequence, and the storm took a more northerly course than was expected, thus involving

those districts in the gale, which was not expected to prevail further north than Hull.

The following table contains a comparative statement of the storm warnings and their results in 1884, and in the ten preceding years. It will be seen that the percentage of warnings justified is the highest yet attained.

Comparison of results for 1884 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.
1874	317	45.4	32.8	78.2	16.4
1875	248	41.1	35.1	76.2	21.0
1876	265	61.1	21.5	82.6	11.7
1877	475	53.3	25.9	79.2	16.4
1878	485	56.7	20.8	77.5	17.9
1879	509	50.5	25.1	75.6	20.6
1880	390	58.2	24.6	82.8	13.3
1881	454	58.6	23.3	81.9	14.8
1882	503	61.4	21.1	82.5	14.9
1883	610	56.2	21.6	77.8	20.8
1884	461	66.4	20.0	86.4	12.1

A return of all the gales since 1873 for which no warning has been issued by the Office has been presented to the House of Lords (Parliamentary Paper, 248).

The numbers in each year are:—1874, 11; 1875, 11; 1876, 15; 1877, 15; 1878, 8; 1879, 10; 1880, 14; 1881, 12; 1882, 13; 1883, 7.

These figures are, however, not very conclusive, as many of the gales enumerated were very local, only affecting a limited portion of the coasts, and the several years are not properly comparable with each other.

Fishery Barometers.—In connexion with the subject of storm warnings, the supply of public, so-called “fishery,” barometers to the coast may be mentioned. The whole number of stations on our coasts supplied with these instruments by the Office is at present 168, being the same as in the previous year. Of these stations, 58 are in England, 5 in Wales, 47 in Ireland, 54 in Scotland, 3 in the Isle of Man, and 1 in Jersey. The list is given in Appendix X., p. 80.

Fishery. barometers.

Observations on Ben Nevis.—The arrangements with the Directors of the observatory established on the summit of Ben Nevis, at a height of 4,000 feet above the sea, have been reconsidered during the past year. The Meteorological Council having carefully examined the question of the probable utility of regular daily telegraphic reports from this station, and of the necessary outlay they would involve, were unable to avoid the conclusion that the practical value of such daily reports in aiding the preparation of the weather forecasts and issue of storm warnings, for which alone they would be of utility, would not be sufficient to justify their cost. They therefore proposed to the Directors that the observatory should send to the Meteorological Office telegrams

Observations on Ben Nevis.

Observations
on Ben Nevis.

only of any sudden changes of conditions which appeared important, and that copies of the other observations should be sent in writing from time to time. This was agreed to by the Directors, and the Council have in return agreed to continue the grant of 100*l.* yearly towards the expenses of the observatory, at the same time expressing a regret that the demands of other descriptions on the funds at their disposal has precluded their making a larger contribution to that institution.

Atlantic tele-
grams.

Atlantic Telegrams.—Suggestions for obtaining telegraphic reports of weather from the coasts of North America and from vessels that have crossed the Atlantic have frequently been under the consideration of the Council, but the probable utility of such reports did not appear to justify the expense.

In the course of the summer of 1884, however, a suggestion to the same effect was made by Professor Mascart, Director of the Central Meteorological Office in Paris, offering to share the expense with the Council. This led to a reconsideration of the subject, with the result that the Council came to the conclusion that an experimental arrangement of the suggested description might be attempted.

They therefore resolved to enter into communication with the Hydrographer of the United States Navy, or the Chief Signal Office, Washington, with a view to obtaining from outward-bound steamers on their arrival at New York and Boston telegraphic reports of storms met with in the western portion of the Atlantic. It was considered that as the facts, so far as hitherto recorded, indicate that the cyclonic disturbances which have been traced across the Atlantic require at least four to five days for their passage from the coast of America, timely intelligence of the approach of such disturbances to the coasts of western Europe might be transmitted by wire from the port of arrival of ships that had encountered them on their voyages from Europe.

Accordingly, on the recent visit of the Chairman of the Council, Lieut.-General Strachey, to Washington, on the occasion of the International Meridian Conference, negotiations were opened with the Chief Signal Office of the United States in that city. General Hazen at once entered most cordially into the scheme, and it was arranged that instructions should be given to his agents at New York and Boston to collect from incoming steamers reports of storms met with west of the meridian of 45° W., as well as of ice or derelict ships seen on any part of the voyage, the latter classes of information being of especial importance to seamen.

Forms have accordingly been prepared for issue to captains of the fast steamers that cross the Atlantic from England, which they are requested to forward to the Signal Office agent on arrival at either of the ports named, and a system of telegraphing has been arranged with the Signal Office. A specimen of this form is given at Appendix XIII., p. 88. The service was commenced in November 1884, and has now been satisfactorily brought into working order.

It cannot be said that the information as to the weather thus received has yet been of a nature to improve the forecasts, or to

indicate the approach of atmospheric disturbances from the Atlantic ; but the experiment seems worth a longer trial.

Publications.—The Weekly Weather Report has appeared in its enlarged and improved form, as explained in the last Report, and has been completed by the addition of two Appendices. Of these Appendix I. gives:—

a. For the past 19 years for the several districts, for each quarter and for the year, the summary of rainfall and of mean temperature.

b. For the past seven years, for each Month, and with Progressive values from the commencement of each year—

The number of days with rain.

The rainfall in inches.

The accumulated heat in day-degrees above and below 42° respectively.

c. For the past four years (five years from April 1), the number of hours of bright sunshine, and the per-centages of its possible duration.

Appendix II. gives the Weekly and Progressive values of the same elements for seven years as under *b.*, and four years as under *c.*

The Monthly Weather Report has also appeared regularly.

The Principles of Forecasting by means of Weather Charts.—This work, which was prepared by the Hon. Ralph Abercromby, F.R.Met.Soc., at the request of the Council, as explained in the Report for 1879, and the completion of which was delayed for several years by his protracted illness, has now been published. The subjects of which it treats are classified by the author under the following heads: Synoptic Charts; Gradients and Wind; Isobars and Weather; Weather Sequence; Weather Forecasting; Storm Warnings. It is illustrated by 65 woodcuts.

Simultaneous Observations.—The Office has continued its co-operation with the system of simultaneous observations, taken once in every 24 hours, which was organised ten years ago at the request of the Chief Signal Officer of the United States. Simultaneous observations.

A form for the entry of the simultaneous observations is bound up with every ship's log issued by the Office.

In previous Reports it has been stated that the Lords Commissioners of the Admiralty had, at the request of the Council, issued instructions for these observations to be taken (in addition to those made by the Service Regulations) on board each detached ship-of-war on foreign service; or, in the case of a squadron acting together, on board the ship of the senior officer. The number of these observations which have been received during the year from the Royal Navy has been 7,000, and from the Mercantile Marine, 8,500.

Observers at Land Stations.—The list of observers at land stations for 1884 is given in Appendix XIV., p. 89.

PART III.

LAND METEOROLOGY OF THE BRITISH ISLES.

Observatories and Stations.—Records of the climate of the British Isles are received by the Office from stations with different degrees of fulness of organisation, which may be arranged in five classes.

Self-recording
observatories.

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

Anemographic
stations.

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

Stations of
Second Order.

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

Telegraphic
Reporting
Stations.

4. The Telegraphic Reporting Stations at which eye observations are taken, forming the material upon which the daily weather reports and forecasts are based. The hours of observation at these stations are limited by the requirements of the telegraphic system, as explained in Part II., but the data which they furnish are utilized to afford climatological information for parts of the country where Stations of the Second Order do not exist.

Extra stations.

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

A detailed account of these several stations and of the methods employed by the Office in dealing with the records they respectively furnish will be found in Appendix XV., p. 90.

Documents
received.

Appendix XVI., p. 95, contains a list of all documents relating to the land meteorology of the British Isles received at the Office during the year.

Changes in the
observatories.

The foundation stone of the new observatory at Falmouth, the intended erection of which was noticed in the last Report, p. 19, was laid in the month of August, and the building is now so far completed that the meteorological instruments are shortly to be transferred to it. The Council has undertaken to bear the cost of erecting the instruments, in addition to the yearly grant of 250*l.* for the maintenance of the observations, which are continued for the present at the old observatory.

At Glasgow the arrangements for the maintenance of the self-recording meteorological instruments by local subscriptions are not yet completed, but through the zealous action of Prof. Grant, the continuity of the observations has not been hitherto

interrupted, and it is still hoped that the means of maintaining the record in the future will be obtained. Changes in the observatories.

At Armagh the records of the self-registering instruments finally ceased from December 1883, but the observations of the second order continue to be made, in aid of which the Council has granted a yearly sum of 50*l*.

The Council have to express their deep regret at the death, at a very advanced age, of the Rev. C. Clouston, LL.D., who took charge of the anemograph at Sandwick Manse in the Orkneys. Dr. Clouston had been a regular meteorological observer, either at Sandwick or at Stromness, for more than 60 years, and was the recognized authority for scientific information of all kinds relating to the Orkneys. The Council have applied to the Scottish Meteorological Society for advice as to the continuance of the observations, and they have reason to hope that the Society may be able to secure the services of Dr. Clouston's successor.

Inspection of the Stations.—The self-recording observatories and the anemographic stations (Classes 1 and 2), as well as the Telegraphic Reporting Stations (Class 4), are regularly visited each year by the Inspectors of the Office, before mentioned (p. 10). The extra stations (Class 5) are inspected as opportunity offers. Of the Stations of the Second Order (Class 3), some belong to the Royal Meteorological Society; these are visited by an Inspector appointed by the Society, an allowance being made by the Office toward the cost of the inspection, in accordance with the recommendation of the Treasury Committee (1877). The remaining Stations of the Second Order, which are in immediate connexion with the Meteorological Office, are visited at least once in every two years by the Inspectors of the Office. The Superintendent of the Kew Observatory, Mr. G. M. Whipple, is specially employed to inspect and report on the self-registering apparatus, and on the photographic processes at the observatories. Extracts from the Reports of the Inspectors of the Office and of Mr. Barker, who was charged with the duty of inspection in England during Mr. Ley's illness in the summer of 1884, will be found in Appendix VII., p. 48. Inspection of the stations.

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

Quarterly Weather Report.—Parts I. to III. of the volume for 1877 of this publication have been issued, and good progress is being made towards clearing off the arrears. Publications.

The volume of the Monthly Weather Report for 1884, which takes the place of the Quarterly Weather Report, has appeared (see p. 17).

The publication of the Hourly Readings from the seven observatories has been continued. The volume for 1882 has been published, and that for 1883 is well advanced.

Publications.

The tables of monthly and five-day means from the observatories for the years 1881 and 1882 have appeared in the volume of Hourly Readings for 1882.

Reports from Stations of the Second Order.—The volume for 1880 has appeared, and it contains, in addition to the information given for previous years, a table showing the monthly amounts of bright sunshine recorded at various stations, with the percentages of total possible duration. The volume for 1881 is in hand.

Special Researches.

The Harmonic Analyser.—A memorandum on the work done with this instrument will be found at Note A, p. 22.

An instrument has been constructed, from designs by the Chairman, for producing the graphical representation of the harmonic components of thermometrical and barometrical curves, and it will be applied to the results obtained from the harmonic analyser. The instrument is arranged so as to draw the curves of the first four orders, and can be adjusted for their varying amplitudes and hours of maximum.

Electrical Anemometer.—The electrical anemometer referred to at page 24 of last Report as being constructed by Mr. Preece, of the Telegraph Department, has been erected at Kew for preliminary trial, but some of the mechanism is found to require modification, and the instrument is still in the experimental stage, though its ultimate success is not doubted.

Hand Anemometer.—A few experimental hand anemometers have also been constructed in view of obtaining a more definite record of the wind's force or velocity than can be secured by the present system of estimate. One of these has been tried at one of the lightships under the authority of the Trinity Board, and another is under observation at Kew. The results are not yet sufficiently advanced to admit of any conclusion as to the suitability of this form of instrument for general use.

Movement of Clouds.—The experiments for ascertaining the direction and velocity of the upper currents of the air by shell firing have not been much extended, the Council not having the necessary facilities at their command for the purpose. But there is reason to think that the plan can be carried out usefully, and it is hoped that arrangements may still be made that will accomplish this.

The determination of the distance and movement of clouds, photographically, before noticed (see Report, 1884, p. 23), still continues to be experimented on at Kew, but the results in this case also have not yet been of such value as to call for special notice.

Eruption of Krakatoa.—At the desire of the Special Committee of the Royal Society charged with collecting data relative to the eruption at Krakatoa, the Council have undertaken to prepare a report on the atmospheric disturbance which accompanied the great final explosion. A considerable number of automatically recorded barometric traces have been received and examined, and the results are being carefully dealt with.

LIBRARY.

The library contains standard works on Meteorology and the allied sciences. It consists at present of nearly 9,000 volumes and pamphlets, exclusive of charts and MS. records of observations. The books and other documents are accessible to scientific men.

Appendix XVII., p. 99, contains a list of the accessions to the library during the year. The volumes marked with an asterisk have been purchased.

In conformity with a practice now generally recommended by authorities on bibliography, all books and pamphlets received during the year have been catalogued upon cards, besides being entered in the existing reference catalogues.

EXPENDITURE.

Appendix XVIII., p. 126, shows the receipts and payments during the year ending 31st March 1885. The amount voted by Parliament was 15,300*l.*, as in the previous year.

The following abstract of expenditure shows the amount properly chargeable to the year in question, and its distribution under the various heads, together with the increase or decrease in 1884-85, as compared with the previous year :—

NET EXPENDITURE.	1883-84.	1884-85.	Increase.	Decrease.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Payment of Council -	1,000 0 0	1,000 0 0	—	—
Secretary -	800 0 0	800 0 0	—	—
Office salaries -	742 10 0	758 16 0	16 6 0	—
Rent, fuel, and lighting -	713 17 7	716 8 2	2 10 7	—
Alterations to premises, attendance, and contingencies -	466 16 2	424 5 9	—	42 10 5
Expenses incidental to International Meteorological Congress -	5 11 3	—	—	5 11 3
Pensions -	42 16 4	42 16 4	—	—
Special Researches -	660 8 8	989 8 2	328 19 6	—
Land Meteorology -	3,684 17 7	3,051 1 9	—	633 15 10
Weather Information -	4,026 0 1	4,066 6 10	40 6 9	—
Inspections -	525 8 5	560 12 1	35 3 8	—
Ocean Meteorology -	2,694 18 1	2,415 6 2	—	279 11 11
Total -	£ 15,363 4 2	14,855 1 3	423 6 6	931 9 5

(Signed)

RD. STRACHEY,
Chairman of the Council.

NOTE A.

NOTE on the WORK done with the HARMONIC ANALYSER.

The work hitherto done with the harmonic analyser has been confined almost exclusively to the determination of the air temperature constants, from the photographic thermograms, of the following seven observatories:—

Valencia,	Glasgow,	Falmouth,	Kew.
Armagh,	Aberdeen,	Stonyhurst,	

The curves dealt with have been those for the 12 years 1871 to 1882, inclusive, those for the years 1879, 1880, 1881, and 1882 having been analysed during the past twelve months; at the present time the whole of the results obtained from the machine are being examined and checked preparatory to their publication.

In the Report of the Meteorological Council for 1880, p. 46, *et seq.*, there is a note by Professor Stokes on the employment of the machine, with rules for the use of the same, in which the method to be employed in dealing with breaks in the continuity of the curves is indicated. It may, however, be of use to give here a rather more detailed account of the operations involved in the treatment of the curves, with an example of the manner in which the readings of the machine are recorded and dealt with.

The machine is furnished with three pairs of recording cylinders and discs, numbered consecutively 1 to 6, which give the coefficients for the first three pairs of terms of the expansion, and in addition a seventh cylinder and disc from which the mean is obtained. In the thermograms which supply continuous photographic records of the march of temperature, the trace for 24 hours covers a length of 8.75 inches, while a vertical height of about 0.7 inch* corresponds to a range of ten degrees in temperature; each thermograph sheet contains the record for 48 hours.

Conveniently placed in the machine is a cylinder or drum, the circumference of which is equal to the length of 24 hours upon the thermograms. Round this cylinder the thermograms are rolled, the fluctuations of temperature indicated by the curves being followed, as the cylinder revolves, by a combination of the movement of the cylinder with that of a pointer moving in a line parallel to its axis.

The handle by which the cylinder is turned gives motion at the same time to the seven discs of the machine, and the operator thus controls by his left hand both the speed with which the curves are paid through the machine and the consequent velocity of the angular motion of the discs, while by a suitable contrivance the movements of the pointer, governed by his right hand, produce on the face of the discs corresponding movements to the right or left of the balls by which the motion of the discs is conveyed to the recording cylinders.

At the commencement of an operation all the cylinders are set to zero; the twelve months curves are then passed consecutively

* This value varies slightly for each observatory.

through the instrument; the first pair of cylinders, which gives the coefficients of the first order, and also the mean cylinder, 7, being read for each day, while cylinders 3 and 4 and 5 and 6, which give the coefficients of the second and third orders respectively, are only read for each five days and at the end of each calendar month. The numbers on the cylinders are, however, progressive, so that the increments upon them for any given period could very easily be obtained. The form in which the readings are recorded is as follows:—

READINGS of the RECORDING CYLINDERS of the HARMONIC ANALYSER.
Dry-bulb Thermometer Curves, from July 30 to August 3, 1882.
Kew Observatory.

Month and Day.	FIRST ORDER.				SECOND ORDER.			
	Cylinder 1.		Cylinder 2.		Cylinder 3.		Cylinder 4.	
	Reading at Midnight.	Difference from last Reading.	Reading at Midnight.	Difference from last Reading.	Reading at Midnight.	Difference from last Reading.	Reading at Midnight.	Difference from last Reading.
June 30 - -	+10' 480	—	—12' 333	—	—3' 953	—	—3' 256	—
July 30 - -	+12' 540	+0' 103	—14' 926	—0' 118	—	—	—	—
" 31 - -	+12' 678	+0' 138	—15' 004	—0' 078	—4' 054	+0' 400	—3' 454	—0' 080
August 1 - -	+12' 773	+0' 095	—15' 069	—0' 065	—	—	—	—
" 2 - -	+12' 814	+0' 041	—15' 207	—0' 138	—	—	—	—
" 3 - -	+12' 897	+0' 083	—15' 287	—0' 080	—4' 081	—0' 030	—3' 466	—0' 012
Month and Day.	THIRD ORDER.				MEAN.		Midnight reading of Curve.	Difference from last Reading.
	Cylinder 5.		Cylinder 6.		Cylinder 7.			
	Reading at Midnight.	Difference from last Reading.	Reading at Midnight.	Difference from last Reading.	Reading at Midnight.	Difference from last Reading.		
June 30 - -	—1' 877	—	—1' 827	—	— 2' 285	—	—	—
July 30 - -	—	—	—	—	+52' 687	+2' 302	—	—
" 31 - -	—2' 674	—0' 031	—2' 394	—0' 032	+54' 554	+1' 917	—	—
August 1 - -	—	—	—	—	+57' 177	+2' 623	—	—
" 2 - -	—	—	—	—	+59' 753	+2' 576	—	—
" 3 - -	—2' 786	—0' 112	—2' 456	—0' 065	+61' 299	+1' 546	—	—

At present only the monthly increments of the readings have been dealt with, so as to obtain the coefficients of the mean daily variation for each month of the year. The process followed is, therefore, simply to divide the monthly increment by the number of days in the month, and then to multiply the quotient by a

through the instrument; the first pair of cylinders, which gives the coefficients of the first order, and also the mean cylinder, 7, being read for each day, while cylinders 3 and 4 and 5 and 6, which give the coefficients of the second and third orders respectively, are only read for each five days and at the end of each calendar month. The numbers on the cylinders are, however, progressive, so that the increments upon them for any given period could very easily be obtained. The form in which the readings are recorded is as follows:—

READINGS of the RECORDING CYLINDERS of the HARMONIC ANALYSER.
Dry-bulb Thermometer Curves, from July 30 to August 3, 1882.
Kew Observatory.

Month and Day.	FIRST ORDER.				SECOND ORDER.			
	Cylinder 1.		Cylinder 2.		Cylinder 3.		Cylinder 4.	
	Reading at Midnight.	Difference from last Reading.	Reading at Midnight.	Difference from last Reading.	Reading at Midnight.	Difference from last Reading.	Reading at Midnight.	Difference from last Reading.
June 30 - -	+10°480	—	-12°333	—	-3°953	—	-3°256	—
July 30 - -	+12°540	+0°103	-14°926	-0°118	—	—	—	—
" 31 - -	+12°678	+0°138	-15°004	-0°078	-4°054	±0°000	-3°454	-0°080
August 1 - -	+12°773	+0°095	-15°069	-0°065	—	—	—	—
" 2 - -	+12°814	+0°041	-15°207	-0°138	—	—	—	—
" 3 - -	+12°897	+0°083	-15°287	-0°080	-4°084	-0°030	-3°466	-0°012

Month and Day.	THIRD ORDER.				MEAN.		Midnight reading of Curve.	Difference from last Reading.
	Cylinder 5.		Cylinder 6.		Cylinder 7.			
	Reading at Midnight.	Difference from last Reading.	Reading at Midnight.	Difference from last Reading.	Reading at Midnight.	Difference from last Reading.		
June 30 - -	-1°877	—	-1°827	—	-2°285	—	—	—
July 30 - -	—	—	—	—	+52°637	+2°302	—	—
" 31 - -	-2°674	-0°031	-2°391	-0°032	+54°554	+1°917	—	—
August 1 - -	—	—	—	—	+57°177	+2°623	—	—
" 2 - -	—	—	—	—	+59°753	+2°576	—	—
" 3 - -	-2°786	-0°112	-2°456	-0°065	+61°299	+1°546	—	—

At present only the monthly increments of the readings have been dealt with, so as to obtain the coefficients of the mean daily variation for each month of the year. The process followed is, therefore, simply to divide the monthly increment by the number of days in the month, and then to multiply the quotient by a

factor which is determined by the scale-value of the thermograms, and which will therefore be different for each observatory.

The ratios of the factors for cylinders 1 to 6 to that of number 7 were very carefully determined from a series of experimental curves of which the values were known. The numerical factor is obtained for each observatory by obtaining on cylinder No. 7 the scale reading corresponding to a vertical movement of the pointer of 10° on the thermogram, which in the case of Kew is $\cdot 075$ inch. The factor for cylinders Nos. 1 and 2 is eight times that for cylinder No. 7; the factor for Nos. 3 and 4 is four times that quantity, and for Nos. 5 and 6 is eight thirds of that quantity. The signs of the factors depend on the direction in which the discs and cylinders are caused to revolve. The constant quantity, added to the reduced reading of cylinder No. 7 corresponds to the temperature which is assumed as the zero at the commencement of the operation.

As an illustration, the case of Kew for July 1882 may be taken, the final readings of the cylinders for which month are above given. The increments for the month shown by these figures are as follows:—

Cylinder	-	-	-	<u>1.</u>	<u>2.</u>	<u>3.</u>	<u>4.</u>	<u>5.</u>	<u>6.</u>	<u>7.</u>							
Observed increment	-	+	2·198	-	2·671	-	0·101	-	0·198	-	0·797	-	0·564	+	56·833		
Divided by 31 (the number of days)	-			+	0·071	-	0·086	-	0·003	-	0·006	-	0·026	-	0·018	+	1·834
Factor	-	-	-	-	53·52	+	53·52	-	26·76	-	26·76	-	17·84	-	17·84	+	6·69
Coefficient deduced	-	-	-	-	3·80	-	4·60	+	0·08	+	0·16	+	0·46	+	0·32	+	12·27
														Add constant	-	48·17	
														Mean temperature	-	60·44	

APPENDIX.

APPENDIX I.

"COLLECTION of DATA from SHIPS."

THE method which has been followed by the Office, since its first establishment in 1854 up to the present date, in the collection of information on Ocean Meteorology, has been to supply officers of the Mercantile Marine with a complete outfit of verified instruments, on the condition of their returning the instruments, and the log of observations made with them, to the Office, or to one of the agents mentioned below, at the completion of the voyage.

Every instrument supplied has been originally verified at Kew Observatory, and on the completion of the voyage it is compared with a standard instrument either at the Office or by one of its agents. Under ordinary circumstances it is not requisite to send the instruments to Kew for re-verification after every voyage, as the changes in their errors are generally slight.

The regular outfit of a ship consists of :—

- 1 Barometer (Kew pattern).
- 6 Thermometers, with a thermometer screen.
- 4 Hygrometers.

The first record of observations is made in a Rough Book supplied for the purpose, which is retained by the captain, who copies the observations into a Meteorological Log kept for the Office.

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

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

Aberdeen	-	J. R. Jones	-	Navigation School.
Cardiff	-	Captain Fowler	-	Sailors' Home.
Dundee	-	Leonard Allen	-	Navigation School.
Glasgow	-	D. M'Gregor	-	37 and 38, Clyde Place.
Greenock	-	Do.	-	36, Brynauer Street.
Hull	-	Z. Scaping	-	Trinity House.
Liverpool	-	J. Gill	-	Sailors' Home.
Southampton	-	C. H. Permain	-	13, Oriental Place.

A set of instruments is kept in working order at the Office in London and at each agency. When a captain expresses himself willing to observe, he is invited to inspect the instruments and learn what will be required of him. If this takes place at one of the agencies, and the captain decides to undertake the work, his name is submitted to the Marine Superintendent, who, if the owners of the ship are British subjects, and she is likely to return to some port in the United Kingdom, sanctions the supply, having due regard to the nature of the proposed voyage and giving preference to captains intending to visit the districts whence the information existing in the Office is scanty.

In a few exceptional cases captains are supplied at ports where there are no agencies, and in these cases the instruments are sent from the Office in London.

Agents receive a fee of 1*l.* 5*s.* for each case of supply and return of instruments, and an additional fee of 1*l.* for the first "excellent" log sent in by any observer whom they may have invited to begin keeping a log, but the Council reserve to themselves the right of deducting the fees for both supply and return of the instruments, if no log is returned, or one which is worthless.

Captains are requested to give notice of their return to any port in the United Kingdom to the agent at the port, if there be one, or else to the Office in London, and steps are then taken to send for the instruments and log. The latter is sent up to London, and the instruments are at once compared with a standard set, and if received at an agency, the results of such comparison are duly forwarded to London.

As regards the Royal Navy, Her Majesty's ships have been supplied by the Office, since its foundation in 1854, with the meteorological instruments used in the service, and for this provision is annually made in the Estimates furnished by the Office to the Treasury upon which the vote for the Meteorological Council is based. The records of observations made by naval officers are in due course deposited at the Admiralty, where they are available for use. It is optional with the observers to keep for the Office a Meteorological Log in addition to the regular record of observations required by the rules of the service. The Council are glad to say that they receive from time to time Meteorological Logs of high value from Her Majesty's ships.

Meteorological Logs received at the Office, whether from Her Majesty's ships or from the Mercantile Marine, are tested according to a definite form (the "test sheet," which has been published in the Report of the Maritime Conference of London, 1874, p. 35), and the observations are classified according to their quality.

As soon as this first testing has been effected, a letter is written to the captain, and if any questions arise to which he can probably give an answer, he is requested to do so while the incidents are fresh in his memory. The replies are noted in the log for future reference.

The method of discussion varies according to the object proposed and the amount of data to be dealt with.

If it is proposed to discuss all the meteorological observations in a given part of the sea, they are first transcribed into data books; an account of the way in which the data books are prepared and used has been given in previous Reports.

If only one element (such as the surface temperature of the sea) is to be discussed, it has been found best to plot the data directly from the logs in geographical position on a chart, and to deduce from the chart means for spaces as small as the number of the observations will allow.

DAILY SYNCHRONOUS METEOROLOGICAL OBSERVATIONS at NOON, GREENWICH MEAN TIME.

In addition to the meteorological logs received from the Navy, owing to the kindness of the Lords Commissioners of the Admiralty, a full set of observations is made at one time each day by all of Her Majesty's ships, in whatever part of the world they may be stationed. These are entered on monthly forms, and forwarded to the Office as soon as possible after the end of each month. Officers of the Mercantile Marine who are keeping meteorological logs, are also invited to co-operate in keeping the synchronous observations, and in numerous instances the observations are well and regularly made. By these means the Council are in early possession of valuable observations which cover, to some extent, the navigable seas of the whole Globe.

APPENDIX II.

LIST of CAPTAINS (and Officers) who have sent in Logs classed as "Excellent" during the year ending March 31, 1885. The figures opposite to each show the total number of such Logs which they have returned to the Office during the period that they have been observing.

Captain's Name.	Number of "Excellent" Logs.	Ship.
Aldrich, Pelham, R.N. -	8	H.M.S. "Sylvia."
Balderston, Richd. James -	5	"Belfast."
Balfour, Lieut. Andrew, R.N. -	13	H.M.S. "Magpie."
Barker, Mr. D. W., F.R.Met.Soc. -	6	"Superb."
Barlow, A. E. - - -	9	S.S. "Parramatta."
Becket, Alexander - - -	6	"Amana."
Berridge, Henry - - -	5	"Superb."
Blake, Edwin John - - -	10	"Tilkhurst."
Bolton, S. H. - - -	4	S.S. "Tyne Queen."
Bouchette, Francis James -	4	S.S. "Montreal."
Boynes, Mr. W. C. (First Officer)	1	"Carn Marth."
Brown, Alfred John - - -	11	"Arafura."
Buchan, James - - -	16	"Coppename."
Burton, George - - -	1	"British Prince."
Campbell, Archibald - - -	13	S.S. "Circassia."
Carpenter, Lieut. Alfred, R.N., F.R.Met.Soc. - - -	11	H.M.S. "Myrmidon."
Cato, W. R. - - -	7	S.S. "Scotia."
Clarke, James - - -	3	S.S. "Olbers."
Cooke, Charles F. - - -	3	"Melbourne."
Crotty, J. H. - - -	2	"Evesham Abbey."
Crutchley, William Caius, R.N.R.	8	S.S. "Ruapchu" and S.S. "Kai-koura."
Dart, Leonard C. - - -	5	"Alcester."
Davidson, H. - - -	1	S.S. "Oceanic."
Denham, George - - -	5	S.S. "Erl King" and S.S. "Ocean King."
Deuchars, William - - -	3	S.S. "Jan Mayen."
Donaldson, R. A. - - -	2	S.S. "Glenavon."
Dunbar, John Ivor - - -	3	S.S. "Arracan."
Dyke, Henry W. - - -	5	"Markland."
Dyke, Lieut. in Command H. H., R.N. - - -	1	H.M.S. "Sylvia."
East, Lieut. James H. C., R.N.	5	H.M.S. "Myrmidon."
England, Thomas - - -	2	"Jane."
Freeman, Thomas William -	19	S.S. "Bellerophon."
Fullarton, D. - - -	1	"Timaru."
Gadd, C. - - -	1	S.S. "Parramatta."
Graham, W. Vincent - - -	1	"Bowfell."
Gray, David - - -	11	S.S. "Eclipse."
Grieve, William M. - - -	5	"City of York."

Captain's Name.	Number of "Ex- cellent" Logs.	Ship.
Griffin, E. J. - - -	1	S.S. "Spartan."
Halley, Edward - - -	1	"City of Madras."
Hayward, P. M. - - -	1	S.S. "Dacia."
Holdich, John Peach, R.N.R. -	9	"British Envoy."
Holloway, John - - -	2	S.S. "Bombay."
Howard, Lieut. W. Vansittart, R.N.	3	H.M.S. "Flying Fish."
Hughes, W. P. - - -	6	"Laonene."
Hurrell, A. A. - - -	1	"Carn Marth."
Irving, P. J. - - -	1	S.S. "Republic."
Jeffery, Arthur W. - - -	7	S.S. "Teniers."
Jones, S. Griff - - -	5	"Hermine."
Kellett, Arthur - - -	1	S.S. "Calabria."
Kennedy, C. W. - - -	2	S.S. "Germanic."
Kidley, W. H. - - -	4	S.S. "Coptic."
Ladd, Mr. Richard, F.R.A.S., F.R.Met.Soc.	11	S.S. "Scotia."
Lalley, William Nicholson -	5	S.S. "Derwent."
Lawson, James - - -	5	S.S. "Minho" and S.S. "Humber."
Leeper, Lieut. A., R.N. - -	5	H.M.S. "Lark."
Longley, H. - - -	12	S.S. "Mosser."
Lupham, R. D. - - -	8	S.S. "Ceylon."
McDougall, Alexr. - - -	3	"Auckland."
McFee, J. R. - - -	1	"Great Victoria."
Maclear, J. F. L. P., R.N. -	10	H.M.S. "Flying Fish."
Mallandaine, Frederick - -	1	"Imberhorne."
Manning, Henry - - -	8	S.S. "Seine."
Marshall, Frederick - - -	1	"Wiltshire."
Messum, Lieut. S. V. S. S., R.N.	1	H.M.S. "Dart."
Metcalfe, John - - -	8	S.S. "Oceanic."
Miller, A. John - - -	4	"Cannanore."
Milne, W. F. - - -	2	S.S. "Esquimaux."
Moffat, Thomas - - -	1	"Westland."
Moore, Lieut. and Comr. W. U., R.N.	4	H.M.S. "Dart."
Murdoch, Peter - - -	6	"Sierra Estrella."
Murray, Alexander - - -	4	S.S. "Windward."
Nicholson, Malcolm - - -	4	"St. Vincent."
Norman, Francis - - -	3	"Polestar."
Nowell, S. - - -	1	"British Prince."
Oldham, Lieut. in Command C. F., R.N.	6	H.M.S. "Lark."
Olver, William - - -	3	"Clynder."
Pagan, James - - -	2	S.S. "Tenasserim."
Parsell, Henry - - -	7	S.S. "Adriatic."
Parson, Geo. Fry - - -	4	"Earnock."
Pearson, Charles William -	24	S.S. "Strathleven."
Peebles, Robert - - -	9	"Tweeddale."
Potter, Thomas - - -	2	S.S. "Durham."
Prout, John Cawse - - -	3	"Cape St. Vincent."
Randall, William - - -	7	"Dynomene."
Renaut, Charles Henry - -	14	"Pleione."

Captain's Name.	Number of "Ex- cellent" Logs.	Ship.
Richardson, Sub.-Lieut. Wyndham, R.N.	6	H.M.S. "Sylvia."
Rosseter, William Lawrence -	4	"St. Kilda."
Russell, Charles James -	4	"Candahar."
Savage, Lieut. W. M., R.N. -	2	L.H. Tender "Richmond."
Scott, William -	15	"Commewyne."
Seymour, J. -	3	S.S. "Scotia."
Shaw, Gilbert -	5	S.S. "Beta."
Shearer, George -	7	"Corona."
Simpson, A. -	1	S.S. "Australasian."
Simpson, Alexander -	15	"Traveller."
Smith, J. -	1	"Crosshill."
Smith, William Charles -	9	"Thirlmere."
Smith, William Henry, R.N.R.	18	S.S. "Circassian."
Spratley, W. -	6	S.S. "Mozart."
Steven, David -	3	"Inchkeith."
Stiven, John H. -	5	"Arethusa."
Strang, Robert -	2	"Lyttelton."
Tannock, Robert Stewart -	5	"Glencairn."
Thomson, A. S. -	5	S.S. "Dacia."
Trant, W. H. -	1	S.S. "Venetian."
Travers, H. de la Cour -	2	S.S. "Tartar."
Trott, Samuel -	3	S.S. "Minia."
Vereker, Capt. Hon. Foley C. P., R.N.	4	H.M.S. "Magpie."
Wait, A. McLean -	3	S.S. "Spartan."
Walker, Henry -	4	S.S. "Cephalonia."
Waring, William -	11	S.S. "Gordon Castle."
Watson, Alexander -	1	"Elvira."
Wharton, W. J. L., R.N. -	15	H.M.S. "Sylvia."
Wheaton, N. J. -	1	"Eliza."
White, Elijah -	1	"Marathon."
Wight, Henry Potts -	13	"Oamaru."
Williamson, Lieut. Andrew C., R.N.	2	H.M.S. "Myrmidon."
Wilson, William -	1	"Horsa."
Youlden, H. -	4	"May Hulse."

Names of observers deceased printed in italics.

APPENDIX III.—SHIPS SUPPLIED AND DOCUMENTS RETURNED DURING THE YEAR ENDING 31st MARCH 1885.

The number of merchant ships supplied with standard instruments and meteorological logs during the above period was 117.
 The number of meteorological logs and documents from Foreign Stations received during the same period, and registered in the Office, amounted altogether to 317, of which 190 were returned from ships, and the remainder from land stations, outside the British Isles.

LIST OF DOCUMENTS RECEIVED FROM LAND STATIONS.

Place.	Observer.	No. of Documents.	Nature of Observations.
Abaco (Bahamas)	G. L. Nairn, Lightkeeper	1	"Lighthouse" Register, January to December 1884.
Barbados (Commercial Hall)	T. L. Ince	2	"Lighthouse" Register, January to December 1884.
" (Joe's River House)	R. B. Walcott, M.D., F.R. Met. Soc.	2	" " " " "
Bermuda	Sergt. J. Green, Medical Staff Corps.	5	Aneurograms, February 1884 to February 1885.
Beyrout (Lee Observatory)	F. Niar, B.A., and R. H. West.	11	Two observations daily, March 1884 to February 1885.
Breaksea Island (King George's Sound).	W. Lindfield, Lightkeeper	1	"Lighthouse" Register, July to December 1883.
Cape Juby (North West Africa)	S. Morris	10	Two observations daily, February 1884 to January 1885.
Cape Pembroke (Falkland Islands)	G. K. Broom, Lightkeeper	2	"Lighthouse" Register, January to December 1884.
Cay Lobos (Bahamas)	Byron N. Jones and G. L. Nairn, Lightkeepers.	2	" " " July 1883 to June 1884.
Cay Sul (Bahamas)	T. R. Thompson, Lightkeeper	3	" " " May to December, 1882; July 1883 to June 1884.
Elopura (N.W. Borneo)	D. Mason Fraser	1	Monthly temperature and rainfall observations for the quarters ending March to September 1884.

List of Documents—continued.

Place.	Observer.	No. of Documents.	Nature of Observations.
Famagusta (Cyprus)	A. H. Moghabghab and S. Photinos.	6	Two observations daily, November 1882 to April 1883.
Gibraltar	Sergt. A. Rand and Lance-Corpl. T. W. Jent, Med. Staff Corps.	12	" " " March 1884 to February 1885.
Great Basses	Lightkeepers	3	Eight observations daily, May and June, and October 1884 to January 1885.
Heligoland	Lightkeepers	13	" " " February 1884 to February 1885.
Inagua (Bahamas)	N. H. E. Garner, Lightkeeper	2	" Lighthouse " Register, January to December 1884.
Kilwa, Kivini	Lieut. C. S. Smith, R.N., H.M. Vice-Consul.	3	Two observations daily, May to July 1884, with barometer diagrams for the same period.
Kudat (N.W. Borneo)	J. J. L. Wheatley	1	Daily temperature and rainfall observations, October to December 1883, and abstract for the year.
Kyrenia (Cyprus)	E. Jeannides	6	Two observations daily, November 1882 to April 1883.
Larnaca (Cyprus)	A. Tsepis	6	" " " " " "
Limassol (Cyprus)	Luigi Bérard	6	" " " " " "
Little Basses	Lightkeepers	3	Eight observations daily, May and June, and October 1884 to January 1885.
Nicosia (Cyprus)	A. Kyriakides	6	Two observations daily, November 1882 to April 1883.
Norfolk Island	T. Rossiter	2	" " " October 1883 to February 1884.
Papho (Cyprus)	A. H. Moghabghab and E. A. Malliotis.	6	" " " November 1882 to April 1883.
Perim	Robert Stopford	2	Three observations daily, January 5, to May 23, 1884; two observations daily, August and September 1884.
São Paulo (Brazil)	Late H. B. Joyner, F.R.G.S., F.R.Met.Soc.	1	Two observations daily, December 1883.
Sombbrero	J. A. Richardson, Lightkeeper	2	" Lighthouse " Register, December 1883 to November 1884.
Suva (Fiji)	J. D. W. Vaughan	8	One observation daily, May 1883 to November 1884.

List of Documents received from SHIPS.

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
¹ Alderton, T.	S.S. Australia	2,137	P. & O. Steam Navigation Co., London.	To and from Calcutta, via Suez, 1884	3
² Aldrich, Pelham, R.N.	Sylvia	1,050	H.M.S.	At Cape of Good Hope, 1884	4
" "	"	"	"	In Simon's Bay, 1884	12 days.
" "	"	"	"	Off East Coast of Africa, 1884-85	4
Balderston, R. J.	Belfast	1,865	R. Brocklebank, Liverpool	To and from Calcutta, 1884	7
³ Barlow, A. E.	S.S. Parramatta	4,759	P. & O. Steam Navigation Co., London.	To Sydney, Bombay, and home, via Suez, 1884	4
Barlow, B. J., R.N.R.	S.S. Amarapoora	2,464	British and Burmese Steam Nav. Co., Lim., Glasgow.	To and from Rangoon, via Suez, 1884	3
Becket, Alexander	Amara	1,299	J. Smith, Glasgow	To Sydney, Wilmington (Cal.), Astoria, and home, 1883-84	11
⁴ Berridge, Henry	Superb	1,451	H. Green, Blackwall	To Melbourne, and from Newcastle (N.S.W.) to San Francisco and home, 1883-84	9
⁵ Black, John	S.S. Explorer	1,298	The Charente S.S. Co., Lim., Liverpool.	To and from New Orleans, 1884	2
Blake, E. J.	Tilkhurst	1,527	W. R. Price, London	To Algoa Bay, Newcastle (N.S.W.), San Francisco, and home, 1883-85	12
Bolton, S. H.	S.S. Tyne Queen	1,264	J. W. Smith, Hull	Three voyages to and from Spanish Ports, 1884	3
" "	"	"	"	One voyage to and from Harnas (Sweden), three to and from Dronheim, 1884-85	2
Bouchette, F. B.	S.S. Montreal	3,308	Mississippi & Dominion S.S. Co., Lim., Liverpool.	Five voyages to and from Quebec, 1884	3
Bowen, Albert	Barque Chilian	601	J. Donaldson, Glasgow	To and from Valparaiso, 1883-84	7
Brown, A. J.	Barque Arafura	540	J. R. Anderson, London	To Newcastle (N.S.W.), Valparaiso, and home, 1883-85	10

List of Documents, &c.—continued.

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
1. Churchley, W. R.N.R.	S.S. Kaikoura	2,885	New Zealand Shipping Co., Christchurch, N.Z.	To and from Lyttelton, via Suez, 1884—85	3
"	S.S. Ruapehu	2,655	"	To Hobart Town, Wellington, Rio Janeiro, and home, 1884	3
2. Cart, L. C. Davison, H.	Alcester	1,597	R. C. Haws, Liverpool	To and from Rangoon, 1883-84	2
"	S.S. Oceanic	2,440	Oceanic Steam Navigation Co., Lim., Liverpool.	Trading between Hong-Kong and San Francisco, via Yokohama, 1883-84	4
3. Penham, George	S.S. Earl King	2,193	W. Ross, Glasgow	To and from New Orleans, 1883-84	2
"	S.S. Ocean King	1,606	"	Two voyages to and from Montreal; one to Montreal, Alexandria, New York, and home, 1884	4
"	"	"	"	To and from New York, 1885	1
4. Leuchars, W.	S.S. Jan Mayen	469	The Dundee Polar Fishing Co., Dundee.	To and from Greenland, and to and from Davis Straits, 1884	7
Donaldson, R. A.	S.S. Glenavon	2,985	J. McGregor, London	To Singapore (via Suez), Hong-Kong, Shanghai, Yokohama, Gibraltar (via Suez), New York, and home, 1884	4
5. Dalling, George	S.S. Port Phillip	1,732	"	To and from China, via Suez, 1884-85	4
Dunbar, J. I.	S.S. Arracan	1,856	Anglo-Australasian Steam Navigation Co., London. British and Burnese Steam Navigation Co., Glasgow.	To Melbourne, via Cape Good Hope, and home, via Suez Canal, 1884-85	4
"	"	"	"	To and from Rangoon, via Suez, 1884	3
6. Duncan, Robert	S.S. Garth Castle	2,381	Sir T. Brassey, Westminster	To Table Bay, 1884	3
Dutton, J. E.	S.S. Sardinian	2,577	R. G. Allan, Liverpool	One voyage to and from Portland; one to and from Baltimore, 1884	1
					2

LIST of DOCUMENTS, &c.—continued.

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
¹⁰ Crutchley, W. C., R.N.R.	S.S. Kaikoura	2,885	New Zealand Shipping Co., Christchurch, N.Z.	To and from Lyttelton, via Suez, 1884-85	3
¹¹ " "	S.S. Ruapehu	2,655	" "	To Hobart Town, Wellington, Rio Janeiro, and home, 1884	3
Lart, L. C. - Davison, H.	Alcester - S.S. Oceanic -	1,597 2,440	R. C. Haws, Liverpool - Oceanic Steam Navigation Co., Lim., Liverpool.	To and from Rangoon, 1883-84	3
Denham, George	S.S. Erl King -	2,193	W. Ross, Glasgow	Trading between Hong-Kong and San Francisco, via Yokohama, 1883-84	9
¹² " "	S.S. Ocean King	1,606	" "	To and from New Orleans, 1883-84	2
¹² " "	" "	"	" "	Two voyages to and from Montreal; one to Montreal, Alexandria, New York, and home, 1884	4
Deuchars, W.	S.S. Jan Mayen	469	The Dundee Polar Fishing Co., Dundee.	To and from New York, 1885	1
Donaldson, R. A.	S.S. Glenavon	2,985	J. McGregor, London	To and from Greenland, and to and from Davis Straits, 1884	7
¹³ " "	S.S. Port Phillip	1,792	" "	To Singapore (via Suez), Hong-Kong, Shanghai, Yokohama, Gibraltar (via Suez), New York, and home, 1884	4
Dunbar, J. L.	S.S. Arracan	1,856	Anglo-Australasian Steam Navigation Co., London. British and Burmese Steam Navigation Co., Glasgow.	To and from China, via Suez, 1884-85	4
¹⁴ Duncan, Robert	S.S. Garth Castle	2,381	Sir T. Brassey, Westminster	To Melbourne, via Cape Good Hope, and home, via Suez Canal, 1884-85	4
Dutton, J. E.	S.S. Sardinian	2,577	R. G. Allan, Liverpool	To and from Rangoon, via Suez, 1884	3
				To Table Bay, 1884	1
				One voyage to and from Portland; one to and from Baltimore, 1884	2

LIST of DOCUMENTS, &c.—continued.

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
Dyke, H. H., R.N., Lieut. in Command.	Sylvia	1,050	H.M.S. -	From Monte Video to Simon's Bay, 1884	2
Dyke, H. W.	Barque Markland	920	W. H. De Veber, St. John's, N.B.	To Buenos Ayres, Valparaiso, Mauri- tius, Galle, Bangkok, and home, 1883-85	14
England, Thomas	Barque Jane	636	P. Sutherland, Liverpool	To Apalachicola, and home, 1884	5
"	"	"	"	To St. Vincent, New Orleans, and home, 1884-85	3
Freeman, T. W.	S.S. Bellerophon	1,397	Oceanic Steam Navigation Co., Liverpool.	To and from China, via Suez, 1884	3
"	"	"	"	"	4
Fullarton, D.	Timaru	1,306	Shaw, Savill, and Albion Co., Lim., London.	To Otago, Oregon, and home, 1884-85	8
Gadd, C.	S.S. Parramatta	2,684	P. & O. Steam Navigation Co., London.	To and from Sydney, via Suez, 1884-85	4
Graham, W. Vincent	Barque Howfoll	1,002	R. Brocklebank, Liverpool	To and from Manila, 1883-84	8
Gray, David	S.S. Eclipse	435	D. Gray, Peterhead	To and from Greenland, 1884	5
Green, Frederick	Barquentine Zea	201	J. Adamson, Sunderland	To Constantinople, 1884	2
Grey, Charles, R.N.R.	Mac Millan	1,450	J. McMillan, Jun., Dumbarton	To Calcutta, 1883-84	3
Greive, W. M.	City of York	1,195	G. Smith, Glasgow	To and from Astoria, 1884-85	8
Griffin, E.	S.S. Spartan	2,223	Union S.S. Co., Lim., South- ampton.	To and from Cape Town, 1884	2
Grose, Henry	Melmerby	1,510	A. Cassels, Liverpool	To and from Quebec, 1884	2
Halley, Edward	City of Madras	1,577	G. Smith, Glasgow	To and from Rangoon, 1883-84	7
Hannah, Henry	S.S. Irrawaddy	1,623	British and Burmese Steam Navi- gation Co., Glasgow.	From Gibraltar to Rangoon, and back, via Suez, 1884	2
Harrison, H. I. N.	S.S. Asiatic	1,557	Union S.S. Co., Lim., London	To Port Elizabeth, 1884	1
Hayward, P. M.	S.S. Dacia	1,473	India Rubber and Telegraph Works Co., London.	From Cadiz to the Canary Islands and home, 1883-84	5

List of Documents, &c.—*continued.*

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
Hird, William	Marlborough	1,124	J. Leslie, London	From Lyttelton, 1884	3
"	Tarauaki	1,130	"	To Lyttelton, 1883	3
Holdich, J. P., R.N.R.	British Envoy	1,265	J. Coupland, Leicester	To and from Melbourne, 1883-84	6
Holloway, John	S.S. Bombay	2,044	R. S. Donkin, North Shields	To New Zealand, via Cape of Good Hope, Rio Janeiro, and home, 1883-84	4
"	"	"	"	To and from New Zealand, via Cape of Good Hope, 1884	4
Hughes, W. P.	Laonene	1,746	D. Fernie, Liverpool	To Mauritius, Wallaroo, and home, 1883-84	8
Hurrell, A. A.	Carn Marth	1,174	E. Handcock, Cardiff	To Malta, New York, and home, and to and from Wilmington, 1884-85	3
Irving, P. J.	S.S. Republic	2,187	Oceanic Steam Navigation Co., Liverpool.	Five voyages to and from New York, 1884	3
Jeffery, A. W., F.R. Met. Soc.	S.S. Teniers	-	-	From Antwerp to Buenos Ayres, Monto Video, Rio Janeiro, and home, 1884	3
"	"	-	-	To and from Monte Video, 1884	2
Jones, S. G.	Barque Hermine	538	T. H. Jackson, Liverpool	To Rosario, Lota, Ilico, Buchupureo, and home, 1883-84	9
Judd, S. G.	Barque Spirit of the Dawn.	692	J. Bell, Liverpool	To Brisbane, Portland (Oregon), and home, 1883-84	9
Kellett, Arthur	S.S. Calabria	2,031	Telegraph Construction and Maintenance Co., London.	To and from Singapore, via Suez, 1883-84	4
"	"	"	"	To St. Vincent, Brazil, St. Vincent, and home, 1884	2
Kennedy, C. W.	S.S. Germanic	3,150	Oceanic Steam Navigation Co., Liverpool.	Five voyages to and from New York, 1884-85	3
Kidley, W. H.	S.S. Coptic	2,789	"	Trading between Hong Kong and San Francisco, via Yokohama, 1882	4

List of DOCUMENTS, &c.—continued.

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
Kidley, W. H.	S.S. Coptic	2,789	Oceanic Steam Navigation Co., Liverpool.	To New Zealand, via Cape of Good Hope, Rio Janeiro, and home, 1884 -	3
King, J. W.	Fearnought	1,293	The Merchants Trading Co., Liverpool.	To Zanzibar, Gallé, Rangoon, and home, 1883-84 -	8
Lailey, W. N.	S.S. Derwent	986	Mercantile S. S. Co., Ltd., London.	Two voyages to and from Cronstadt; one to Brindisi, Girenti, and home, 1884 -	3
Lawson, James	S.S. Humber	1,528	Royal Mail Steam Packet Co., London.	To Barbadoes, Grenada (W.I.), and Havre, 1883 -	1
"	"	"	"	To Brazil, River Plate, and home, 1883 -	3
Leslie, John	Invercauld	1,247	R. Connon, Aberdeen	To Cape Town, Calcutta, Mauritius, Madras, Batavia, and home, 1883-84 -	8
Lindsay, H. K.	Eaton Hall	1,779	S. Williamson, Liverpool	To Melbourne, Newcastle (N.S.W.), San Francisco, and home, 1883-84 -	9
¹³ Longley, H.	S.S. Mosser	1,323	J. H. Bushby, London	To China and Japan, via Suez, thence to New York, via Suez, and home, 1883-84 -	5
²⁵ Lunham, R. D.	S.S. Ceylon	2,149	J. L. Clark, London	One voyage to and from Mediterranean ports, one to and from Port Said, one to and from Funchal, one to and from Iceland, one to Copenhagen, 1884 -	4
McClure, William	Iron Cross	1,508	D. Fernie, Liverpool	To and from Java, 1883-84 -	7
McDougall, Alexander.	Auckland	1,245	The Albion Shipping Co., Ltd., Glasgow.	To Wellington, Newcastle (N.S.W.), Adelaide, and home, 1884-85 -	7
McFee, J. R.	Great Victoria	2,268	R. H. Dixon, Liverpool	To and from San Francisco, 1883-84 -	8
²⁶ Macleaur, J. F. L. P., R.N.	Flying Fish	940	H.M.S.	At China station, 1884 -	4
²⁶ "	"	"	"	In China and Japan Seas, 1884 -	4
²⁶ "	"	"	"	" " " " -	4

List of Documents, &c.—*continued.*

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
McMillan, John	Canterbury	1,245	Shaw, Savill, and Albion Co., Lim., London.	To and from Otago, 1883-84	6
Malet, J. H.	S.S. Marengo	1,823	A. Wilson, Hull	To and from New York, 1884	1
Mallandaine, Frederick.	Imberthorne	1,997	Imberthorne Ship Co., London	To Sydney, San Francisco, and home, 1883-84	10
Manning, Henry	S.S. Seine	3,579	Telegraph Construction and Maintenance Co., Lim., London.	To Singapore, via Suez, Batavia, Port Darwin, Singapore, and home via Suez, 1883-84	4
Marshall, Frederick	Wiltshire	1,461	G. Marshall, London	To and from Singapore, via Suez, 1884	3
Metcalf, J.	S.S. Oceanic	2,440	Oceanic Steam Navigation Co., Lim., Liverpool.	To and from Chittagong, 1884-85	7
Miller, A. J.	Cannanore	1,599	W. H. De Wolf, Liverpool	Trading between Hong-Kong and San Francisco, via Yokohama, 1882-83	3
Miller, A. T., R.N.	Conway	—	Training Ship	To Rio Janeiro, Chittagong, and New York, 1883-84	2
Milne, W. F.	S.S. Esquimaux	166	Dundee Whale and Seal Fishing Co., Dundee.	Off Birkenhead, 1884	4
Moffat, Thomas	Westland	1,116	Shaw, Savill, and Albion Co., Lim., London.	To St. John's, Davis Straits, and home, 1884	7
Moore, W. L., R.N., Lieut. and Comr.	Dart	470	H.M.S.	To and from Wellington, 1883-84	6
Muir, J.	Invercargill	1,246	Shaw, Savill, and Albion Co., Lim., London.	At Hobart Town, 1883-84	3
Murdoch, Henry	Penthesilen	1,668	W. D. Reid, Liverpool	To and from New Zealand, 1883-84	6
Murdoch, Peter	Sierra Estrella	1,436	A. M. Anderson, Liverpool	To Bombay, Rangoon, and home, 1883-84	2
"	"	"	"	To Melbourne, Newcastle (N.S.W.), San Francisco, and home, 1883-84	10
"	"	"	"	To and from Chittagong, 1884-85	7

Last of Documents, &c.—continued.

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
Murray, Alexander	S.S. Windward	321	W. Baxter, Peterhead	To and from Greenland, 1884	-
New, G.	S.S. Annie	1,247	J. Gray, Whitby	One voyage to St. Vincent and home, and one to New York and home, 1884	3
¹⁶ Nicholson, Malcolm	Barque St. Vincent	891	T. L. Devitt, London	To and from Adelaide, 1884-85	6
Norman, Francis	Barque Polestar	625	J. Lyne, Liverpool	To Valparaiso, and home from Talcahuano, 1883-84	5
Norris, W. H.	Barque Dilbar	1,281	G. Lidgett, London	To Rio Janeiro, Valparaiso, Mauritius, Adelaide, and towards home, 1883-84	8
Nowell, S.	S.S. British Prince	2,548	British Shipowners' Co., Liverpool.	To and from Philadelphia, 1884	1
³⁰ Oldham, C. F., R.N., Lieut. in Command.	H.M.S. Lark	—	H.M. Schooner	At Auckland, N.Z., 1883-84	4
³⁰ " "	"	—	"	" 1884	4
³⁰ " "	"	—	"	On Australian station, 1884	4
³⁰ " "	"	—	"	"	2
Olver, William	Barque Clynder	1,117	R. Thorn, Glasgow	To Sydney, Newcastle (N.S.W.), Lyttleton, and towards home, 1883-84	6
Owen, Henry	S.S. Arab	2,044	Union S.S. Co., London	To and from Baltimore, via Bermuda, 1884	2
Pagan, James	S.S. Teuasserim	1,755	British and Burmese Steam Navigation Co., Ltd., Glasgow.	To and from Rangoon, via Suez, 1884	3
³¹ Park, J. B.	S.S. Potosi	2,704	Pacific Steam Nav. Co., Liverpool	To and from Sydney, via Suez, 1884	3
³² Parker, E. J.	Halcyone	843	W. Savill, London	To Wellington, 1883-84	4
³³ Parsell, H.	S.S. Adriatic	2,458	Oceanic Steam Navigation Co., Liverpool.	Six voyages to, and five from, New York, 1884-85	4
Parson, G. F.	Earnock	1,198	W. Fraser, London	To and from Adelaide, 1883-84	7

List of Documents &c.—continued.

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
31 Pearson, C. W.	S.S. Strathleven	2,436	W. Burrell, Glasgow	From Gibraltar to Yokohama and New York, via Suez, thence to Savannah, and home, 1883-84	5
"	"	"	"	From Suez to Yokohama, Shanghai, and New York, via Suez, 1884-85	4
Peattie, R. D.	Barque Brodieck Bay	753	J. S. Hatfield, Liverpool	To and from New Zealand, 1884	7
Peddes, Robert	Barque Tweeddale	1,403	J. Roxburgh, Glasgow	To and from Calcutta, 1884	7
Peters, James	S.S. Gloucester	1,304	Great Western Steamship Co., Linn., Bristol	One voyage towards Baltimore. One to and from New York, 1883-84	2
Potter, Thomas	S.S. Durham	1,466	W. S. Bailey, Hull	Trading between Hull, Cronstadt, Reval, and Rotterdam, 1883-85	3
Prout, J. C.	Cape St. Vincent	1,422	A. P. Lyle, Greenock	To Cape Town, Java, and home, 1883-84	2
Purdie, Robert	Barque Savanetta	324	G. M. Turnbull, Glasgow	To Trinidad, New York, Trinidad, and home, 1883-84	7
Randall, William	Dynomenue	1,900	D. Fernie, Liverpool	To Calcutta and New York, 1883-84	2
Renaut, C. H.	Pleione	1,092	The Shaw, Savill, and Albion Co., Linn., London	To and from Wellington, 1883-84	7
Roberts, A. F.	Trevelyan	1,042	Shaw, Savill, and Albion Co., Linn., London	Home from Port Chalmers, 1884	3
Rogers, J. T., R.N.R.	S.S. Lepanto	1,871	A. Wilson, Hull	To and from New York, 1884	2
Rosseter, W. L.	Barque St. Kilda	865	A. T. Parker, Liverpool	To and from Demerara, 1884	3
"	"	"	"	"	3
Russell, C. J.	Canlahar	1,418	R. Brocklebank, Liverpool	To and from Calcutta, 1883-84	2
Sanderson, J.	Collingrove	861	A. L. Elder, London	To and from Adelaide, 1883-84	7
Sargent, A. H.	Barque Glendora	774	Shaw, Savill, and Albion Co., Linn., London	Home from Canterbury, N. Z., 1884	3
35 Savage, Lieut. W. M., R.N.	L. H. Tender Richmond	183	Board of Trade, London	At the Bahamas, 1883-84	13
36 "	"	"	"	" 1884	4

LIST OF DOCUMENTS, &c.—continued.

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
Savage, Lieut. W. M., R.N.	L. H. Tender Richmond	183	Board of Trade, London	At the Bahamas, 1884-85	4
Scott, William	Barque Commewyne	315	J. Grierson, Glasgow	To and from Surinam, 1884	3
"	"	"	"	" 1884-85	3
⁹ Seymour, J.	S.S. Scotia	2,931	Telegraph Construction and Maintenance Co., London.	To and from Pernambuco 1884	2
Shaw, Gilbert	S.S. Beta	1,087	W. Cunard, London	Between Halifax and Jamaica, via Bermuda, 1884	1
"	"	"	"	"	"
Shearer, George	Barque Corona	1,210	W. Stephen, Dundee	To Newcastle (N.S.W.), Iquique, and Hamburg, 1883-85	4
Simpson, A.	S.S. Australasian	2,343	W. Henderson, Aberdeen	To Sydney, via Cape of Good Hope, and home, via Suez, 1884	10
Simpson, Alexander	Schooner Traveller	196	A. Simpson, Peterhead	To Ivigut, Philadelphia, Ivigtut, Philadelphia, and Esbjerg (Jutland), 1884	3
Smith, J.	Barque Cross Hill	1,019	J. Hayton, Liverpool	To Yokohama, Kobe, New York, and home, 1883-84	7
²⁸ Smith, J. H., R.N.R.	Worcester	—	Training Ship	Off Greenhithe, 1883-84	14
²⁹ "	"	—	"	" 1884	4
Smith, W. C.	Thirlmere	1,711	J. Fisher, London	To Sydney, San Francisco, Pernambuco, and home, 1883-84	3
³⁷ Smith, W. H., R.N.R.	S.S. Circassian	2,356	R. G. Allan, Liverpool	Two voyages to and from Quebec, three to and from Halifax, 1883-84	10
Spradly, W.	S.S. Mozart	1,304	Liverpool, Brazil, and River Plate Steam Nav. Co., Liverpool.	One voyage to Lisbon, Bahia, Rio Janeiro, Bahia, and home; and one to Monte Video, Santos, Bahia, and home, 1883-84	4

List of Documents, &c.—*continued*.

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year	Months of Register.
Spratt, W. -	S.S. Mozart -	1,304	Liverpool, Brazil, and River Plate Steam Nav. Co., Liverpool.	One voyage to and from Monte Video; one home from Monte Video, 1884-85 -	1
Steven, David	Barque Inch Keith -	1,238	A. Russell, Glasgow -	To and from Calcutta, 1883-84 -	2
Stewart, J. R. -	S.S. Ayreshire -	871	J. Turnbull, Glasgow -	Glasgow to Naples, Porman, Philadelphia, Havana (Cuba), Sagua la Grande, New York, Cardenas (Cuba), New York, Jamaica, Halifax, St. John's, and home, 1883-84 -	5
Stinson, Alfred	Barque Julia H. -	585	R. C. Haws, St. John's, N.B. -	To and from Jamaica, 1883-84 -	4
Stiven, J. H. -	Arethusa -	1,272	J. Hamilton, Liverpool -	To Bombay, Calcutta, Akyab, Queens-town, and Antwerp, 1883-84 -	10
Strang, Robert	Lyttelton -	1,111	Shaw, Savill, and Albion Co., Lim., London.	To and from Otago, 1884 -	6
Tannock, R. Stewart	Glencairn -	1,564	A. Allen, Glasgow -	To and from Chittagong, 1883-84 -	7
Thompson, A. S. -	S.S. International -	1,004	India Rubber, &c. and Telegraph Works Co., London.	To Teneriffe, 1884 -	2
Tomlin, P. S. -	S.S. Ballaarat -	4,752	P. & O. Steam Navigation Co., London.	Two voyages to and from Melbourne, via Suez, 1883-84 -	6
" "	" -	"	" " " "	To Melbourne and back to Malta, via Suez, 1884 -	2
" "	" -	"	" " " "	To and from Melbourne, via Suez, 1884-85 -	3
Trant, W. H. -	S.S. Venetian -	2,733	S.S. Venetian Co., Liverpool -	Six voyages to, and five from, Boston, 1884 -	4
Travers, H. de la Cour.	S.S. Tartar -	2,755	Union S.S. Co., Lim., Southampton -	Two voyages to and from Cape Town, &c., 1884 -	3
" "	" -	"	" " " "	Two voyages to and from Cape Town, &c., 1884 -	3

LIST of DOCUMENTS, &c.—continued.

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
⁴⁰ Trott, Samuel	S.S. Minia	1,350	Anglo-American Telegraph Co., London.	To Berehaven, Cardiff, Brest, Falmouth, and Halifax, 1884	4
⁴⁰ " "	"	"	"	In Halifax Harbour and off coast of Newfoundland, 1884	4
⁹ " "	"	"	"	At Halifax and in North Atlantic, 1884-85	4
¹¹ Vereker, The Hon. F. C. P., R.N.	Maggie	774	H.M.S.	Surveying in Strait of Malacca, and from Batavia to Aden, Seychelles, and Aden, 1884	4
⁴¹ " "	"	"	"	Home from Seychelles, via Suez 1884	2
¹⁷ Wait, A. McLean	S.S. Spartan	2,223	Union S.S. Co., Lim., Southampton	To and from Cape Town, 1884	2
¹⁷ " "	"	"	"	To and from Cape Town, &c., 1884	2
Walker, Henry	S.S. Cephalonia	3,490	Cunard S.S. Co., Lim., Liverpool	Three voyages to and from New York, two to and from Boston, 1884	4
" "	"	"	"	Five voyages to and from Boston, 1884-85	4
⁴² Waring, William	S.S. Gordon Castle	2,031	T. Skinner, London	To China, via Suez, Australia, New Zealand, Sydney, China, Japan, China, New York, via Suez, and home, 1883-84	8
¹⁵ Warren, W. H. C.	Barque Bedfordshire	1,155	W. Hope, Liverpool	To Rio Janeiro, Akyab, Rangoon, and towards home, 1883-84	8
Watson, Alexander	Barque Elvira	464	H. F. Watt, Wavertree, Liverpool	To Imbituba, Pernambuco, New Orleans, and home, 1883-84	6
Wharton, W. J. L., R.N.	Sylvia	1,050	H.M.S.	In Rio de la Plata and Straits of Magellan, 1882-84	18
" "	"	"	"	In Straits of Magellan and at Monte Video, 1884	2

List of Documents, &c.—*continued.*

Captain's Name.	Ship.	Tons.	Owners.	Voyage and Year.	Months of Register.
Wheaton, N. J.	Benjamin Eliza	299	J. H. Goodyear, Liverpool	To Imbituba (Brazil), Pernambuco, Barbadoes, St. Vincent, and home, 1884 -	4
White, Elijah	Marathon	1,471	J. Nevins, St. John's, N.B.	To Singapore, Valparaiso, Huanillos, and home, 1883-84 -	11
Wight, H. P.	Oamaru	1,306	Albion Shipping Co., Lim., Glasgow.	To and from Lyttelton, 1883-84 -	6
Williams, Henry	Argomene	1,662	D. Fernie, Liverpool	To Mauritius, Chittagong, and home, 1884 -	2
Wilson, James	Barque Clan Ferguson	799	T. Dunlop, Glasgow	To Brisbane, Valparaiso, Astoria, and home, 1883-84 -	11
Wilson, William	Barque Horsa	1,128	Star Nav. Co., Liverpool	To and from Java, 1883-84 -	8
Youlden, H.	Barque May Hulse	463	J. Hansom, Southampton	To Buenos Ayres, Valparaiso, and home, 1882-84 -	7

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

- ¹ Kept by P. H. Gouge, 4th Officer.
- ² Kept by Lieutenant Wyndham Richardson, R.N.
- ³ Kept by G. Douglas Sumner, 3rd Officer.
- ⁴ Kept by D. Wilson Barker, F.R.Met.Soc., Chief Officer.
- ⁵ Kept by J. W. Jinks, 3rd Mate.
- ⁶ Kept by 3rd Officer.
- ⁷ Kept by Lieutenant A. C. Williamson, R.N.
- ⁸ Kept by Lieutenant A. C. Williamson, R.N., and James H. C. East, R.N.
- ⁹ Kept by Richard Ladd, F.R.A.S., F.R.Met.Soc.
- ¹⁰ Kept by H. W. Bennett.
- ¹¹ Kept by J. C. Westall, 4th Officer.
- ¹² Kept by J. O. Toole, 2nd Officer.
- ¹³ Kept by Osborn W. Read.
- ¹⁴ Kept by B. C. Wainwright, F.R.Met.Soc.
- ¹⁵ Kept by Officers.
- ¹⁶ Assisted by Officers.
- ¹⁷ Kept by P. Forbes, 4th Officer.
- ¹⁸ Kept by Anthony Standidge Thomson.
- ¹⁹ Assisted by Walter Haldson, 2nd Officer.
- ²⁰ Kept by W. C. Boytes, 1st Officer.
- ²¹ Kept by George James.
- ²² Assisted by Messrs. Calvert and Cooper.
- ²³ Kept by R. C. Keys, 2nd Officer.
- ²⁴ Kept by C. Lancaster.
- ²⁵ Kept by C. L. Hulson, F.R.Met.Soc.
- ²⁶ Kept by Lieutenant W. Vanstuart Howard, R.N.
- ²⁷ Kept by William W. Inglis, 2nd Officer.
- ²⁸ Kept by the Boys.
- ²⁹ Kept by Lieutenant Stuart V. S. C. Messum, R.N.
- ³⁰ Kept by Lieutenant A. Leeper, R.N.
- ³¹ Kept by R. Routh, 3rd Officer.
- ³² Kept by Alfred H. Sergeant, Chief Officer.
- ³³ Kept by R. Ward.
- ³⁴ Assisted by A. S. Robertson and E. F. Collard, 2nd Officers.
- ³⁵ Kept by Henry King Sturdee, Chief Officer.
- ³⁶ Kept by Henry King Sturdee and S. A. Dillett.
- ³⁷ Kept by Messrs. Cairne & Griffith, 3rd & 4th Officers.
- ³⁸ Kept by S. de B. Lockyer, 2nd Officer.
- ³⁹ Kept by G. C. Gordon, 2nd Officer.
- ⁴⁰ Kept by W. R. Luger.
- ⁴¹ Kept by Lieutenant Andrew Balfour, R.N.
- ⁴² Assisted by W. A. Holland, Chief Officer, and A. Le Huray, 3rd Officer.
- ⁴³ Kept by A. W. Lister.

APPENDIX IV.

INSTRUMENTS supplied, &c. to the Royal Navy.

Per Account.	Baro- meters.	Ane- roids.	Thermometers.				Hydro- meters.
			Ordinary.	Max.	Min.	Screens.	
April 1st, 1884, afloat -	173	366	1,068	142	127	100	119
Issued since -	52	80	256	44	37	14	62
Returned since -	225	446	1,324	186	164	114	181
April 1st, 1885, afloat -	41	69	227	22	29	6	55
	184	377	1,097	164	135	108	126

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

April 1st, 1884, in use -	74	114	250	19	26	5	16
Issued since -	3	5	41	3	9	1	—
Returned since -	77	119	291	22	35	6	16
	3	6	36	1	2	1	—
April 1st, 1885, in use -	74	113	255	21	33	5	16

DISPOSITION of ADMIRALTY INSTRUMENTS on April 1st, 1885.

Afloat in Royal Navy -	184	377	1,097	164	135	108	126
In use at stations -	74	113	255	21	33	5	16
In store at M.O. -	101	72	62	57	77	12	69
" Chatham -	7	5	32	6	5	3	—
" Sheerness -	6	10	56	10	9	2	9
" Portsmouth -	5	6	13	8	5	6	27
" Devonport -	4	5	13	—	8	5	28
" Queenstown -	3	3	1	1	1	—	8
" Gibraltar -	1	4	2	—	—	—	4
" Malta -	6	8	19	5	5	1	18
" Halifax -	6	11	29	6	6	—	12
" Bermuda -	3	6	41	—	2	—	15
" Jamaica -	3	2	12	2	2	—	—
" Cape of Good Hope -	7	9	49	6	6	—	31
" Trincomalee -	—	4	27	4	4	—	—
" Hong Kong -	15	6	31	4	8	2	10
" Coquimbo -	—	7	3	1	2	—	23
" Sydney -	1	5	46	—	1	—	—
" Esquimalt -	6	4	10	2	2	—	—
Total, April 1st, 1885 -	432	657	1,798	297	311	144	396
Lost, &c. since April 1st, 1884 -	—	8	158	4	8	5	8
Under repair -	7	13	—	—	—	—	—

APPENDIX V.

INSTRUMENTS supplied, &c. to Mercantile Marine.

Per Account.	Baro- meters.	Com- passes.	Thermometers.				Hydro- meters.
			Ordinary.	Max.	Min.	Screens.	
April 1st, 1884, afloat -	148	—	790	—	—	155	486
Issued since -	102	—	619	—	1	94	314
Returned since -	250	—	1,409	—	1	249	800
	111	—	641	—	—	105	347
April 1st, 1885, afloat -	139	—	768	—	1	144	453

INSTRUMENTS at Stations, viz., Telegraph Offices, Observatories,
Navigation Schools, &c.

April 1st, 1884, in use -	111	4	251	62	59	35	41
Issued since -	9	—	20	10	5	4	—
Returned since -	120	4	271	72	64	39	41
	7	—	10	8	3	3	—
April 1st, 1885, in use -	113	4	261	64	61	36	41

DISPOSITION of Board of Trade Instruments on April 1st, 1885.

In merchant ships -	139	—	768	—	1	144	453
In use at stations -	113	4	261	64	61	36	41
In store at M.O. -	30	1	111	6	46	43	97
At Liverpool Agency -	8	8	42	—	—	10	21
„ Aberdeen „ -	4	—	13	—	—	2	33
„ Glasgow „ -	4	—	28	—	—	4	17
„ Dundee „ -	6	—	17	—	—	7	19
„ Hull „ -	5	—	31	—	—	8	20
„ Southampton „ -	6	—	28	—	—	8	25
„ Cardiff „ -	1	—	14	—	—	6	10
Total, April 1st, 1885 -	316	13	1,313	70	108	268	736
Lost, &c. since April 1st, 1884 -	3	—	122	—	—	9	47

APPENDIX VI.

LIST of STATIONS reporting Meteorological Observations by Telegraph to the Office on 31st March 1885, with the Names of Observers.

*†Sumburgh Head -	Rev. W. Brand - - -	Minister of Dunrossness.
*†Stornoway - -	D. MacDonald - - -	Late Officer S.S. "Great Eastern."
Wick - - -	J. Sinclair - - -	Watchmaker.
Nairn - - -	W. D. Penny - - -	Schoolmaster.
*†Aberdeen - -	J. McCormack - - -	Telegraph Clerk.
Leith - - -	W. Hay - - -	Do.
*†Shields - - -	J. W. Irvine - - -	Do.
Spurn Head - -	J. B. Smith - - -	Assistant Lightkeeper.
†York - - -	H. M. Platnauer - - -	Curator of Museum.
Loughboro' - -	W. Berridge, F.R.Met.Soc. -	
†Ardrossan - -	J. W. Mayes - - -	Telegraph Clerk.
Malin Head - -	P. O'D. Farren - - -	Signalman, Lloyd's.
*†Mullaghmore -	K. Kerr - - -	Retired Coastguard Officer.
*†Belmullet - -	Miss M. J. Tolan - - -	Telegraphist.
Donaghadee - -	T. MacGowan - - -	Telegraph Clerk.
Parsonstown - -	B. Budds - - -	Assistant Observer at Lord Rosse's Observatory.
Barrow-in-Furness -	W. S. Whitworth - - -	Engineer, Barrow-in-Furness Railway.
*†Holyhead - -	C. Durham - - -	Keeper of Sailors' Home.
Liverpool - -	J. Hartnup, junr. - - -	Bidston Observatory.
*†Valencia - -	J. E. Cullum - - -	Superintendent of the Observatory.
Roche's Point - -	W. Kennedy - - -	Telegraph Clerk.
Pembroke - -	Messrs. Blake and Baker -	Lightkeepers.
*†Scilly - - -	W. Thomas - - -	Signalman.
Prawle Point - -	J. John - - -	Coastguard Officer.
†Hurst Castle - -	G. G. Appleton - - -	Lightkeeper.
†Jersey - - -	J. Fisher - - -	Signalman.
*†Dungeness - -	P. Curnow - - -	Lightkeeper.
*†London - - -	F. Gaster, F.R. Met. Soc. -	Clerk, Meteorological Office.
Oxford - - -	W. Wickham - - -	Radcliffe Observatory.
Cambridge - -	H. Todd - - -	Observatory.
*†Yarmouth - -	G. T. Watson - - -	Secretary, Sailors' Home.
†Hayes Junction -	W. Foster - - -	Station Master.

Note.—Those stations marked with an asterisk (*) report also at 2h. p.m.; and those with a dagger (†) at 6h. p.m. ‡ This station now reports by post only.

APPENDIX VII.

REPORTS ON THE INSPECTION OF THE STATIONS IN
1884.A.—REPORT OF INSPECTION OF THE IRISH AND WELSH STATIONS
WITH DUNGENESS.

TELEGRAPHIC REPORTING STATIONS.

I have the honour to report that on the 15th May I went to Dungeness, taking with me the instruments required for the establishment of the telegraphic reporting station at that point. I found the locality very well suited for the purpose, as the point is very low, and there is, for the distance of several miles, no hill which could affect the wind.

The principal lightkeeper, Mr. Lloyd, seems intelligent, and has already had considerable experience in weather reporting for the Trinity House.

The barometers are erected in his house, the thermometer screen in his garden, and the rain gauge at a little distance from the buildings.

The telegraphic wires have been carried to the signal station, situated in the Redoubt, distant more than a quarter of a mile from the lighthouse. It will be necessary to make some provision for a messenger to carry the reports to the telegraph office. As soon as the reports are quite satisfactory the station will be substituted for Dover.

St. Ann's Head (visited August 20th).—This station calls for no remark.

Parsonstown (visited August 27th).—This station continues very satisfactory, except in the arrangements for observing, the observers being two clerks in land agent's offices, one of whom takes the telegraphic and the other the second order (climatological) observations. It is very desirable that a better system should be introduced.

Belmullet (visited September 10th).—I found that it was necessary to change the observer appointed to this station, and I appointed Miss Mary Tolan, the telegraph clerk, as reporter. The exposure of the thermometers and rain gauge is not improved by the change, as they are now in a garden and not on the open hill side, but I think the arrangement I made is the only one possible. It appears to work well, and the observations have been published since October 1st.

Valencia (visited September 25th).—There is nothing to remark as to the telegraphic reports.

Roche's Point (visited September 26th).—The station was in good order.

Donaghadee (visited October 1st).—There is nothing further to report about this station, which continues quite satisfactory.

Mullaghmore (visited October 3rd).—This station is in good order. It is not yet certain whether Mr. Kerr can continue at Mullaghmore after the close of the current year.

Malin Head (visited October 8th and 9th).—This station is extremely well exposed. It is a signal tower situated on an isolated hill 200 feet high, close to the coast. The sea is visible except between east and south. There are no mountains near to divert the wind.

One barometer is placed in the tower, the other in the observer's bedroom at Slievebawn, distant two miles from the tower. The rain gauge and thermometer screen are placed on the hill top near the tower. The observer is Lloyd's signalman, P. Farren.

Holyhead (visited October 13th).—The reporter at this station (Caleb Durham) has only recently been appointed. He will, I think, make a good observer. The instruments are in good order.

STATIONS FOR THE WEEKLY WEATHER REPORT.

Llandoverry (visited August 19th).—This is a new station. The observer is Mr. Jonah Watkins, bank manager. The site is not very good, as the only space available is that of a small garden. The instruments are not of high quality.

Waterford, Brook Lawn (visited August 22nd).—This is also a new station. The observer is Mr. C. P. Bolton, F.R.Met.Soc. The instruments are good and well exposed, and there is good hope of the station being a permanent one.

Kilkenny, The Castle (visited August 23rd).—This is also a new station, established by the Marquis of Ormonde, who is himself the observer when at home. The arrangements are all satisfactory. I have hopes that this station may become one of the second order.

Foynes, Mount Trenchard (visited September 23rd).—This station continues in the same condition. The observer cannot find a substitute when he is occasionally absent.

Killarney (visited September 26th).—This is a new station situated about a mile from the town. The observer is the Rev. G. Robert Wynne, F.R.Met.Soc. The instruments are of good quality, and the exposure good, except for wind, which is much affected by the proximity of mountains.

STATIONS OF THE SECOND ORDER.

St. David's (visited August 21st).—This station was, as usual, in very good order. The thermometers and rain gauge had at the date of my visit been temporarily placed in a garden, but were very shortly to be moved to a site in an open field.

Galway (visited August 29th).—This is a station which I hope may be made a climatological one. The observer is W. Ryan, assistant to Professor Larmour, Professor of Physics at the Queen's College. The observations are carefully taken, but the exposure of thermometers and rain gauge is not good, being in a garden with many fruit trees in it. The instruments are good.

Dublin, Fitzwilliam Square (visited September 27th).—This station continues as satisfactory as it is possible for a town station, with a limited garden exposure, to be.

Dublin, Glasnevin (visited September 30th).—The observations are very well taken, and the station in good order.

Dublin, Mountjoy Barracks (visited October 11th).—The new scaffolding for the anemometer and sunshine recorder has been erected. The station is in complete order.

Colebrooke (visited October 2nd).—This station is in good condition, but some doubt exists as to its height above sea level, which inquiry at the Ordnance Survey Office at Mountjoy Barracks failed to remove. It will be necessary to have the ground re-levelled for a distance of about two miles from the nearest Ordnance Bench Marks.

Markree (visited October 4th).—This station is in good order, Mr. Marth taking much interest in the work. He has, however, no assistant at present.

Londonderry (visited October 7th).—This station is in a fairly good condition. The observer, J. Conroy, was absent on the day of my visit, but his son was quite competent to act as his substitute.

OBSERVATORIES.

Valencia (visited September 25th).—The new anemometer has been put up, and works quite satisfactorily. The other instruments continue in good order.

I find that a new gate is required for the yard, and some other minor repairs were ordered to be taken in hand.

If the Council contemplate the erection of an electrical anemometer, it will be necessary to bear in mind that the Post Office telegraphic Linesman lives at Rossbeigh, at a distance of over 20 miles from the island.

Armagh (visited October 2nd).—The photographic self-recording apparatus at this station has been packed up by Mr. Whipple awaiting the decision of the Council as to its disposal. It will be necessary to supply some instruments to the observatory to enable Dr. Dreyer to carry on his observations.

THERMOMETERS.

The following table gives the results of comparisons made with Inspector's standard No. 3,349, and the thermometers at the different stations, the readings of the standard being corrected for instrumental errors, none of the Kew corrections for the station thermometers, however, being allowed for:—

STATIONS.	Dry Bulb.	Wet Bulb.	Max.	Min.	Spare Therm.	Notes.
Colbrook	-0.3	+0.2	+0.1	+0.2	—	
Dublin (City)	-0.3	-0.3	-0.8	+0.2	—	
Dublin (Phoenix Park)	-0.8	-0.3	-0.3	0.0	-0.3	Grass min. -0° 1.
Glasnevin	+0.1	-0.2	-0.5	+0.7	—	Grass min. +1° 7.
Londonderry	-0.1	-0.1	-1.0	+0.2	-0.2	
Markree Castle	-0.1	-0.1	+0.1	+0.1	—	
Parsonstown	-0.6	-0.1	-0.2	+0.1	—	
St. Davids	-0.2	-0.3	+0.3	-0.2	—	Grass min. -0° 1.

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

Donaghadee	-1	+3	-1	-5	—
Mullaghmore	-3	-2	+1	-2	-1
Parsonstown	+6	+1	-1	-3	—
Valencia	+4	+1	+9	-2	+8
Rocha's Point	+3	+3	+9	-8	—
Holyhead	+1	+2	+3	0	+1.0
Colbrook	+3	+5	-3	+1	+5

WEEKLY WEATHER REPORT STATIONS.

Foynes	+4	+1	+1	-4	—	Wet bulb was too wet, glass too near bulb.
Galway	+3	0	-2	-1.0	—	
Waterford	+2	+3	+1.2	-3	—	Grass min. -0° 5.

(Signed) ROBERT H. SCOTT.

B.—REPORT OF THE INSPECTION OF THE ENGLISH STATIONS.

The state of my health precluding me from taking the whole work of inspection this year, Mr. D. Wilson Barker, F.R.Met.Soc., undertook a large portion of the task for me, and was, at my recommendation,

OBSERVATORIES.

Valencia (visited September 25th).—The new anemometer has been put up, and works quite satisfactorily. The other instruments continue in good order.

I find that a new gate is required for the yard, and some other minor repairs were ordered to be taken in hand.

If the Council contemplate the erection of an electrical anemometer, it will be necessary to bear in mind that the Post Office telegraphic Linesman lives at Rossbeigh, at a distance of over 20 miles from the island.

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THERMOMETERS.

The following table gives the results of comparisons made with Inspector's standard No. 3,349, and the thermometers at the different stations, the readings of the standard being corrected for instrumental errors, none of the Kew corrections for the station thermometers, however, being allowed for:—

STATIONS.	Dry Bulb.	Wet Bulb.	Max.	Min.	Spare Therm.	Notes.
Colbrooke - -	-0.3	+0.2	+0.1	+0.2	—	
Dublin (City) -	-0.3	-0.3	-0.8	+0.2	—	
Dublin (Phoenix Park) -	-0.8	-0.3	-0.3	0.0	-0.5	Grass min. -0° 1.
Glasnevin - -	+0.1	-0.2	-0.5	+0.7	—	Grass min. +1° 7.
Londonderry - -	-0.4	-0.4	-1.0	+0.2	-0.2	
Markree Castle -	-0.1	-0.1	+0.1	+0.1	—	
Parsonstown - -	-0.6	-0.4	-0.2	+0.4	—	
St. Davids - -	-0.2	-0.3	+0.3	-0.2	—	Grass min. -0° 1.

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

Donaghadee - -	-1	+3	-1	-5	0	
Mullaghmore - -	-3	-2	+1	-2	-1	
Parsonstown - -	+6	+4	-1	-3	—	
Valencia - -	+4	+4	+0	-2	+8	
Roche's Point - -	+3	+3	+9	-8	—	
Holyhead - -	+4	+2	+3	0	+10	
Pembroke - -	+6	+5	-3	+1	+5	

WEEKLY WEATHER REPORT STATIONS.

Foynes - -	+4	+4	+4	-4	—	Wet bulb was too wet, glass too near bulb.
Galway - -	+3	0	-2	-10	—	
Waterford - -	+2	+3	+12	-3	—	Grass min. -0° 5.

(Signed) ROBERT H. SCOTT.

B.—REPORT of the INSPECTION of the ENGLISH STATIONS.

The state of my health precluding me from taking the whole work of inspection this year, Mr. D. Wilson Barker, F.R.Met.Soc., undertook a large portion of the task for me, and was, at my recommendation,

appointed deputy inspector of the stations in the north and east of England for this year.

His report is as follows :—

TELEGRAPHIC REPORTING STATIONS.

Brixton.—Everything in excellent condition, and observations taken regularly.

Loughborough.—All instruments in excellent order and carefully attended to. The position of the screen is not very good, being in a garden with wall round. No better place is available.

Liverpool.—I tested the observatory standard thermometer with which the other thermometers (used for reporting) are frequently tested, and they only differed $0^{\circ} \cdot 1$.

Barrow-in-Furness.—All instruments clean and in good order, and are well attended to. But the position of the screen is bad, partly surrounded by shrubs, and facing a wall.

N. Shields.—The screen has been shifted nearer edge of square since last inspection, but this will not affect the results much. The wind's direction has always been reported as magnetic, under the impression that it was true direction. Rain-gauge rim rather out of order. Other instruments clean.

York.—The position of the instruments here is fairly good, the screen being somewhat sheltered by large trees. Observations are taken by one of the gardeners employed in the grounds.

Spurn Point.—Since the last inspection the screen has been turned round, as directed by Mr. Ley, and now faces N.N.W. (true). All instruments in good order, and observations carefully attended to.

Yarmouth.—All instruments clean and in good order. The screen is not well placed, having its back resting against a wall, but it faces N. $\frac{1}{2}$ E. (true). The position cannot well be altered.

Cambridge.—Instruments clean and in good order. Screen somewhat sheltered by shrubs.

STATIONS of the SECOND ORDER.

Chatham.—The observers take a good deal of trouble over the observations, but owing to the school duties, they are liable to be interrupted, and the instruments, though in good positions, are scattered. The screen faces in a southerly direction. Wet bulb very foul.

Leicester.—Instruments clean and in good order. The vane used for reporting the direction of the wind points magnetic.

Sheffield, Weston Park.—This is a new and good station. The instruments have a good exposure, but the screen is painted green, the Museum Committee objecting to the white paint. The observer, living some distance from the museum, finds it difficult to attend to the evening observations. A wooden frame barometer is in use, but the Museum Committee might procure a proper instrument if the Council proposed it to them, as the observations would then be much more valuable. Suitable station for an anemometer.

Prestwich.—Instruments in good position, clean, and well attended to.

Isle of Man, Cronkbourne.—This is an excellent station. All instruments in good order and great care taken with the observations.

Peel.—Since the last inspection the instruments have been shifted, and are now in a yard at the back of the observer's house. The position is not very good. The observations are carefully taken. The

instruments all clean. If the screen could be moved on to a grass plot on one side of the house it would be better.

Newton Reigny.—A new and excellent station, in charge of a careful observer. Everything in perfect order.

Aysgarth.—Everything in excellent order.

Durham.—The rain gauge shaky. All other instruments clean and in good order.

Seaham.—Instruments in good order. Screen shaky, and sheltered a little by shrubs. The anemometer works very well.

Geddeston.—Solar radiation thermometer out of order. All other instruments in excellent order. Allowances are made for error in solar radiation thermometer. Observations very carefully taken.

Saffron Walden.—Instruments clean and in good order. A new wet-bulb thermometer has been in use since last inspection. From the position of this station, on a gently sloping hill, the wind's direction will not show truly for the neighbourhood. The observer having no assistants, and his time much occupied, finds it impossible to get observations at times.

Oscott.—It being vacation time the observer was absent, and the gardener takes the thermometer readings. No one there could read the barometer correctly. Position of instruments good, and it is to be regretted that the observations cannot be kept up properly.

Stokesay.—The screen has been shifted since last inspection, as suggested by Mr. Ley, and now faces E.N.E. (true). The barometer is much out, reading $\cdot 054$ higher than the standard instrument. The observations are well attended to.

STATIONS FOR THE WEEKLY WEATHER REPORT.

Alnwick.—Observations taken regularly. The thermometers are of Six's pattern, fitted in a window about 21 feet from the ground. The anemometer gives some extraordinary results, giving great velocity for southerly and south-westerly wind, and registering small velocities for northerly winds of apparently the same force. It is situated at the east corner of one of the castle towers, and is no doubt affected by up-drafts. The cups are at far too great a distance from the registering drum to give good results.

Cirencester.—The thermometers used here are unverified and mounted on wood, stems not graduated, but only read $0\cdot 1$ different from the standard thermometer; tested in water. This station is in a good position, and would be very suitable for a Second Order Station, if arrangements could be made for the observations to be taken.

(Signed) D. W. BARKER.

I have incorporated the instrumental comparisons made by Mr. Barker with those made by myself in the tables appended to this Report.

The following stations in the south and west of England were inspected by me this year:—

TELEGRAPHIC REPORTING STATIONS.

Praeger Point (inspected September 17th).—The observer, Mr. J. John, and, in his occasional absence, the chief boatman, Mr. Kessell, continue to conduct the observations with great care. The instruments were all in excellent order. Gave instructions as to the temporary

instruments all clean. If the screen could be moved on to a grass plot on one side of the house it would be better.

Newton Reigny.—A new and excellent station, in charge of a careful observer. Everything in perfect order.

Aysgarth.—Everything in excellent order.

Durham.—The rain gauge shaky. All other instruments clean and in good order.

Seaham.—Instruments in good order. Screen shaky, and sheltered a little by shrubs. The anemometer works very well.

Geldeston.—Solar radiation thermometer out of order. All other instruments in excellent order. Allowances are made for error in solar radiation thermometer. Observations very carefully taken.

Saffron Waldon.—Instruments clean and in good order. A new wet-bulb thermometer has been in use since last inspection. From the position of this station, on a gently sloping hill, the wind's direction will not show truly for the neighbourhood. The observer having no assistants, and his time much occupied, finds it impossible to get observations at times.

Oscott.—It being vacation time the observer was absent, and the gardener takes the thermometer readings. No one there could read the barometer correctly. Position of instruments good, and it is to be regretted that the observations cannot be kept up properly.

Stokesay.—The screen has been shifted since last inspection, as suggested by Mr. Ley, and now faces E.N.E. (true). The barometer is much out, reading $\cdot 054$ higher than the standard instrument. The observations are well attended to.

STATIONS FOR THE WEEKLY WEATHER REPORT.

Alnwick.—Observations taken regularly. The thermometers are of Six's pattern, fitted in a window about 21 feet from the ground. The anemometer gives some extraordinary results, giving great velocity for southerly and south-westerly wind, and registering small velocities for northerly winds of apparently the same force. It is situated at the east corner of one of the castle towers, and is no doubt affected by up-drafts. The cups are at far too great a distance from the registering drum to give good results.

Cirencester.—The thermometers used here are unverified and mounted on wood, stems not graduated, but only read $0^{\circ} \cdot 1$ different from the standard thermometer; tested in water. This station is in a good position, and would be very suitable for a Second Order Station, if arrangements could be made for the observations to be taken.

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The following stations in the south and west of England were inspected by me this year:—

TELEGRAPHIC REPORTING STATIONS.

Prawle Point (inspected September 17th).—The observer, Mr. J. John, and, in his occasional absence, the chief boatman, Mr. Kessell, continue to conduct the observations with great care. The instruments were all in excellent order. Gave instructions as to the temporary

shifting of the barometers, necessary on account of the re-painting of the room. They have been moved without injury.

Seilly (September 21st to 23rd).—The observer's health some time since broke down, but it has been again restored, and the observations are carefully conducted. Such steps as I was able to take to secure the services of a deputy have been explained in two letters to the Secretary. The thermometers and barometers were in good order. Portions of the anemometer were somewhat corroded, and the clock, which had stopped on the day of my arrival, much required cleaning. I therefore dismounted the instruments, and with the assistance of a watchmaker from Penzance, cleaned and repaired them, with the exception of the brush of the vane, which is totally worn away. Ordered the exterior of the anemometer case to be re-painted. The traces of the anemograph are still occasionally faint, owing to the salt and moisture. The rain gauge required some slight repairs.

Jersey (visited October 4th).—The observations are faultlessly conducted, and the instruments are in excellent order.

Hurst Point (visited October 17th).—The instruments were all in good order. Mr. Appleton continues to read the barometers correctly and the thermometers somewhat roughly. The rain gauge required rectifying. The tube and cap of the thermometer screen had gone to pieces, so that rain occasionally found access to the instruments. I had a new tube and cap made at Lymington.

STATIONS of the SECOND ORDER and for the WEEKLY WEATHER REPORT.

Arlington Court (inspected September 16th).—The instruments at this station appear to be very well attended to. The exposure of all of them is most admirable, and I am of opinion that the situation is most favourable for a Second Order Station, should Lady Chichester consent to its institution as such.

Totnes (September 18th).—At this station of the Second Order the observations are well conducted, and the records well filled. The position and condition of the instruments are unexceptionable.

Plymouth (inspected September 18th).—The observer, Mr. J. Merrifield, Ph.D., F.R.A.S., conducts the work at this Weekly Weather Reporting Station with much care, but the exposure of none of the instruments, excepting the sunshine recorder, is good, and it seems improbable that a better will be obtained.

Helston (September 25th).—The observer, Mr. Gill, who is a school-master, is fairly accurate and painstaking. The observations were interrupted in January and February of this year owing to an outbreak of fever in the observer's house. The barometer, by Casella is in a brass frame, has not been verified at Kew, but has been compared for a long period with the observatory standard at Falmouth, and has a correction of $+0.10$ uniform throughout the scale. The field in which the rain gauge has hitherto been placed, having been converted into arable land, the instrument has been shifted into the observer's kitchen garden. It is not here properly exposed, and I should recommend that it be fixed to the summit of a stone pillar at the end of the garden, for, although its rim would thus be more than 5 feet above the ground, the exposure would be a great deal more satisfactory.

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St. Aubin's, Jersey (visited October 6th).—All the instruments at this station were found to be, as usual, in excellent order, and the records are very complete.

Southampton (October 16th).—The utmost care is taken in the observations made at this station, and I found the instruments to be all in the best condition.

St. Leonard's (October 20th).—The observations at this station are carefully taken, and the instruments are well attended to.

St. Edmund's College, Ware (October 20th).—This new station of the Second Order is situated on a hill, and has an excellent exposure. The observer is the Rev. B. Ward, who formerly assisted in taking the observations at Oscott. The barometer, which is in laboratory of the College, stood close to the fireplace and was too high above the floor to be read with ease. I requested that it should be removed to a more convenient position. The thermometer screen and rain gauge are near the middle of a large lawn on the west or front side of the College. I ordered that the screen should be turned round, so as to open to the north, instead of the south, as it did at the date of my visit.

Cooper's Hill (inspected October 21st).—The instruments of this Second Order Station are in excellent condition, but the evening observations are still taken at 3 p.m. instead of at 9 p.m. The barometer, which is a very good instrument, has been verified at Kew since my last inspection.

Harpden (inspected October 23rd).—The mean temperature at this station, after allowance is made for altitude, appear about 1° too low. I am unable to say with precision to what cause this circumstance is due. It is conceivable that this may be partly due to the use of the screen "Stow's No. 2."

Bethamstead (October 23rd).—At this Weekly Weather Reporting Station the thermometers are those quoted for Harpenden. The rain gauges are in good order and the rainfall record well kept.

Table I. shows the results of the barometric comparisons made this year at the English stations. In Table II. the differences between the observer's and inspector's readings of the thermometer, and also the differences between the readings of the thermometers in water and those of the inspector's standards are tabulated. Mr. Barker employed the mercurien No. 3,538 as his standard; and I used two thermometers, viz. T. 1,314 and Casell's 20,523. There was occasionally a trivial difference between the readings of the two latter instruments, and in these instances the mean of the two (corrected) readings is given as that of the standard.

The readings of the inspector's standard barometer employed for the comparisons in Table I. are throughout corrected for index error, those of the reporting and spare barometers uncorrected.

St. Aubin's, Jersey (visited October 6th).—All the instruments at this station were found to be, as usual, in excellent order, and the records are very complete.

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St. Edmund's College, Ware (October 20th).—This new station of the Second Order is situated on a hill, and has an excellent exposure. The observer is the Rev. B. Ward, who formerly assisted in taking the observations at Oscott. The barometer, which is in laboratory of the College, stood close to the fireplace and was too high above the floor to be read with ease. I requested that it should be removed to a more convenient position. The thermometer screen and rain gauge are near the middle of a large lawn on the west or front side of the College. I ordered that the screen should be turned round, so as to open to the north, instead of the south, as it did at the date of my visit.

Cooper's Hill (inspected October 21st).—The instruments of this Second Order Station are in excellent condition, but the evening observations are still taken at 3 p.m. instead of at 9 p.m. The barometer, which is a very good instrument, has been verified at Kew since my last inspection.

Harpenden (inspected October 23rd).—The mean temperature at this station, after allowance is made for altitude, appear about 1° too low. I am unable to say with precision to what cause this circumstance is due. It is conceivable that this may be partly due to the use of the screen "Stow's No. 2."

Rothamsted (October 23rd).—At this Weekly Weather Reporting Station the thermometers are those quoted for Harpenden. The rain gauges are in good order and the rainfall records well kept.

Table I. shows the results of the barometric comparisons made this year at the English stations. In Table II. the differences between the observer's and inspector's readings of the thermometers and also the differences between the readings of the thermometers in water and those of the inspector's standards are tabulated. Mr. Barker employed the instrument No. 3,348 as his standard; and I used two thermometers, B. T. 1,314 and Casella 30,523. There was occasionally a trivial difference between the readings of the two latter instruments, and in these instances the mean of the two (corrected) readings is given as that of the standard.

The readings of the inspector's standard barometer employed for the comparisons in Table I. are throughout corrected for index error, those of the reporting and spare barometers uncorrected.

TABLE I.—BAROMETERS at the ENGLISH STATIONS.

Station.	Reporting Barometer.			Check Barometer.	
	Height of Mercury.	Difference of Observer's from Inspector's Reading.	Error of Instrument as compared with Standard.	Height of Mercury.	Difference of Observer's from Inspector's Reading.
Aysgarth - - -	29'513	+ '003	+ '012	—	—
Barrow-in-Furness - -	30'163	- '001	—	30'013	+ '008
Brixton - - -	30'127	- '002	—	—	—
Cambridge - - -	30'152	- '001	—	—	—
Chatham - - -	29'915	- '002	- '010	—	—
Cooper's Hill - - -	30'058	- '001	—	—	—
Cronkbourne - - -	30'151	- '001	—	—	—
Durham - - -	29'759	+ '002	- '001	—	—
Geldeston - - -	30'187	- '002	—	—	—
Harpenden - - -	29'530	- '010	—	—	—
Helston - - -	30'068	+ '001	—	—	—
Hurst Castle - - -	30'454	'000	—	30'151	- '001
Jersey - - -	30'363	'001	—	30'371	+ '001
Leicester - - -	30'023	- '010	+ '020	—	—
Loughborough - - -	30'076	- '002	—	—	—
Newton Reigny - - -	29'571	+ '003	- '010	—	—
Oscott - - -	29'665	—	+ '003	—	—
Peel - - -	30'076	—	- '004	—	—
Prawle Point - - -	30'037	- '001	—	30'030	- '003
Prestwich - - -	29'719	- '005	- '001	—	—
Saffron Walden - - -	30'023	+ '001	—	—	—
St. Aubyn's - - -	30'335	'000	—	—	—
St. Leonard's - - -	30'325	+ '001	—	—	—
Scilly - - -	30'090	'000	—	30'091	+ '001
Seaham - - -	29'892	+ '001	+ '022	—	—
Sheffield - - -	29'950	+ '001	+ '000	—	—
Do. Weston Park - -	29'780	—	- '001	—	—
Shields, N. - - -	29'033	- '001	—	29'161	- '005
Southampton - - -	30'375	'000	—	—	—
Spurn Head - - -	29'981	+ '001	—	29'983	+ '001
Stokesay - - -	29'981	+ '011	+ '061	—	—
Ware, St. Edmund's College - - -	30'022	- '002	—	—	—
Yarmouth - - -	30'059	+ '001	—	29'045	- '002
York - - -	29'913	+ '003	- '001	—	—

TABLE I.—BAROMETERS at the ENGLISH STATIONS.

Station.	Reporting Barometer.			Check Barometer.	
	Height of Mercury.	Difference of Observer's from Inspector's Reading.	Error of Instrument as compared with Standard.	Height of Mercury.	Difference of Observer's from Inspector's Reading.
Aysgarth - - -	29.513	+ '003	+ '012	—	—
Barrow-in-Furness - -	30.103	- '001	—	30.043	+ '008
Brixton - - -	30.127	- '002	—	—	—
Cambridge - - -	30.152	- '004	—	—	—
Chatham - - -	29.915	- '002	- '010	—	—
Cooper's Hill - - -	30.058	- '001	—	—	—
Cronkbourne - - -	30.151	- '001	—	—	—
Durham - - -	29.759	+ '001	- '001	—	—
Geldeston - - -	30.187	+ '002	—	—	—
Harpenden - - -	29.590	- '010	—	—	—
Helston - - -	30.068	+ '001	—	—	—
Hurst Castle - - -	30.456	'000	—	30.451	- '001
Jersey - - -	30.368	'000	—	30.371	+ '001
Leicester - - -	30.029	- '019	+ '030	—	—
Loughborough - - -	30.076	- '002	—	—	—
Newton Reigny - - -	29.571	+ '003	- '010	—	—
Oscott - - -	29.665	—	+ '006	—	—
Peel - - -	30.076	—	- '004	—	—
Prawle Point - - -	30.037	- '001	—	30.039	- '003
Prestwich - - -	29.749	- '005	- '001	—	—
Saffron Walden - - -	30.023	+ '001	—	—	—
St. Anbun's - - -	30.335	'000	—	—	—
St. Leonard's - - -	30.325	+ '001	—	—	—
Scilly - - -	30.090	'000	—	30.091	+ '001
Seaham - - -	29.892	+ '001	+ '022	—	—
Sheffield - - -	29.950	+ '001	+ '009	—	—
Do. Weston Park - -	29.780	—	- '004	—	—
Shields, N. - - -	29.933	- '001	—	29.931	- '005
Southampton - - -	30.375	'000	—	—	—
Spurn Head - - -	29.981	+ '001	—	29.980	+ '001
Stokesay - - -	29.984	+ '011	+ '061	—	—
Ware, St. Edmund's College. - - -	30.022	- '002	—	—	—
Yarmouth - - -	30.059	+ '001	—	30.046	- '005?
York - - -	29.945	+ '003	- '001	—	—

TABLE II.—THERMOMETERS at the ENGLISH STATIONS.

STATION.	DATE.	DRY BULB.				WET BULB.				MAXIMUM.				MINIMUM.				SPARE, OR GLASS.			
		Difference of Observer's Readings.	Correction to be applied according to the Inspector's Standard.	Latest Kew Correction.	Temperature of Water according to Reading of Thermometer.	Difference of Observer's Readings.	Correction to be applied according to the Inspector's Standard.	Latest Kew Correction.	Temperature of Water according to Reading of Thermometer.	Difference of Observer's Readings.	Correction to be applied according to the Inspector's Standard.	Latest Kew Correction.	Temperature of Water according to Reading of Thermometer.	Difference of Observer's Readings.	Correction to be applied according to the Inspector's Standard.	Latest Kew Correction.	Temperature of Water according to Reading of Thermometer.	Difference of Observer's Readings.	Correction to be applied according to the Inspector's Standard.	Latest Kew Correction.	Temperature of Water according to Reading of Thermometer.
Arlington Court	September 16th	—	+ .05	?	63.2	—	— .05	?	63.3	—	— .55	?	63.8	—	+ .95	?	62.3	—	—	—	—
Aysgarth	August 8th	—	—	—	65.5	—	—	—	65.8	—	—	—	65.7	—	—	—	65.2	—	—	—	65.8
Barrow-in-Furness	August 6th	—	— .3	?	66.2	—	— .3	?	66.2	—	+ .1	?	65.8	—	+ .1	?	65.8	—	—	—	—
Brixton	July 28th	—	— .1	—	62.8	—	— .1	—	62.8	—	+ .2	—	62.5	—	+ .1	—	62.6	—	—	—	—
Cambridge	August 16th	—	— .8	—	67.6	—	— .7	—	67.5	—	— .8	—	67.6	—	+ .5	—	66.3	—	—	—	—
Chatham	July 25th	— .1	— .1	— .1	63.0	+ .2	— .8	— .8	63.8	.0	+ .6	+ .1	62.4	.0	.0	— .1	63.0	.0	— 1.0	?	64.0
Cirencester	August 22nd	—	—	—	—	—	—	—	—	—	— .2	—	60.2	—	— .2	—	60.2	—	—	—	—
Cooper's Hill	October 21st	+ .1	— .05	— .2	60.9	.0	— .05	— .2	60.9	+ .1	+ .15	— .1	60.7	+ .1	+ .45	+ .2	60.4	+ .1	+ .05	— .1	60.8
Cronkbourne	August 5th	.0	— .8	.0	66.0	— .1	— .1	.0	65.3	+ .1	— .2	.0	65.4	.0	+ .3	+ .1	64.9	—	.0	?	65.2
Durham	August 9th	—	— 1.2	—	59.7	—	— 1.2	—	59.7	—	— 1.0	—	59.5	—	+ .5	—	58.0	—	+ .1	—	58.4
Geldeston	August 15th	.0	— .3	+ .2	66.4	.0	— .7	— .1	66.8	.0	— .2	— .1	66.3	.0	— .1	— .1	66.2	—	— .2	—	66.3
Harpندن	October 23rd	+ .1	+ .45	?	52.9	+ .1	+ .35	?	52.9	.0	— .05	?	53.1	+ .2	+ .2	?	52.7	—	—	—	—
Helston	September 25th	—	— .15	?	57.9	—	— .25	?	58	—	— .15	?	57.9	—	+ .45	?	57.3	—	—	—	—
Hurst Point	October 17th	—	+ .05	—	55.7	—	— .25	—	56.0	—	+ .05	—	55.7	—	+ .65	—	54.9	—	—	—	—
Jersey	October 4th	—	— .1	?	57.9	—	— .2	?	58.0	—	— .1	?	57.9	—	+ .2	?	57.6	—	—	—	—
Leicester	July 30th	+ .1	— .1	?	59.2	+ .2	— .1	?	59.2	+ .2	— .1	?	59.2	+ .3	+ .4	?	58.7	— .3	+ .2.3	?	56.8
Liverpool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	— .25	—	65.35
Loughborough	July 30th	—	— .8	?	63.7	—	— .9	?	63.8	—	— .3	?	63.2	—	— .1	?	63.0	—	—	—	—
Newton Reigny	August 7th	+ .1	— 1.0	— 1.5	58.8	.0	— 1.0	— .4	58.8	.0	— .8	— .3	58.6	.0	.0	.0	57.8	.0	+ .2.7	+ .2	55.1
Oscott	August 20th	.0	— .7	?	60.4	.0	— .6	?	60.3	— .1	— .3	?	60.0	.0	— .1	?	59.8	—	—	—	—
Peel	August 5th	— .1	— .5	— .1	59.8	— .1	— .3	.0	59.6	— .1	+ .2	+ .1	59.1	.0	+ .2	.0	59.1	—	—	—	—
Plymouth	September 18th	—	+ .15	—	67.5	—	+ .25	?	67.4	—	— .15	?	67.8	—	+ .75	?	66.9	—	—	—	—
Prawle Point	September 17th	—	— .15	—	63.7	—	— .25	—	63.8	—	— .15	—	63.7	—	+ .25	—	63.3	—	+ .05	—	63.5
Prestwich	August 1st	.0	— .3	— .3	81.4	.0	— .2	— .3	81.3	.0	— .1	— .5	81.2	.0	— .1	— .2	81.2	+ .2	—	.0	—
Rothamsted	October 23rd	—	+ .45	—	52.5	—	+ .35	—	52.6	—	— .05	—	53.0	—	+ .35	—	52.6	—	+ .75	—	52.2
Saffron Walden	August 16th	+ .2	— .8	?	61.0	.0	— .8	?	61.0	.0	— .6	+ .2	60.8	.0	+ .2	.0	60.0	+ .1	—	+ .2	—
St. Aubyn's, Jersey	October 6th	.0	+ .1	?	59.8	+ .1	+ .3	?	59.6	.0	+ .1	?	59.8	.0	+ .2	?	59.7	.0	.0	?	59.9
St. Leonard's	October 20th	.0	— .35	— .4	55.9	.0	— .45	— .4	56.0	.0	.0	+ .1	56.0	.0	.0	+ .1	56.0	—	—	—	—
Scilly	September 21st-23rd	—	— .05	—	61.2	—	+ .15	—	61.0	—	— .25	—	61.4	—	+ .25	—	59.9	—	— .05	—	61.2
Seaham	August 11th	.0	— .9	.0	63.8	— .1	— .5	.0	63.4	+ .1	— .1	.0	63.0	.0	— .1	.0	63.0	—	—	—	—
Sheffield	July 31st	+ .1	—	— 1.0	—	.0	—	— .5	—	—	—	—	—	—	—	—	—	—	—	—	—
Do., Weston Park	July 31st	—	— 1.6	—	66.8	—	— .2	—	65.4	—	— 1.2	—	66.4	—	.0	—	65.2	—	—	—	—
Shields, N.	August 11th	—	— .3	?	65.0	—	— .3	?	65.0	—	— .1	?	64.8	—	+ .6	?	64.1	—	—	—	—
Southampton	October 16th	+ .1	.0	— .2	52.9	+ .1	.0	— .1	52.9	.0	— .4	— .6	53.3	.0	+ .3	— .1	52.6	.0	+ .5	.0	52.4
Spurn Head	August 13th	—	— .4	?	69.2	—	— .6	?	69.4	—	— .1	?	68.9	—	+ .1	?	68.7	—	—	—	—
Stokesay	August 21st	— .1	— .3	— .3	54.2	— .1	— .4	— .1	54.3	.0	+ .3	— .2	53.6	+ .2	.0	+ .3	53.9	— .3	+ .2	?	53.7
Totnes	September 18th	— .1	— .1	?	67.9	— .1	— .1	?	67.9	.0	— .1	?	67.9	.0	.0	?	67.8	.0	— .1	?	67.9
Ware, St. Edmund's College	October 20th	—	+ .05	?	54.7	—	— .05	?	54.8	—	— .15	?	54.9	—	+ .25	?	54.5	—	—	—	—
Yarmouth	August 14th	—	+ .1	?	67.0	—	— .7	?	67.8	—	+ .1	?	67.0	—	+ 1.1	?	66.0	—	—	—	—
York	August 12th	—	— .4	?	70.0	—	— .4	?	70.0	—	— .6	?	70.2	—	+ .6	?	69.0	—	—	—	—
York (Second Order)	August 12th	+ .1	— .4	?	70.0	.0	— .4	?	70.0	.0	— .2	?	69.8	+ .2	+ .1	?	69.5	—	—	—	—

C.—REPORT OF INSPECTION of the SCOTTISH STATIONS.

BAROMETERS.

The barometers at the various stations were compared with inspector's mercurial standard barometer No. 588, and I have again the satisfaction to report that this standard barometer has not yet once been detected to be out of order. On all tours of inspection it was compared some days before leaving, and some days after returning to, Edinburgh, with Board of Trade Standard No. 958, which remains constantly in my house. The small aneroid No. 11 was also read at each inspection, since such readings, which are quite unsuitable for trustworthy comparison, might possibly be of use in case of an accident occurring to any of the barometers.

The following table gives the corrected readings of standard No. 588, and the uncorrected readings of the reporting and check barometers at each of the stations, and it will be seen that all the instruments continue to be in excellent order:—

STATIONS.	Inspector's Standard No. 588. Corrected.	Reporting Barometer. Uncorrected.	Check Barometer. Uncorrected.	REMARKS.
Laudale - -	29·825	29·828	—	House under repair. Check barometer dismantled.
Stornoway - -	30·030	30·028	30·029	
Sandwick - -	29·767	29·780	—	
Dunrossness - -	29·463	29·462	29·465	
Wick - -	29·558	29·558	—	In shop.
Do. - -	29·488	—	29·490	In house.
Dunrobin - -	29·698	29·797	—	
Inverness - -	29·556	29·556	—	
Nairn - -	29·445	29·444	29·443	
Aberdeen - -	30·164	30·166	—	In post office.
Do. - -	30·117	—	30·118	In house.
Braemar - -	29·250	29·260	—	
Dundee - -	30·072	30·070	—	
Glenalmond - -	29·455	29·454	—	
Leith - -	29·774	29·765	—	In post office.
Do. - -	29·753	—	29·746	In house.
Pinnore - -	29·383	29·381	—	
Rothsay - -	29·765	29·766	—	
Ardrossan - -	30·094	30·092	—	In post office.
Do. - -	30·062	—	30·061	In house at Saltcoats.
Observatory, King's College, Aberdeen	30·229	30·230	—	

The results of comparisons made with inspector's standard thermometer No. 2,522, and the thermometers at the different stations,

and at Aberdeen Observatory, are given in the following table. The readings of the standard have been corrected for instrumental errors, but none of the Kew corrections for the station thermometers, however, have been allowed for :—

STATIONS.	Standard No. 2529 Corrected.	Dry Bulb.	Wet Bulb.	Space Ther- mometer.	Maximum Thermo- meter.	Minimum Thermo- meter.	Time in Water in Minutes.	Change of Tempera- ture of Water.	Notes.
Landale -	60.7	+0.2	+0.1	—	+0.2	+0.2	116	+0.4	Hygrometer broken. New one ordered.
Stormoway -	54.8	+0.6	+0.5	+0.1	-0.3	-0.5	30	Uniform	
Sandwick -	59.0	+0.2	-0.1	—	+0.5	-0.5	120	+0.5	
Dunrossness -	57.7	+0.3	+0.4	+0.2	+0.3	+0.7	165	+0.3	
Wick -	62.8	+0.3	+0.4	—	-0.1	+0.1	30	-0.2	
Duncolin -	61.3	-0.1	-0.5	—	+0.6	+0.6	100	Uniform	
Inverness -	54.6	—	—	—	0.0	+0.1	100	Do.	
Nairn -	55.2	+0.2	+0.7	+0.7	-0.1	+1.0	135	+0.2	
Aberdeen -	61.5	+0.1	+0.5	+0.1	+0.5	+0.1	130	Uniform	
Braemar -	62.6	+0.5	+0.5	—	+0.5	-0.1	150	Do.	
Dumfries -	57.0	+0.5	+0.5	—	+1.4	-0.1	80	Do.	
Glenalmond -	55.1	+0.1	+0.1	—	+0.1	-0.3	60	Do.	
Leith -	56.2	+0.2	+0.5	—	0.0	-0.2	50	Do.	
Pinnoke -	48.8	+0.2	+0.3	—	-0.3	-0.1	80	-0.2	
Rothsay -	47.1	+0.1	0.0	—	0.0	-0.3	180	Uniform	
Aberdeen Observatory	49.7	+0.5	+0.1	+0.1	0.0	-0.3	70	Do.	
King's Col- lege -	56.8	+0.2	+0.3	—	+0.2	-0.1	780	Do.	Observatory. In Stevenson's screen.
Do.	59.8	+0.2	+0.1	—	+0.2	+0.2	180	Do.	

Landale (inspected August 19th).—The instruments were all in good order, and the observations appear to be carefully made. At the time of inspection the house was undergoing extensive repairs, the whole of the interior being nearly gutted. The check barometer was packed away in its box. The reporting barometer was not then removed, but in a few days it was to be taken from its place for a short time. As Mr. Fletcher quite understands the handling of his barometer, it is not supposed that any injury will happen to the instruments during the changes.

As requested, I examined the observation book for 1880, which is one that was supplied by Mr. Newton and has no columns for clouds. In July of that year Mr. Fletcher was from home nearly the whole month, when the observations were made by his brother. These observations Mr. Fletcher seems to have understood at the time, but evidently he cannot now interpret them so as to give the details of cloud correctly, as desired by the Office.

Stormoway (inspected August 25th).—The thermometer screen and rain gauge were removed October 11th, 1883, to the positions indicated in last year's report. These positions are good, and all the instruments were in good order.

Sandwick (inspected August 27th).—The instruments were in excellent order, and to meet contingencies, another of Dr. Clouston's servants, Ann Souter, had been taught to observe, which she does quite correctly.

The orientation of the anemograph was examined. The cardinal points on the horizon were determined by magnetic compass, a variation of about 23° being allowed for. These points agreed with the points determined by Mr. Scott some years ago. Referring the indication of

and at Aberdeen Observatory, are given in the following table. The readings of the standard have been corrected for instrumental errors, but none of the Kew corrections for the station thermometers, however, have been allowed for:—

STATIONS.	Standard No. 2522, Corrected.	Dry Bulb.	Wet Bulb.	Spare Thermometer.	Maximum Thermometer.	Minimum Thermometer.	Time in Water in Minutes.	Change of Temperature of Water.	Notes.
Laudale -	60.7	+0.2	+0.1	—	+0.2	+0.2	110	+0.4	
Stornoway -	54.8	+0.6	+0.5	+0.4	-0.3	-0.5	90	Uniform	
Sandwick -	56.0	+0.2	-0.1	—	+0.5	-0.5	120	+0.5	
Dunrossness -	57.7	+0.3	+0.4	+0.2	+0.3	-0.7	165	+0.3	
Wick -	62.8	+0.3	+0.4	—	-0.1	+0.1	90	-0.2	
Dunrobin -	61.3	-0.4	-0.5	—	+0.6	-0.6	100	Uniform	
Inverness -	54.6	—	—	—	0.0	+0.1	100	Do.	Hygrometer broken. New one ordered.
Nairn -	55.2	+0.2	+0.7	+0.7	-0.1	+1.0	135	+0.2	
Aberdeen -	63.5	+0.4	+0.5	+0.4	+0.6	+0.1	130	Uniform	
Braemar -	62.6	+0.5	+0.5	—	+0.5	-0.1	150	Do.	
Dundee -	57.0	+0.5	+0.5	—	+1.4	-0.4	80	Do.	
Glenalmond -	55.1	+0.1	+0.1	—	+0.1	-0.3	60	Do.	
Leith -	56.2	+0.2	+0.5	—	0.0	-0.2	50	Do.	
Pinnore -	48.8	+0.2	+0.3	—	-0.3	-0.1	80	-0.2	
Rothsary -	47.1	-0.1	0.0	—	0.0	-0.3	180	Uniform	
Ardrossan -	49.7	+0.3	+0.4	+0.1	0.0	-0.3	70	Do.	
Observatory, King's College -	59.8	-0.2	+0.3	—	+0.2	-0.4	180	Do.	Observatory.
Do. -	59.8	+0.2	+0.1	—	+0.2	+0.2	180	Do.	In Stevenson's screen.

Laudale (inspected August 19th).—The instruments were all in good order, and the observations appear to be carefully made. At the time of inspection the house was undergoing extensive repairs, the whole of the interior being nearly gutted. The check barometer was packed away in its box. The reporting barometer was not then removed, but in a few days it was to be taken from its place for a short time. As Mr. Fletcher quite understands the handling of his barometer, it is not supposed that any injury will happen to the instruments during the changes.

As requested, I examined the observation book for 1880, which is one that was supplied by Mr. Newton and has no columns for clouds. In July of that year Mr. Fletcher was from home nearly the whole month, when the observations were made by his brother. These observations Mr. Fletcher seems to have understood at the time, but evidently he cannot now interpret them so as to give the details of cloud correctly, as desired by the Office.

Stornoway (inspected August 25th).—The thermometer screen and rain gauge were removed October 11th, 1883, to the positions indicated in last year's report. These positions are good, and all the instruments were in good order.

Sandwick (inspected August 27th).—The instruments were in excellent order, and to meet contingencies, another of Dr. Clouston's servants, Ann Souter, had been taught to observe, which she does quite correctly.

The orientation of the anemograph was examined. The cardinal points on the horizon were determined by magnetic compass, a variation of about 23° being allowed for. These points agreed with the points determined by Mr. Scott some years ago. Referring the indication of

the anemograph to these points, the orientation of the instrument was found to be correct.

The spiral thread of the direction pencil was next compared with reference to the sheet on the cylinder which was seen to be correctly placed, the pencil projecting just as far beyond the N. line at the foot as it did beyond the N. line at the top of the sheet. A careful examination, however, showed that from a point about mid-way between N.E. and N. the spiral thread of the pencil had received a twist, so that this portion will cease to mark till the rest of the pencil be worn down some little way. Fortunately, however, the pencil has been so long in use that the indications which fail at the foot of the sheet are supplied by indications at the top, and this is done so completely that no hiatus is left. Instructions were accordingly given to fix the sheet on the cylinder as before.

A reference to the curves in the Meteorological Office will show when the anemograph ceased to record this part of the curve, whether, for instance, it was at the time when the instrument was last repaired by a local workman.

At the time of inspection the wind suddenly changed from about E. to S.S.E., blowing, roughly speaking, from six to eight miles an hour, and dying away to a calm in a space of time less than 10 minutes. The anemograph seemed much too sluggish in indicating this change of direction.

While afterwards inspecting the observatory at King's College, Aberdeen, I made inquiry regarding the working of the anemograph there, and Mr. Boswell kindly showed me changes in the wind's direction, with small velocities, on the sheets of August 31st, and September 1st and 3rd. On the first of these dates at 10 p.m., with a velocity at the rate of four miles an hour, the anemograph recorded a change from S.W. to W. almost instantaneously.

It may be a matter for consideration by the Meteorological Council whether during next year's inspection Mr. Whipple should not go to Sandwick, and put this anemograph into a thorough state of repair.

Dunrossness (inspected August 30th).—The instruments were in good order, and were correctly observed. The maximum and minimum thermometers are neither of them engraved on the stem, and as the error of the latter is large—0·7, it might be considered whether a new set of these thermometers might be supplied to this station.

The delay in the receipt of the telegrams from Dunrossness has not been occasioned by any remissness on the part of the observer or of the telegraph clerk at Boddam, but has arisen entirely at Lerwick. The postmaster at Lerwick informed me that scarcely, if ever, are the weather telegrams so late as 8.30 a.m., 2.30 or 3.30 p.m. The telegrams on reaching Lerwick must wait their turn to be transmitted, which, during the herring season, for example, means sometimes a delay of three or four hours. Another cable is to be laid in April next, when these delays, I was informed, will cease.

The observations of the previous eight months were examined as to the entries of extreme wind force. So far as Mr. Brand could recollect, every case equalling 8 or upwards was reported at the time. The number of cases was smaller than I should have anticipated, though Mr. Brand's estimate of force agrees closely with that of the observers at the other stations.

Wick (inspected September 2nd).—The observations here are made with much intelligence, and the instruments were in very good order

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Wick (inspected September 2nd).—The observations here are made with much intelligence, and the instruments were in very good order

Orders were given to execute some necessary repairs on the thermometer screen and repaint it.

Dunrobin (inspected September 4th).—The instruments remained as at the time of last year's inspection, the Stevenson's screen not having been added owing to a difficulty the joiner had in understanding the sketch-plan sent. This was explained, and the screen would be ready in a few days after inspection.

The amount of cloud is to be added to the observations. An attempt will also be made to observe the force of the wind, but it must be added that the hills to the westward and the woods in the immediate neighbourhood render it difficult to make quite satisfactory observations of the force of the wind.

Inverness (inspected September 5th).—The observations at this station have, for various causes, been for some time interrupted. Mr. Fraser removed to his present house, of which he has taken a lease for some years, in May last, but delayed resuming the observations till after inspection, when he could have advice regarding the positions of the instruments.

A new hygrometer had been ordered and was being compared at Kew, and it was fully expected that the observations would be resumed on October 1st.

Nairn (inspected September 6th).—The Stevenson screen was ordered to be repaired and repainted, and the rain gauge to be removed to a place 24 feet S.S.E. of its present position, the change being necessary owing to the growth of a young apple tree. At last the trees in the adjoining plantations have been cut down for a distance of from 50 to 80 yards from the boundary wall of the school grounds, thus greatly improving the station in many respects. Much attention is given by Mr. Penny to the instruments, and to the systematic training of his assistant.

Aberdeen (inspected September 9th).—The Stevenson screen was painted immediately after last inspection, and everything was in excellent order. Both assistants made the observations and reduced them with correctness and despatch. Other two of the clerks were under training as assistants, should their services be at any time required.

Aberdeen, King's College Observatory (inspected September 10th).—The instruments were all in excellent order. The anemometer and its registrations were examined with some care, and the results showed it to be in remarkably good working order. A Stevenson screen has recently been added to the observatory, and has been placed in the best situation afforded by the University grounds. The ground for some distance round the screen is to be turfed, and the thermometers have been hung in positions and at heights comparable with those at the ordinary stations of the Office. As the results of the comparison of the thermometer did not quite agree with last year's comparison, I remained an hour longer, and thereafter Mr. Boswell and I made another independent reading of all the thermometers which agreed with two previously made readings. Hence the thermometer's errors given in the table are the comparisons by two observers of the thermometers with No. 2522 (corrected), all the thermometers having been in water together for three hours, during which its temperature did not change so much as the tenth of a degree.

Braemar (inspected September 11th).—The instruments were in good order. A Stevenson screen was just added with maximum and minimum thermometers and a hygrometer, with which observations

have been made since October 1st for comparison with those made in the screen used at the station since 1855. The force of the wind is observed both by estimation and by a Robinson's Anemometer, which is on a stout post with ladder 18 feet high.

Dundee (inspected September 16th).—The instruments were all in good order, and they are observed with care. In August a new 5-inch rain gauge had been added to the station for comparison with the Fleming's gauge hitherto in use, both being placed in an open situation near each other in the grounds of the cemetery, about a furlong from the thermometers.

Glendalmond (inspected September 29th).—The instruments are all in the positions in which they were when the late Dr. Percy Robinson was observer, and they are in excellent condition. The observations are made with much care by the Rev. A. H. S. Patrick, M.A., music-master, who, if his duties in the College will admit of it, will add the 9 p.m. observations to those now made.

Leith (inspected September 26th).—Except a slight discolouration in the mushin of the wet bulb, the instruments were in good order, and much interest is manifested by Mr. Hay in the observations and work of the assistants. The gate of the small railed-in enclosure, where the rain gauge and screen are placed, was ordered to be repaired.

Pinnore (inspected October 9th).—The instruments were in good order. The ground for some distance round the thermometer screen has been turfed since last inspection, and the minimum thermometer lowered to 4 feet. The observations are intelligently made, and the observer is desirous of making the schedule as full as may be in his power. Owing to the position of Pinnore, the winds are not unfrequently very light, and they can indicate only in a rough manner the general direction of the wind in that part of Scotland. No little trouble is taken by Mr. Donald, by climbing to the top of a knoll and otherwise, to secure correct observations of the wind. Fuller notes of weather and cloud are gradually to be added.

Rothsay (inspected October 11th).—The instruments were in good order and the observations very intelligently made. Since last inspection several low-growing shrubs have been removed from near the thermometer screen, and a plot has been turfed round the rain gauge. The direction of the wind is taken from a vane which works well on a pole 36 feet high. The amount of cloud is to be added to the schedule.

Ardrossan (inspected October 13th).—The instruments at this station were in good order, and both Mr. Mayes and the assistant made and reduced the observations correctly. The observation book was examined from January 1st downwards, and as regards the wind, an improvement commenced in the last week of January. The estimates of wind force were examined in detail, and these agreed on the whole very well with the estimates made at the other stations, with perhaps a tendency to rate the force one grade of Beaufort scale higher than the others. The faulty observations of the barometer pointed out by the Office were compared with those at the same dates made in Edinburgh, and, except in one doubtful case, the errors suspected by the Office were corroborated. The errors were not generally 0·050 inch, but mostly errors of 0·030 inch, some of them, perhaps made by the assistant, who at the time was new to the work, setting the vernier about 0·30 inch too low, but mostly by a 6 being put down for a 9, or 3 for an 8, and *vice versa*. The readings of June 1st, made by the assistant, were altogether wrong. An improvement began in June, since which time I did not detect any faulty observations. The rain gauge on July 5th and 10th had been

tampered with, and Mr. Mayes much regretted that he failed to report the fact to the Office when he became aware of it. The more important sections of the recent issue of "*Instructions on Meteorological Telegraphy*" were gone over in detail with the two observers, and as both seemed thoroughly alive as to the requirements of the future, I have considerable confidence that their work will now prove satisfactory.

(Signed) ALEXANDER BUCHAN.

D.—REPORT ON THE INSTRUMENTS AT THE OBSERVATORIES.

Falmouth.—On August 2nd I visited the plot of ground designed for the site of the new observatory, and met several members of the Committee of the Polytechnic Society there.

By request, I checked, by means of my azimuth compass, the bearings of the lines laid down for the building preliminary to the excavation of the trenches for the foundations.

I dismounted, cleaned, and examined the anemograph, fitted new prickler, and tightened up a loose fan, oriented it by compass and by mark. I dismounted, cleaned, and examined barograph and thermograph, and improved the focus of the wet bulb, and compared the thermometers with the standard.

I found the Beckley rain gauge in good order, the shake in the trace being due to a defective fitting of the pencil, the holder being too small to hold a pencil unless it is carefully trimmed to shape. It has not been found practicable to adopt the suggestion I made on my last inspection as to the removal of the spare gauge. It would be very desirable to supply a second gauge to run at the new observatory some time before the present one is dismounted.

Valencia.—Immediately on my arrival, August 14th, I had the new anemograph unpacked and made arrangements for erecting it. The weather being uncertain at this station, I proceeded at once to dismount the old instrument. This being done, it became stormy, and we were unable to put the other up for several days. On August 20th it was completed, and having been oriented carefully by a solar observation, was set to work. The barograph and thermograph were examined and cleaned, being in good order, and the thermometers were compared with the standard. The Beckley rain gauge was also found to be in good condition.

A box chronometer formerly in use at the Armagh Observatory was conveyed by me to this observatory and deposited with Mr. Cullum for use as a standard timekeeper, the observations hitherto being controlled by means of an ordinary watch set from time to time by means of the clock at the Anglo-American Telegraphic Station-house.

Lemagh.—This observatory no longer being one of the self-recording observatories of the Meteorological Council, Dr. Dreyer, the director, was desirous of having the instruments dismounted and packed away in order to avoid incurring the risk of their accidental injury or destruction. I accordingly dismounted the barograph and thermograph, carefully packing and securing the various pieces of apparatus in order that they might be stored away or forwarded to any place where the Council might decide upon their being deposited either for storage or further use.

The anemograph and Beckley rain gauge, being retained in operation, were examined and found to be in good order.

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The anemograph and Beckley rain gauge, being retained in operation, were examined and found to be in good order.

Holyhead.—Both the bridled and Beckley anemographs were examined. The former instrument was undergoing slight repair at the time of my visit, the top plate of the instrument being re-adjusted on the roof of the hut which protects it, on account of its position having become a little shifted by warping of the roof.

The Beckley anemograph was in good order, with the exception of the velocity pencil, which being indented in one place, caused an irregularity to appear in the trace whenever the defective portion came into contact with the recording cylinder. This I, in a great measure, rectified, by bending the pencil spiral and grinding the indented portion down. In fitting the instrument together, I inadvertently exchanged the cross clutches of the two recording pencils. Some days after my inspection this caused the instrument to fail during a brisk wind, but Mr. Williams, C.E., who has charge of both anemographs, detected the source of failure and replaced the clutches in their proper fittings. Since then the instrument has worked correctly. I examined the orientation and found it was properly performed by the man in charge.

Oxford.—The Radcliffe Observatory was visited on September 3rd. All the instruments were examined and found to be in excellent order. The thermometers were compared and found to require the following corrections :—

Dry bulb standard	— 0·5 Max. + 0·2
Wet „	— 0·4 Min. + 0·1

(Signed) G. M. WHIPPLE.

October 1884.

Aberdeen (visited by Mr. Baker on September 17, 18, 19).—All the instruments at this observatory were found in capital working order and the photography was good.

I thought it advisable, however, to entirely dismount the thermograph clock, as the oil had become somewhat thick, but as regards the barograph clock, only parts required cleaning, besides a general oiling.

The lenses and conductors of both instruments were carefully wiped.

The exposed parts of the anemograph were dismounted and thoroughly examined and oiled, but the clock did not require cleaning, having recently been taken down for the purpose of attaching a new clock line, when it was thoroughly cleaned.

Afterwards the orientation was examined, and the result is appended to this report.

The rain gauge was generally cleaned.

The standard dry and wet bulb thermometers were compared with a Kew standard thermometer in water at a temperature of 60 degrees, and the following corrections were derived from a mean of four readings :—

Dry, No. 458.	Wet Bulb, 395.
—0·05	0·06

Mr. Boswell having called my attention to the fact that there was a difference of some two or three tenths of a degree between the above corrections and those determined by Mr. Buchan during the week preceding my visit, we thought it well to compare the maximum and minimum in use in the thermograph screen as well as all the thermometers mounted in the Stevenson screen. These were all tested in water with the following results :—

MAXIMUM and MINIMUM used in THERMOGRAPH SCREEN.

Kew Standard, No. 571. Mean of 4 readings.	Maximum M.O. 48.		Minimum M.O. 89.	
	Mean of 4 readings.	Correction.	Mean of 4 readings.	Correction.
59.2	59.8	-0.6	—	—
59.2	—	—	59.0	+0.2*

Tested September 19.

THERMOMETERS employed in the STEVENSON SCREEN, situated in the Garden.

Kew Standard, No. 571. Mean of 4 readings.	B.T. 1755.		B.T. 1756.		Maximum 257.		Minimum M.O. 76.	
	Mean of 4 readings.	Corr. rection.	Mean of 4 readings.	Corr. rection.	Mean of 4 readings.	Corr. rection.	Mean of 4 readings.	Corr. rection.
59.25	59.55	-0.03	—	—	—	—	—	—
59.30	—	—	59.0	-0.3	—	—	—	—
59.50	—	—	—	—	59.7	-0.4	—	—
59.80	—	—	—	—	—	—	59.6	-0.3

The above comparisons indicate a constant difference of 0.2 higher than those of Mr. Buchan, which is most probably due to a difference between the two standard thermometers employed in the examination.

The Kew standard of reference was again compared with the observatory standard on my return to Kew, and found to be unchanged.

(Signed) T. W. BAKER.

* This correction is some three tenths less than the one used by Mr. Boswell, but I carefully examined the chamber, and could not detect any spirit detached from the main column. To make certain, however, the chamber was warmed over a gas burner and afterwards the thermometer placed in a vertical position for about an hour, when it was recompared, but the above correction had not changed.

MAXIMUM and MINIMUM used in THERMOGRAPH SCREEN.

Kew Standard, No. 571. Mean of 4 readings.	Maximum M.O. 48.		Minimum M.O. 89.	
	Mean of 4 readings.	Correction.	Mean of 4 readings.	Correction.
59° 2	59° 8	-0° 6	°	°
59° 2	- - -	- - -	59° 0	+0° 2*

Tested September 19.

THERMOMETERS employed in the STEVENSON SCREEN, situated in the Garden.

Kew Standard, No. 571. Mean of 4 readings.	B.T. 1755.		B.T. 1756.		Maximum 257.		Minimum M.O. 766.	
	Mean of 4 readings.	Cor- rection.	Mean of 4 readings.	Cor- rection.	Mean of 4 readings.	Cor- rection.	Mean of 4 readings.	Cor- rection.
59° 25	59° 55	-0° 03	°	°	°	°	°	°
59° 30	- - -	-	59° 6	-0° 3	-	-	-	-
59° 30	- - -	-	- - -	-	59° 7	-0° 4	-	-
59° 30	- - -	-	- - -	-	- - -	-	59° 6	-0° 3

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APPENDIX VIII.

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 great change so far as our own coasts are concerned, but Malin Head has been started as a Telegraphic Reporting Station.

Arrangements have been made by which information of storms met with to the westward of Long. 45° West by the large Atlantic steamers in their passage from England to the United States is forwarded telegraphically to the Meteorological Office by the Chief Signal Officer of the United States. These arrangements are referred to more fully further on. The Daily Weather Report also has been improved by the addition, in the margin, of means for each month of the daily maximum and minimum temperatures, in addition to the mean values previously published.

The Office now receives, when the telegraphic communications are perfect, fifty-four reports every morning, fourteen every afternoon (except on Sundays), and twenty each evening. The interruptions which have occurred at times in the communication with Sumburgh Head and Stornoway have not been serious, owing to the moderate force of the gales which occurred during the winter. The suspension of the afternoon reports on Sundays is due to the fact that almost all the telegraphic circuits are closed at the hours at which the messages would be transmitted. The instructions to the observers have not been altered during the year, and the system of observing cirrus cloud has not been materially extended.

The foreign reporting stations, 23 in number, extend along the entire western coast of the Continent, from Bodö in Lat. 67° N. to Corunna in Lat. 43° N., and include four stations on the coast of the Baltic, and one in the Mediterranean. The information is received in accordance with arrangements made with the various Meteorological organisations in France, Holland, Germany, Denmark, Norway, and Sweden.

At the British and Irish stations the morning observations are taken at 8 a.m. Greenwich time, and most of the telegrams arrive in London at about 9 o'clock, when the Intelligence Department of the Post Office extracts from them the portions required for its wind and weather reports. They are then transmitted to the Meteorological Office by its private wire, where the majority of them usually arrive between 9 a.m. and 10 a.m.

As fast as the reports come in, the information is entered on a chart, which shows for each station at 8 a.m. the barometrical and thermometrical readings, with their respective alterations during the preceding 24 hours, the direction and force of the wind, and the state of the weather, together with any changes of importance which may have been noticed in the course of the preceding day. From this chart,

which is preserved in the Office, other charts are drawn for publication in the newspapers, as described further on.

If necessary, telegraphic warnings of storms or of atmospherical disturbance is immediately sent to our own coasts and to foreign countries. A brief telegraphic resumé of the weather is despatched shortly after 11 a.m. to the Harbour Authorities in Jersey. Another telegraphic message, of about 75 words, is sent to the Underwriters' Association, Liverpool, containing reports of the pressure, wind and weather at 14 stations on the coasts of the British Islands; and a third message of about the same length is forwarded to the Central News and to the Exchange Telegraph Company for despatch to the provinces. The last of these messages consists of a brief statement of the general condition of the weather in Western Europe, as shown by the reports for the morning. It is, however, not in the morning only that storm warnings are issued to the coasts, for a constant watch is kept during the day, and whenever on the receipt of the regular or of special telegrams the condition of the weather appears to be threatening, cautionary messages are at once issued to such parts of the coast as are thought to be menaced by a gale.

During the year 1884, there were prepared each morning, afternoon, and evening, Forecasts of the weather, for one day in advance; these were drawn up for eleven districts in the British Islands, and issued to subscribers, to certain Clubs, and to many of the London and Provincial newspapers in accordance with the arrangements referred to on p. 11. The districts for which the Forecasts were prepared were those into which the returns for the Weekly Weather Report are divided, viz. :—

0. Scotland, N.	}	4. Midland Counties.
1. „ E.		5. England, S.
2. England, N.E.		6. Scotland, W.
3. „ E.		7. England, N.W. (with N. Wales).
8. England, S.W. (with S. Wales).		
9. Ireland, N.		
10. „ S.		

About an hour and a quarter is occupied in the preparation and transmission of the provincial and foreign telegrams, and in the drawing up of the “Remarks” and 11 a.m. Forecasts for the London newspapers, so that the MS. copies for the “Times” and other papers are ready for issue soon after 11 a.m.

The Charts prepared daily for newspaper publication are as follows :—

For the "Times,"	-	-	two daily, viz.: for 8 a.m. and 6 p.m.
For the Patent Type-found- ing Company, on behalf of the "Shipping Gazette," and for distribution to the provincial press	}	one	„ for 8 a.m.

The 8 a.m. charts are sent out at about 10.15 a.m. and the 6 p.m. chart at about 8.30 p.m.

The draft of the Daily Weather Report, with two charts attached, is drawn on transfer paper, and is ready by noon, when it is at once sent to the lithographer to be printed. The copies for delivery by hand in London are issued at about 1.30 p.m., while the remainder are received at the Meteorological Office at about 3.30 p.m., whence they are transmitted by post to the subscribers and others.

In addition to the charts referred to above, the Patent Type-founding Company are supplied with various diagrams showing the changes in pressure, temperature, rainfall, wind, and weather for the London district. These are engraved *daily* for the "Daily Chronicle," *weekly* for the "Observer" and "Graphic," and *monthly* for the "Miller." They are all accompanied by remarks on the phenomena exhibited.

At about 3 p.m. the observations taken at twelve home stations at 2 p.m. are received, and those for two foreign stations (Skudesnaes and Rochefort) come in afterwards. Copies of these reports are issued, together with the 8 a.m. report, to certain newspapers and subscribers. Two copies of the "Remarks" (8 a.m. and 2 p.m.) are sent to the Type-founding Company for issue to provincial newspapers for publication, in order to explain the 8 a.m. charts.

From 7 to 7.30 p.m. the twenty evening (6 p.m.) reports arrive and are charted and discussed for the morning daily papers in accordance with the arrangement referred to on p. 11. The forecasts and remarks are usually ready by 8.30 p.m., but in bad weather, owing to the delay of the reports and the additional care which is necessary in dealing with them, it is frequently 9 p.m. before they are issued. The "Times" publishes in its first edition the daily map showing the distribution of pressure, the winds, temperature, and weather at 6 p.m., and in its second edition a similar map for 8 a.m. on the day of issue.

The official charts for 2 p.m. and for 6 p.m. are still much less complete than that for 8 a.m. That for 2 p.m. is drawn on the information received from twelve home stations, supplemented by two foreign ones, whenever the latter arrive in time to be used. The material for the 6 p.m. charts is now supplied by reports from sixteen stations in the United Kingdom, supplemented by four from continental stations, but the latter frequently arrive late at the very time when they are most wanted, *i.e.*, during bad weather.

The Sunday duty is still conducted as follows:—Two of the clerks attend on Sunday mornings at the Central Telegraph Station from 8.30 a.m. to about 10.15 a.m. By an arrangement with the Post Office these clerks are supplied with the telegrams immediately they arrive in London. These are examined and charted, with the view of issuing, when necessary, warnings of coming storms, to our own and neighbouring coasts. It is necessary that promptitude should be observed in this service, as the observations must be dealt with and the warnings issued so that the latter may reach the coast before the telegraph offices close for the day, which is usually at about 10 a.m. No work of any kind is transacted for the newspapers on Sunday mornings, the main object of the service being to give prompt information of storms to our coasts; but a telegram is sent to Jersey in the same way as on week days, and there is the ordinary interchange of messages with foreign countries. At 6 p.m. the same clerks attend at the Meteorological Office to receive the evening reports and to prepare the 3.30 p.m. forecasts,

and another opportunity is thus offered for the correction or extension of any warnings which may have been issued in the morning.

Daily Weather Report.

Very little change has been made in the form of the Daily Weather Report since 1st January 1884. The information now fills four large quarto pages, and is arranged as follows:—

Page 1 contains the whole of the reports from which the maps for the day (given on page 2) are prepared; and also the 6 p.m. reports of the previous day; page 2 contains (1) a map of North-western Europe showing for 8 a.m. on the date of publication the distribution of pressure, the prevalent winds, and the sea disturbance, with necessary explanations; together with a table showing the mean pressure of the atmosphere for the month at 22 stations; (2) a similar map showing the distribution of temperature, the weather at each station, and the distribution of rainfall during the past 24 hours; together with tables of mean temperature of the air and of evaporation at 8 a.m. and of the daily maximum and minimum temperatures and the mean rainfall for the month at a large number of stations over the United Kingdom.

Page 3 contains (1) remarks on the principal features exhibited by the reports for the day; and (2) the forecasts drawn up for each district at 11 a.m. relating to the weather likely to be experienced during the 24 hours ending at noon on the day after that of publication.

Page 4 contains the reports and remarks for 2 p.m. on the previous day, and there is space for the insertion of a Weekly Summary on Mondays, and any other brief information which it is deemed necessary to print at once.

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

Atlantic Telegrams.

In the course of the year arrangements have been made for forwarding from the United States occasional reports of gales, icebergs, and derelict ships, which have been met with by passenger steamers of the principal lines running from various European ports to New York or Boston. The vessels referred to are supplied with forms on which to enter the information necessary (see Appendix XIII., p. 88), and these are received by officers of the Chief Signal Office at the ports named. The facts are then sent by cable to the Meteorological Office in an abbreviated form, as follows:—

REPORT of a STORM, and EXPLANATION.

(Say, From New York) to Met. London.

"Scotia."	19.	Fifteen.	64.	South-west	North-west.	293.	Nine.
Name of steamer supplying the information.	Date of lowest barometer.	Hour of lowest barometer. (= 3 p.m.)	Longitude in which the lowest barometer was observed.	Direction of change of wind, about time of lowest barometer. (= S. W. to N. W.)		Lowest barometer observed. (= 29.3 inches.)	Extreme force of wind during the storm. (= 9, Beaufort's scale.)

Reports of ice and derelict ships relate to ice or derelicts seen on any part of the passage, and are worded thus:—

"Scotia."	Icebergs.*	Thirteen.	Fifty-four.
Name of steamer supplying the information.	Nature of ice observed.	Day of month when observed.	Longitude in which the ice was observed.

When a report of ice or of derelict ships is appended to one of a storm, the ship's name is not inserted unless the report of the storm and that of the derelict (or ice) be from different ships.

This information is published in the Daily Weather Report, and is also transmitted to the Meteorological Institutes of France and the Netherlands. A copy is sent regularly to Lloyd's.

Weekly Summary.

On Monday in each week a brief Summary of the Weather which has been experienced over our Islands during the preceding week is given on p. 4 of the Daily Weather Report. It refers only to the principal changes which have occurred, and is intended to serve as an aid to the study of the Daily Reports.

In this manner the main meteorological features of the week are presented as a connected story, and additional facility is afforded for future reference.

Correction and Addition List.

Additional steps are taken to insure accuracy in the Daily Weather Report. At the close of each month a return is received from nearly all of the telegraphic reporting stations, containing a copy of all the observations which have been transmitted to London by wire during the month. These schedules are used for checking the daily telegrams, for the preparation of the average and other values of the different elements, and also as evidence in the case of legal proceedings; and about the middle of every month a lithographic sheet has for many years past been issued with the Daily Weather Report, containing corrections for all discrepancies which have been discovered, and supplying any observations which have been omitted in the published reports. This monthly sheet also contains tables showing the mean values for pressure, temperature, and humidity, together with the total rainfall, and the prevalence of various kinds of weather and of winds from each of the eight principal points during the month, for each telegraphic reporting station within our Islands.

Weekly Weather Report.

The Weekly Weather Report has appeared since the beginning of February 1878. It consisted originally of four pages octavo, but has now been enlarged to four pages quarto, and has been further improved by the insertion on the last page of the number of day-degrees of

* "Derelict" is substituted for icebergs when necessary.

accumulated heat above and below 42° F. for each station from which observations are received. The Report thus contains the average and extreme temperatures and the rainfall values and the total amount of bright sunshine in each week, for seventy stations grouped into eleven districts in Great Britain and Ireland, together with the difference between them and their respective mean values for the corresponding weeks in previous years. In addition to this, the district values for Accumulated Temperature, Rainfall, and Bright Sunshine are given, both for the week and for the whole period since the beginning of the year.

The tables of Accumulated Temperature are designed to give persons engaged in agriculture better means of estimating the manner in which vegetation is affected by temperature than that afforded by the more usual methods of treating the readings of the thermometer. They 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 adopted is 42° F., as being nearly equivalent to 6° Cent., which has been considered by Continental writers on these subjects to be the critical value, the temperature above which is mainly effectual in starting and maintaining the growth, and in completing the ripening, of agricultural crops in a European climate. This base is also convenient as being 10° F. above the Freezing Point.

The accumulated Temperature is expressed in Day-degrees; a Day-degree signifying 1 F. of excess or defect of temperature above or below 42° F. continued for 24 hours, or any other number of degrees for an inversely proportional number of hours.

It has been ascertained by calculation from a considerable series of hourly observations at various places, that the accumulated temperature may be computed, with a very tolerable approximation to the truth, from the observed daily maximum and minimum temperatures alone.

When the temperature during any period remains either wholly above or below the base temperature, the difference between the base and the mean temperature gives the correct accumulated temperature. In other cases this difference gives an approximate value of the accumulated temperature which does not depart greatly from the truth, the deviation depending on the greater or less extent of the daily variations of the temperature above or below the base. Further, since the mean between the maximum and minimum of any day is nearly equal to the mean temperature of the day, the difference of the mean of the maximum and minimum from the base also will give directly a fair approximation to the accumulated temperature for the day.

The following rules, however, supply a still closer approximation to the true values sought, and they have been adopted for the preparation of the table in the Weekly Weather Report. They may be applied to any other base temperature as well as to 42° F., with the slight modification of the numerical coefficients.

RULES for computing for a WEEKLY PERIOD the ACCUMULATED TEMPERATURE above or below 42° F. from the observed MAXIMA and MINIMA.

1. Obtain the mean temperature from the means of the seven observed maxima and minima by multiplying the difference between them by the proper coefficient for the month, and adding the result to the mean of the minima.

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

Conditions of Temperature	To obtain the Accumulated Temperature.	
	Above 42° F.	Below 42° F.
If the minimum is <i>above</i> 42° F. or <i>equal</i> to 42° F.	Subtract 42° F. from the mean.	There is none.
If the minimum is <i>below</i> 42° F., but the mean for the day is <i>above</i> 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 <i>below</i> 42° F., but the maximum is <i>above</i> 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 <i>below</i> 42° F., or <i>equal</i> to 42° F.	There is none.	Subtract the mean from 42° F.

In each case the result will be the mean daily value for the week, 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 the value of the base temperature. In the above instance the base value is 42°; when it is 32° the coefficient is 0·4; when 52° it is 0·33; and when 62° it is 0·25.

A full explanation of these rules will be found in Appendix II. to the Quarterly Weather Report for 1878.

These statistics are given for *each district* on the first page of the publication, the temperature, accumulated heat, rainfall, and sunshine values for *each station** being given on the last page.

The average values, which are used in the report for purposes of comparison, have been recomputed, those now in use being :—

For Temperature - - - 20 years 1861-80
 „ Rainfall - - - 15 „ 1866-80

In addition to the telegraphic reports, and the returns from the self-recording observatories, weekly returns from 34 volunteer observers are used in preparing this report, the names of the observers at each station being as under—

Names of Stations.	Names of Authorities.
Alnwick Castle - - -	Lieut.-Col. F. Holland, for the Duke of Northumberland.
Arlington (N. Devon) - - -	J. Carter, for Lady Chichester.
Bawtry (Hesley Hall) - - -	B. I. Whitaker, F.R. Met. Soc.
Birmingham (Oscott) - - -	Rev. J. W. Browne, St. Mary's College.

* The sunshine values are furnished for only a limited number of carefully selected stations, those in this list so provided are marked with an asterisk.

Names of Stations.				Names of Authorities.
Blackpool	-	-	✚	C. T. Ward, F.R. Met. Soc.
Brookeborough	-	-	-	Mr. Ferguson, for Sir Victor Brooke, Bt. F.L.S.
Cheadle	-	-	✚	J. C. Philips, F.R. Met. Soc.
Church Stoke*	-	-	✚	P. Wright, F.C.S., F.R. Met. Soc.
Cirencester*	-	-	-	The Royal Agricultural College.
Callompton*	-	-	✚	T. Turner, J.P., F.R. Met. Soc.
Douglas (Isle of Man)*	-	-	-	A. W. Moore, F.R. Met. Soc., Cronkbourne.
Dublin	-	-	-	J. W. Moore, M.D., F.R. Met. Soc.
Foynes	-	-	-	T. J. Carey, for Lord Monteaule.
Geldeston*	-	-	-	E. T. Dowson, F.R. Met. Soc.
Hastings (St. Leonard's)*	-	-	-	H. Colborne, M.R.C.S.
Hereford	-	-	✚	T. A. Chapman, M.D., F.R. Met. Soc.
Hillington*	-	-	✚	Rev. H. E. B. Ffolkes, M.A., F.R. Met. Soc.
Kilkenny	-	-	-	H. Carlton, for the Marquis of Ormonde.
Killarney	-	-	-	Rev. G. R. Wynne.
Laudale (Loch Sunart)	-	-	-	A. Fletcher, for T. H. G. Newton, F.R. Met. Soc.
Leicester*	-	-	-	J. C. Smith, the Museum.
Llandovery	-	-	-	J. Watkins.
Llandudno*	-	-	✚	J. Nicol, M.D., F.R. Met. Soc.
Londonderry	-	-	-	J. Conroy, F.R. Met. Soc.
Manchester (Prestwich)	-	-	-	T. R. H. Clunn, M.D.
Markree Castle (Sligo)*	-	-	-	A. Marth, F.R.A.S., for Colonel Cooper, F.R.A.S.
Marlborough	-	-	✚	Rev. T. A. Preston, M.A., F.R. Met. Soc.
Newton Reigny (Penrith)*	-	-	-	T. G. Benn, F.R. Met. Soc.
Plymouth	-	-	-	J. Merrifield, LL.D., F.R.A.S.
Rothamsted	-	-	-	Rainfall by Sir J. B. Lawes, Bart., LL.D., F.R.S., and J. H. Gilbert, Ph.D., F.R.S., temperature by T. Wilson, F.R. Met. Soc.
Scarborough	-	-	✚	A. Rowntree, F.R. Met. Soc.
Silloth*	-	-	-	Rev. F. Redford, F.R.S.E.
Southampton*	-	-	-	J. T. Cook, R.E., Ordnance Survey Office.
Strathfield Turgiss	-	-	✚	Rev. C. H. Griffith, F.R. Met. Soc.
Waterford (Brook Lodge)	-	-	-	C. Percival Bolton, F.R. Met. Soc.

The returns marked "✚" are supplied through the Royal Meteorological Society.

The report is prepared on Wednesday in every week, and is ready for sale early on Saturday morning, but the summary on its first page is sent to the "Times," "Daily News," and some other papers on Wednesday evening.

A *Quarterly Summary* of the Weekly Weather Report has been also issued as an Appendix, giving for each of the 12 districts before referred to (1) the Mean Temperature for each Quarter and for the Whole Year in each year from 1878 to 1884 inclusive, and the means for certain groups of years; (2) the Total Rainfall for the same periods; and (3) the Accumulated Temperature, Rainfall, and Bright Sunshine for the Quarter. In the Summaries for the year 1884 there are added, for each district, the values for *Rainfall* (number of rainy days and fall in inches), and *Accumulated Heat* (above and below 42° F.) during the seven years 1878-84, and *Bright Sunshine* (number of hours recorded, and percentage of possible duration), for each of the five years 1880-84. These are given for each month, and for the whole period elapsed since the commencement of the year: while in a second Appendix

similar values are given for each week in the years mentioned. To these are added, in the Preface, tables showing the total number of hours of sunshine possible in each week and month for each district, with their reciprocals.

MONTHLY WEATHER REPORT.

Since the commencement of 1884 a *Monthly Weather Report* has been issued, containing (1) A General Summary for the Month of the weather experienced over the United Kingdom and its neighbourhood; (2) Tables of the principal Cyclonic and Anticyclonic Systems which have passed over our area during the month; and (3) Tables of Pressure, Temperature, Hygrometric Deductions, Rainfall, Weather, and Wind experienced at a large number of stations scattered over the United Kingdom, together with remarks thereon, and illustrated by two plates. The report is, therefore, as far as possible, similar to the Quarterly Weather Report, but owing to its prompt issue, it cannot contain either the Gale Tables, or the Tables of Mean Values for the Observatories, which are found in its predecessor.

ISSUE OF FORECASTS.

Descriptions of 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. This issue is intended especially for the early editions of the evening papers, for the clubs, and for exhibition at certain selected stations. See p. 10.
- (2.) At 3.30 p.m. (from the morning and afternoon reports), for the day following that of issue. This set of Forecasts is not intended for general publication, but a copy is exhibited regularly at the door of the Meteorological Office.
- (3.) At 8.30 p.m. (from the 6 p.m. reports), for the day following that of issue. These are now supplied gratis to any newspaper or news agency which may apply for them, and send for them regularly. A very large number of the most important papers avail themselves of this advantage.

The forecasts are made for the following districts:—



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

The descriptions and forecasts are posted at the doors of the Meteorological Office, 116, Victoria Street, S.W., on week days, for the inspection of the public. Copies, or extracts from them, are communicated under the conditions stated below, but no information which is not substantially included in them can be supplied.

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

FORECASTS FOR CLUBS.—Forecasts, drawn up at 11 a.m., for all the districts, are supplied to Clubs, for a subscription of ten shillings per annum. These are delivered free, 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.

SUBSCRIBERS FOR THE LITHOGRAPHED COPY OF THE DAILY REPORT have the 11 a.m. Forecast incorporated with their Report on each week day. The subscription for the Report is—

For delivery by hand, where feasible, £2 per annum;

Do. by book post £1 „

N.B.—Subscriptions must be paid in advance, and end at the usual official quarter day. The subscription for any part of an official quarter is charged as a complete quarter.

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 6.30 p.m. and 8 p.m. on Sundays, can be supplied in writing with the latest information in the possession of the Office and with the latest forecast issued for any specified district, on payment of one shilling for each inquiry.

INQUIRIES BY LETTER.—Application may be made by letter, enclosing thirteen pence in stamps if the reply is to be *by post*, and two shillings in stamps if the reply (not exceeding twenty words) is to be *by telegraph*.

INQUIRIES BY TELEGRAPH.—Any person may obtain *by telegraph* from the Meteorological Office the latest information as to the weather in any district of the United Kingdom by payment of a fee of 3s. The telegram containing the inquiry must not exceed 20 words in length, and must be addressed to the

METEOROLOGICAL OFFICE,

LONDON.

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

CHECKING OF FORECASTS.

In order to test the accuracy of the forecasts they have been compared carefully with the weather reported in the various districts on the days to which they referred, and the results of this checking have been already given in the Report (p. 11).

In carrying out this comparison the portions of the forecasts which referred to wind have been carefully separated from those relating to weather. The detailed results of the comparison will be found in Appendix XII., p. 83.

CHECKING OF STORM WARNINGS.

The testing of the warnings is conducted in the following manner: The intelligence issued is compared with the weather experienced on

* Good Friday and Christmas Day are reckoned as Sundays.

the coasts, as indicated by the various self-recording anemometers, by the telegraphic reporters, and by several gentlemen who have volunteered to observe for the Office, and whose names will be found in Appendix XVI.

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, made application to the various Light-house Boards, and have obtained from them the original log-books from some of the most exposed lightships and lighthouses. They would here express their cordial thanks for the co-operation so readily granted to them by these Boards.

The result of the checking for 1884 will be found on p. 14.

The coasts are subdivided into nine districts, as will be seen in the table. Two large tracts of coast are entirely omitted: The west of Ireland from the Shannon to Malin Head, and the West of Scotland from the Mull of Cantyre to Cape Wrath. No warnings are issued to any place within the limits indicated, except to Galway, and the amount of information as to the weather received from the omitted tracts of coast is, as yet, very scanty.

It should be remembered that in analysing the reports, all observations of the wind in which the force *exceeded* 7 (a "moderate gale") or the velocity exceeded 40 miles an hour, have been quoted as instances of the occurrence of a gale; but it has not been considered that the signal was hoisted late or was hauled down too soon, unless the force of 9 (a "strong gale") or the velocity of 50 miles an hour, was reached prior to the issue of the order to hoist, or subsequent to the issue of the order to lower.

In the Summaries all cases in which the signal has been shown to be late by a single report either of force 9, or of a velocity of 50 miles an hour, have been specially noted.

APPENDIX IX.

LIST of PERSONS, PLACES, &c. to which the Daily Weather Report is supplied, free of cost.

Newspapers:

Lloyd's Shipping List. (MS. copy.)
New York Herald.
Times (1st and 2nd editions).

For Exhibition at following Seaports:

Banff.	Dover.
Barrow-in-Furness.	Dundee Harbour-master.
Belfast.	Exeter (2 copies).
Blackpool.	Falmouth.
Bo'ness.	Glasgow Dock.
Boscastle.	Great Grimsby (2 copies)
Brighton.	Groomspoint.
Briton Ferry.	Hastings.
Broughty Ferry.	Hayle.
Buckie.	Holyhead.
Budehaven.	Kingstown.
Caernarvon.	Lancaster.
Cork.	Leith.
Cowes.	Lowestoft.
Cromer.	Margate.
Cullercoats.	Morecambe.
Deptford Yard.	Nairn.

For Exhibition at following Seaports—cont.

Newquay.	Silloth.
Penarth.	Southport.
Plymouth.	Teignmouth.
„ G. W. Docks.	Ventnor (2 copies).
Port Dinorwic.	Weston-super-Mare.
Porthcawl.	Wick.
Queenstown.	Wisbech.
St. Sennen Cove.	Yarmouth.
Scarboro'.	

In exchange for Observations :

Aird, G. H., Seaham.
 Bellingham, J. G., Saffron Walden.
 Benn, T. G., F.R. Met. Soc., Newton Reigny.
 Berridge, W., F.R. Met. Soc., Loughborough.
 Cambridge Observatory.
 Chatham, The Instructor in Surveying. (2 copies.)
 Clark, J. E., York.
 Clouston, Rev. C., LL.D., Sandwick, Orkney.
 Conroy, J., F.R. Met. Soc., Londonderry.
 Cooper, Col., F.R.A.S., Markree, nr. Sligo.
 Dowson, E. T., F.R. Met. Soc., Geldeston, Beccles.
 Durham, University Observatory.
 Greenwich Observatory.
 Leicester Museum.
 Liverpool Observatory.
 McCormack, J., Aberdeen.
 Mellish, H., F.R. Met. Soc., Worksop.
 Moore, A. W., F.R. Met. Soc., Isle of Man.
 Moore, F. W., Glasnevin, Dublin.
 Moore, J. W., M.D., F.R. Met. Soc., Dublin.
 Mullins, Rev. G. H., F.R. Met. Soc., Uppingham.
 Northumberland, Duke of, Alnwick.
 Ordnance Survey Office (Southampton).
 Pearsall, Rev. J., M.A., F.R.A.S., Fleetwood.
 Prestwich Asylum, near Manchester.
 Probert, W. P., LL.D., F.R. Met. Soc., St. David's.
 Radcliffe Observatory, Oxford.
 Richards, W. H., Penzance.
 Rosse, Earl of, F.R.S., Parsonstown.
 Royal Indian C.E. College, Cooper's Hill.
 Rugby Natural History Society.
 Southport, Fernley Observatory.
 Stow, Rev. F. W., M.A., F.R. Met. Soc., Aysgarth
 Bedale.
 Vibert, J. E., M.A., St. Aubin's, Jersey.
 Yorkshire Philosophical Society.

Government Offices :

Admiralty : 12 copies.
 Aldershot, Garrison Library.
 Army Medical Department.

Government Offices—cont.

Army Medical Department, Woolwich.
 Board of Trade : 3 copies.
 "Britannia," H.M.S., Dartmouth.
 Commons, House of.
 Devonport Dockyard : 2 copies.
 " Commander-in-Chief.
 " Captain of Steam Reserve.
 " Master Attendant.
 Farnborough Station, Staff Commandant's Clerk.
 Dublin, Registrar General.
 Greenwich, R.N. College.
 "Indus," H.M.S., Devonport.
 Ireland, Royal College of Science.
 Lords, House of.
 Mann, J. R., Osborne.
 Medical Department of the Navy.
 "Nankin," H.M.S., Milford Haven.
 Portland, Senior Naval Officer.
 Portsmouth, Commander-in-Chief.
 " Dockyard.
 " R. N. College Observatory.
 Queenstown, Rear-Admiral.
 Registrar General.
 " of Seamen.
 "Resistance," H.M.S., Rock Ferry.
 Royal Military Academy.
 Sandhurst Staff College.
 Science and Art Department : 2 copies.
 Sheerness, Commander-in-Chief.
 " Dockyard.
 War Office, Adjutant General, Horse Guards.
 " Commander-in-Chief.

Societies, &c. :

Association of Underwriters, Liverpool.
 Do. Lloyd's.
 British Museum.
 Buchan, A., F.R.S.E., Edinburgh.
 Crossley, Mrs., Halifax.
 Griffith, Rev. C. H., Strathfield Turgiss.
 Jackson, H. Kains, London.
 Ley, Rev. W. C., M.A., Lutterworth.
 Meteorological Council : 4 copies.
 Miller, S. H., F.R.A.S., Lowestoft.
 Observatories : 7 copies.
 Richards, Vice-Adm., Sir G. H., F.R.S., London.
 Royal Society.
 Royal Meteorological Society.
 Scottish Meteorological Society.

Foreign Places :

Algiers, Meteorological Service.
 Bombay, Observatory.

Foreign Places—cont.

Brussels, Royal Observatory.
 Cairo, Laboratoire Khédivial.
 Calcutta, Meteorological Department.
 Chemnitz, Meteorological Service of Saxony.
 Christiania, Meteorological Institute.
 Constantinople, Imperial Meteorological Observatory.
 Copenhagen, Meteorological Institute.
 Cracow, Observatory.
 Florence, Museum.
 Freeden, W. H. v., Bonn.
 Hamburg, Deutsche Seewarte.
 Lisbon, Observatory.
 Madrid, Royal Observatory.
 Melbourne, Observatory.
 Paris, Central Meteorological Bureau.
 „ Meteorological Observatory, Montsouris.
 „ Meteorological Society.
 „ Ministry of Marine.
 Rome, Meteorological Institute.
 San Fernando, Observatory.
 St. Petersburg, Central Physical Observatory.
 Stockholm, Meteorological Institute.
 Tiflis, Physical Observatory.
 Toronto, Meteorological Office.
 Upsala, University Observatory.
 Utrecht, Royal Meteorological Institute.
 Vienna, Imperial Meteorological Institute.
 Washington, Smithsonian Institution.
 „ United States Naval Observatory.
 „ Chief Signal Officer, War Office.
 Zürich, Central Meteorological Institute.

 APPENDIX X.

FISHERY BAROMETERS.

LIST of PLACES supplied with FISHERY BAROMETERS.

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

Orkney Isles.—Burray. Kirkwall.

Scotland, east coast.—Stroma, Keiss, Staxigoe, Wick, Sarclet, Lybster, Dunbeath, Portmahomack, Cromarty, Avoch, Nairn, Burghead, Portessie, Port Knockie, Portsoy, Whitehills, Gardenstown, Roschearty, Pitullie, Inverallochy, Pointlaw, Port Erroll, Findon, Pordethen, Muchals, Stonehaven, Arbroath, Broughty Ferry, St. Andrews, Crail, Cellardyke, St. Monance, Burntisland, Newhaven.

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

England, south coast.—Bognor, Portsea, Ryde and Ventnor (2) (Isle of Wight), Gorey (Jersey), Haslar Hospital, Poole, Weymouth, Portland, Budleigh-Salterton, Cawsand, Charlestown, Mevagissey, Gorranihaven, Devoran, Portseath, Penryn, Durgan, Porthallow, Falmouth, Coverack, Newlyn, Mousehole.

England, south-west coast.—St. Ives, Hayle, Padstow, Port Isaac, Boscastle, Fremington, Burnham, Highbidge, Weston-super-Mare.

Wales.—Briton Ferry, Swansea, Angle, Milford, Abersoch.

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

Isle of Man.—Douglas, Port St. Mary, Peel.

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

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

Ireland, south coast.—Dunmore, Dungarvan, Crosshaven, Kinsale, Union Hall, Castletownsend, Baltimore, Schull, Crookhaven.

Ireland, west coast.—Port Magee, Valencia, Dingle, Tralee, Tarbert, Kileredane, Barna, Elly Bay, Ballyglass, Ballycastle (Co. Mayo), Donegal, Tribane, Killybegs, Teelin, Portnoo, Burton Port, Bunbeg.

Ireland, north coast.—Dunfanaghy, Rathmullen, Buncrana, Greencastle, Portrush, Portstewart.

Scotland, west coast.—Tarbert, Campbeltown, Carradale, Portree (Isle of Skye), Plockton.

Hebrides. Stornoway, Cromore, Babyle, Obb, Ness.

SUMMARY of STATIONS supplied with INSTRUMENTS.

England and Wales	-	-	-	-	67
Scotland	-	-	-	-	54
Ireland	-	-	-	-	47
					<hr/>
					168
					<hr/>

APPENDIX XI.

TELEGRAPHIC WEATHER INTELLIGENCE.

The following stations are supplied with telegraphic information of storms, free of expense, and signal "cones" have been furnished to most of them, all further expenses attendant on the maintenance and repair of the apparatus being borne locally. The stations are situated,

81 in England and Wales, 38 in Scotland, 15 in Ireland, 3 in the Isle of Man, and 3 in the Channel Islands.

NORTH.	WEST.	SOUTH.	EAST.
SCOTLAND. EAST COAST.	ENGLAND, N.W.	ENGLAND, S.W.	ENGLAND, E.
Dunrossness.	Ramsey.	Ilfracombe.	Eyemouth.
Lerwick.	Douglas.	Barnstaple.	Berwick-on-Tweed.
Sealloway.	Castletown.	Boscastle.	Tynemouth.
Kirkwall.	Silloth.	Port Isaac.	S. Shields.
Holborn Head.	Maryport.	Newquay.	Sunderland.
Wick.	Workington.	Hayle.	Middlesborough.
Inverness.	Whitchaven.	Scilly.	Redcar.
Nairn.	Barrow.	St. Sennen.	Whithy.
Burghhead.	Morecambe.	St. Just.	Filey.
Lossiemouth.	Fleetwood.	Penzance.	Bridlington Quay.
Buckie.	Blackpool.	Falmouth.	Hull.
Portsoy.	Lytham.	Pendennis.	Goole.
Banff.	Southport.	Mevagissey.	Grimsby.
Fraserburgh.	Runcorn.	Plymouth.	Boston.
Peterhead.	Liverpool.	Teignmouth.	Sutton Bridge.
Aberdeen.		Exmouth.	Lynn.
Stonellaven.	ENGLAND, W.		Sheringham.
Montrose.	Connah's Quay.		Cromer.
Broughty Ferry.	Port Penrhyn.		
St. Andrews.	Holyhead.		
Dundee.	Port Dinorwic.		
Go'ness.	Carnarvon.		
Grangemouth.	Aberystwith.	ENGLAND, S.	ENGLAND, S.E.
Anstruther.	Milford.	Guernsey.	Yarmouth.
Pittenweem.	Pembrey.	St. Helier's	Southwold.
Burntisland.	Swansea.	(Jersey).	Ipswich.
Alloa.	Llanelli.	Gorey (Jersey).	Harwich.
Granton.	Briton Ferry.	Weymouth.	Chatham.
Newhaven.	Porthcawl.	Poole.	Sheerness.
Leith.	Penarth.	Cowes.	Faversham.
Fisherrow.	Cardiff.	Ryde.	
Dunbar.	Newport.	Portsmouth.	
Cockburnspath.	Weston-super-Mare.	Littlehampton.	
	Burnham.	Brighton.	
		Newhaven.	
		Hastings.	
	IRELAND, E.	Rye.	
	Belfast.	Dover.	
	Douaghadee.	Margate.	
	Howth.		
FIRTH OF CLYDE.	Kingstown.		
Glasgow.	IRELAND, S. and W.		
Greenock.	New Ross.		
Rothesay.	Dunmore East.		
Campbelton.	Dungarvan.		
Girvan.	Youghal.		
Ballantrae.	Queenstown.		
	Passage.		
	Kinsale.		
	Cork.		
	Tralee.		
	Limerick.		
	Galway.		

Circular No. 717.

TELEGRAPHIC WEATHER INTELLIGENCE.

Board of Trade, February 14th, 1874.

THE Board of Trade have been informed by the Meteorological Committee that they are now prepared to re-introduce the use of Admiral FitzRoy's signals (cones and drum) with slightly modified significations, and that the change will take effect on and after 15th March 1874.

The signals to be used will consist of:—

1. Cone, point downwards for Southerly gales; S.E. round by S. to N.W.
2. Cone, point upwards for Northerly gales; N.W. round by N. to S.E.
3. Drum, *with cone*, to indicate the probable approach of a *very heavy gale* from the direction indicated by the cone.*

The drum will not be used without the cone.

The signals are to be kept hoisted *during the daylight only*, until 48 hours have elapsed from the time *the telegram was despatched*, unless countermanded. At night, lanterns may be used wherever the local authorities deem it desirable to do so, as pointed out in the explanatory pamphlet† sent herewith, copies of which are supplied for gratuitous distribution.

It will be seen from the pamphlet in question that the meaning of the signals is that an atmospherical disturbance exists (which will be explained in the telegram), and will probably, but not *necessarily*, cause a gale at the place warned, *from the direction* indicated by the signal.

The Meteorological Office will supply the canvas shapes and lanterns to such places as require them, on loan, but 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 to the keeping of the apparatus in repair, painting, &c., as directed by the Circular No. 278, dated 30th November 1867.

THOMAS GRAY.

APPENDIX XII.

REPORT ON THE COMPARISON OF THE FORECASTS WITH THE WEATHER SUBSEQUENTLY EXPERIENCED, for the 12 Months, April 1881 to March 1885.

The letters used have the following signification:—

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

The Summary for the whole year is given at page 11.

* The "drum" is not in use at present.

† The "explanatory pamphlet" referred to is a circular entitled "Telegraphic Weather Intelligence" printed in large type on four pages, so as to be posted up on a board.

DISTRICTS.		APRIL 1884.				MAY 1884.				JUNE 1884.			
		Percentages.				Percentages.				Percentages.			
		Wind.	Weather.	Average.	a + b.	Wind.	Weather.	Average.	a + b.	Wind.	Weather.	Average.	a + b.
SCOTLAND, N.	a	30	47	44	75	61	58	60	84	53	50	52	90
"	b	30	33	31		16	32	24		37	40	38	
"	c	20	13	17		7	10	8		3	7	5	
"	d	10	7	8		16	0	8		7	3	5	
SCOTLAND, E.	a	57	60	59	84	68	55	62	84	63	44	54	77
"	b	20	30	25		19	26	22		17	30	23	
"	c	13	10	11		3	19	11		13	13	13	
"	d	10	0	5		10	0	5		7	13	10	
ENGLAND, N.E.	a	50	55	53	82	71	52	62	80	70	60	65	80
"	b	30	28	29		13	23	18		27	20	24	
"	c	13	10	11		6	19	12		3	7	5	
"	d	7	7	7		10	6	8		0	13	6	
ENGLAND, E.	a	50	55	53	87	52	45	49	79	70	60	65	90
"	b	37	31	34		32	29	30		23	27	25	
"	c	10	14	12		16	13	15		7	3	5	
"	d	3	0	1		0	13	6		0	10	5	
MIDLAND COS.	a	47	68	58	83	65	45	55	79	83	50	67	87
"	b	33	18	25		19	29	24		10	30	20	
"	c	13	14	14		16	13	15		7	0	3	
"	d	7	0	3		0	13	6		0	20	10	
ENGLAND, S.	a	57	62	60	90	61	55	58	84	77	50	64	80
"	b	37	24	30		29	23	26		20	30	25	
"	c	3	11	7		10	9	10		0	7	3	
"	d	3	3	3		0	13	6		3	13	8	
SCOTLAND, W.	a	45	55	49	77	48	55	52	78	53	63	58	77
"	b	17	38	28		23	29	26		27	10	19	
"	c	27	4	15		16	16	16		17	10	13	
"	d	13	3	8		13	0	6		3	17	10	
ENGLAND, N.W.	a	50	59	55	82	40	58	54	81	60	57	59	80
"	b	27	28	27		32	23	27		23	20	21	
"	c	10	10	10		13	6	10		17	3	10	
"	d	13	3	8		6	13	9		0	20	10	
ENGLAND, S.W.	a	33	59	46	70	52	55	54	75	70	60	65	82
"	b	33	15	24		26	16	21		20	13	17	
"	c	17	11	11		16	10	13		7	20	13	
"	d	17	15	16		6	19	12		3	7	5	
IRELAND, N.	a	27	45	36	64	55	65	60	80	47	53	50	78
"	b	23	33	28		29	23	26		33	23	28	
"	c	27	11	19		6	9	8		10	7	9	
"	d	23	11	17		10	3	6		10	17	13	
IRELAND, S.	a	43	63	53	82	45	55	50	86	47	67	57	79
"	b	27	30	29		30	32	35		30	13	22	
"	c	17	7	12		6	10	8		10	3	6	
"	d	13	0	6		10	3	6		13	17	15	

SUMMARY.

BRITISH ISLES	a	45	57	51	80	57	54	56	81	63	56	60	83
"	b	29	28	29		25	26	25		24	23	23	
"	c	15	11	13		11	12	12		9	7	8	
"	d	11	1	7		7	8	7		4	14	9	

DISTRICTS.		APRIL 1884.				MAY 1884.				JUNE 1884.			
		Percentages.				Percentages.				Percentages.			
		Wind.	Weather.	Average.	a + b.	Wind.	Weather.	Average.	a + b.	Wind.	Weather.	Average.	a + b.
SCOTLAND, N.	a	40	47	44	75	61	58	60	84	53	50	52	90
"	b	30	33	31		16	32	24		37	40	38	
"	c	20	13	17		7	10	8		3	7	5	
"	d	10	7	8		16	0	8		7	3	5	
SCOTLAND, E.	a	57	60	59	84	68	55	62	84	63	44	54	77
"	b	20	30	25		19	26	22		17	30	23	
"	c	13	10	11		3	19	11		13	13	13	
"	d	10	0	5		10	0	5		7	13	10	
ENGLAND, N.E.	a	50	55	53	82	71	52	62	80	70	60	65	89
"	b	30	28	29		13	23	18		27	20	24	
"	c	13	10	11		6	19	12		3	7	5	
"	d	7	7	7		10	6	8		0	13	6	
ENGLAND, E.	a	50	55	53	87	52	45	49	79	70	60	65	90
"	b	37	31	34		32	29	30		23	27	25	
"	c	10	14	12		16	13	15		7	3	5	
"	d	3	0	1		0	13	6		0	10	5	
MIDLAND COS.	a	47	68	58	83	65	45	55	79	83	50	67	87
"	b	33	18	25		19	29	24		10	30	20	
"	c	13	14	14		16	13	15		7	0	3	
"	d	7	0	3		0	13	6		0	20	10	
ENGLAND, S.	a	57	62	60	90	61	55	58	84	77	50	64	89
"	b	37	24	30		29	23	26		20	30	25	
"	c	3	11	7		10	9	10		0	7	3	
"	d	3	3	3		0	13	6		3	13	8	
SCOTLAND, W.	a	43	55	49	77	48	55	52	78	53	63	58	77
"	b	17	38	28		23	29	26		27	10	19	
"	c	27	4	15		16	16	16		17	10	13	
"	d	13	3	8		13	0	6		3	17	10	
ENGLAND, N.W.	a	50	59	55	82	49	58	54	81	60	57	59	80
"	b	27	28	27		32	23	27		23	20	21	
"	c	10	10	10		13	6	10		17	3	10	
"	d	13	3	8		6	13	9		0	20	10	
ENGLAND, S.W.	a	33	59	46	70	52	55	54	75	70	60	65	82
"	b	33	15	24		26	16	21		20	13	17	
"	c	17	11	14		16	10	13		7	20	13	
"	d	17	15	16		6	19	12		3	7	5	
IRELAND, N.	a	27	45	36	64	55	65	60	86	47	53	50	78
"	b	23	33	28		29	23	26		33	23	28	
"	c	27	11	19		6	9	8		10	7	9	
"	d	23	11	17		10	3	6		10	17	13	
IRELAND, S.	a	43	63	53	82	45	55	50	86	47	67	57	79
"	b	27	30	29		39	32	36		30	13	22	
"	c	17	7	12		6	10	8		10	3	6	
"	d	13	0	6		10	3	6		13	17	15	

SUMMARY.

BRITISH ISLES	a	45	57	51	80	57	54	56	81	63	56	60	83
"	b	29	28	29		25	26	25		24	23	23	
"	c	15	11	13		11	12	12		9	7	8	
"	d	11	4	7		7	8	7		4	14	9	

DISTRICTS.		JULY 1884.				AUGUST 1884.				SEPTEMBER 1884.			
		Percentages.				Percentages.				Percentages.			
		Wind.	Weather.	Average.	a + b.	Wind.	Weather.	Average.	a + b.	Wind.	Weather.	Average.	a + b.
SCOTLAND, N.	a	65	58	62	91	68	42	55	83	45	57	51	80
"	b	29	29	29		29	25	28		35	23	29	
"	c	3	7	5		0	26	13		10	13	12	
"	d	3	6	4		3	6	4		10	7	8	
SCOTLAND, E.	a	55	55	55	93	61	55	58	87	47	60	54	79
"	b	36	39	38		32	26	29		33	17	25	
"	c	6	3	4		7	13	10		17	17	17	
"	d	3	3	3		0	6	3		3	6	4	
ENGLAND, N.E.	a	52	52	52	83	65	49	57	90	43	63	53	83
"	b	29	32	31		26	39	33		33	27	30	
"	c	10	10	10		9	6	7		17	10	14	
"	d	9	6	7		0	6	3		7	0	3	
ENGLAND, E.	a	71	52	62	86	57	49	53	87	57	57	57	89
"	b	20	29	24		33	35	34		37	27	32	
"	c	3	16	10		7	13	10		6	6	6	
"	d	6	3	4		3	3	3		0	10	5	
MIDLAND COS.	a	74	58	66	87	73	52	63	89	30	57	44	79
"	b	13	29	21		24	29	26		53	17	35	
"	c	13	7	10		3	16	10		10	16	13	
"	d	0	6	3		9	3	1		7	19	8	
ENGLAND, S.	a	61	58	60	92	63	58	61	90	54	70	62	84
"	b	29	36	32		30	29	29		33	10	22	
"	c	10	6	8		7	10	9		13	17	15	
"	d	0	0	0		0	3	1		0	3	1	
SCOTLAND, W.	a	45	61	53	86	42	42	42	81	27	54	41	65
"	b	39	26	33		49	29	39		26	23	24	
"	c	10	10	10		3	10	7		37	10	24	
"	d	6	3	4		6	19	12		10	13	11	
ENGLAND, N.W.	a	55	49	52	84	58	45	52	79	40	47	44	70
"	b	32	32	32		32	23	27		23	30	26	
"	c	10	16	13		10	19	15		27	20	24	
"	d	3	3	3		0	13	6		10	3	6	
ENGLAND, S.W.	a	52	55	54	86	43	30	37	72	42	60	51	75
"	b	32	32	32		37	33	35		24	23	24	
"	c	13	7	10		13	20	16		24	7	15	
"	d	3	0	4		7	17	12		10	10	10	
IRELAND, N.	a	42	61	52	81	43	37	40	75	27	57	42	77
"	b	32	26	29		37	33	35		50	20	35	
"	c	16	3	9		13	13	13		17	20	19	
"	d	10	10	10		7	17	12		6	3	4	
IRELAND, S.	a	32	49	41	84	33	27	30	72	38	63	51	73
"	b	42	15	43		44	40	42		27	17	22	
"	c	16	3	10		20	17	19		21	10	15	
"	d	10	3	6		3	16	9		14	10	12	

SUMMARY.

BRITISH ISLES	a	55	55	55	86	55	44	50	82	41	59	50	78
"	b	30	32	31		34	31	32		34	21	28	
"	c	10	8	9		8	15	12		18	13	15	
"	d	5	5	5		3	10	6		7	7	7	

DISTRICTS.		OCTOBER 1884.				NOVEMBER 1884.				DECEMBER 1884.			
		Percentages.				Percentages.				Percentages.			
		Wind.	Weather.	Average.	a+b.	Wind.	Weather.	Average.	a+b.	Wind.	Weather.	Average.	a+b.
SCOTLAND, N.	a	40	17	44	84	43	64	54	90	35	61	48	82
"	b	40	40	40		40	33	36		39	29	34	
"	c	20	7	13		10	3	7		16	7	12	
"	d	0	6	3		7	0	3		10	3	6	
SCOTLAND, E.	a	47	67	57	89	47	60	54	79	26	49	38	75
"	b	40	23	32		27	23	25		42	32	37	
"	c	10	3	6		26	17	21		16	13	14	
"	d	3	7	5		0	0	0		16	6	11	
ENGLAND, N.E.	a	52	48	50	84	57	50	54	86	19	42	31	68
"	b	29	39	34		37	27	32		55	19	37	
"	c	6	0	3		3	20	11		16	23	19	
"	d	13	13	13		3	3	3		10	16	13	
ENGLAND, E.	a	55	61	58	90	30	43	37	75	36	35	36	68
"	b	32	32	32		40	37	38		32	23	32	
"	c	3	0	2		30	17	23		16	26	21	
"	d	10	7	8		0	3	2		6	16	11	
MIDLAND COS.	a	45	65	55	92	47	44	46	86	32	40	41	78
"	b	15	29	37		27	53	40		39	35	37	
"	c	3	0	2		26	3	14		26	13	19	
"	d	7	6	6		0	0	0		3	3	3	
ENGLAND, S.	a	42	61	52	91	40	50	45	87	39	48	44	78
"	b	49	29	39		14	40	42		42	26	34	
"	c	3	3	3		13	5	8		16	16	16	
"	d	6	7	6		3	7	5		3	10	6	
SCOTLAND, W.	a	23	14	31	64	24	50	37	64	26	42	34	67
"	b	37	23	30		33	20	27		29	36	33	
"	c	23	13	18		10	30	35		26	3	14	
"	d	17	20	18		3	0	1		19	19	19	
ENGLAND, N.W.	a	49	52	51	80	17	54	51	76	32	45	39	79
"	b	29	29	29		17	33	25		39	42	40	
"	c	16	16	16		26	7	16		16	10	12	
"	d	6	3	4		10	6	8		13	3	8	
ENGLAND, S.W.	a	55	49	52	85	40	54	47	82	48	61	55	84
"	b	23	12	33		37	33	35		39	20	29	
"	c	16	6	11		13	7	10		3	6	5	
"	d	6	3	4		10	6	8		10	13	11	
IRELAND, N.	a	61	48	55	81	30	64	47	81	39	61	50	87
"	b	29	39	29		47	20	34		48	26	37	
"	c	6	7	7		13	13	13		13	10	12	
"	d	13	6	9		10	3	6		0	3	1	
IRELAND, S.	a	19	12	16	83	33	57	45	79	39	55	47	78
"	b	32	42	37		10	27	34		32	29	31	
"	c	3	6	4		10	16	13		19	6	12	
"	d	16	10	13		17	0	8		10	10	10	

SUMMARY.

BRITISH ISLES	a	47	53	50	84	40	54	47	80	34	50	42	77
"	b	34	33	34		35	31	33		40	29	35	
"	c	10	6	8		19	12	16		17	12	14	
"	d	9	8	8		6	3	4		9	9	9	

DISTRICTS.		JANUARY 1885.				FEBRUARY 1885.				MARCH 1885.			
		Percentages.				Percentages.				Percentages.			
		Wind.	Weather.	Average.	a+b.	Wind.	Weather.	Average.	a+b.	Wind.	Weather.	Average.	a+b.
SCOTLAND, N.	a	39	55	47	81	32	54	43	81	52	61	57	86
"	b	32	36	31		39	36	38		29	29	29	
"	c	16	3	10		22	10	16		16	10	13	
"	d	13	6	9		7	0	3		3	0	1	
SCOTLAND, E.	a	32	45	39	76	50	61	57	77	52	68	60	89
"	b	39	36	37		29	11	20		32	26	29	
"	c	16	13	15		18	18	18		13	6	10	
"	d	13	6	9		3	7	5		3	0	1	
ENGLAND, N.E.	a	29	49	39	87	43	50	47	83	58	61	60	84
"	b	61	35	48		29	43	36		29	20	24	
"	c	10	13	12		18	0	9		10	16	13	
"	d	0	3	1		19	7	8		3	3	3	
ENGLAND, E.	a	19	29	44	89	36	32	34	81	45	58	52	91
"	b	48	12	45		50	43	47		39	39	39	
"	c	3	10	7		7	18	12		6	3	4	
"	d	0	9	4		7	7	7		10	0	5	
MIDLAND COS.	a	12	55	49	83	32	29	31	74	49	65	57	90
"	b	45	23	34		35	50	43		39	26	33	
"	c	13	9	11		25	7	16		6	6	6	
"	d	0	13	6		7	14	19		6	3	4	
ENGLAND, S.	a	61	49	55	86	46	32	39	79	58	61	60	92
"	b	29	32	31		32	47	40		32	32	32	
"	c	19	13	11		18	14	16		0	0	0	
"	d	0	6	3		4	7	5		10	7	8	
SCOTLAND, W.	a	26	52	39	75	29	61	47	72	39	65	52	81
"	b	42	29	36		25	25	25		32	26	29	
"	c	23	16	19		28	0	14		13	3	8	
"	d	9	3	6		18	11	14		16	6	11	
ENGLAND, N.W.	a	39	52	46	84	32	50	41	72	32	62	47	81
"	b	42	35	38		36	25	31		36	32	34	
"	c	19	7	13		14	4	9		19	3	11	
"	d	0	6	3		18	21	19		13	3	8	
ENGLAND, S.W.	a	52	74	63	88	50	39	45	81	55	61	58	89
"	b	29	20	25		25	47	36		29	32	31	
"	c	16	6	11		18	7	12		13	0	6	
"	d	3	0	1		7	7	7		3	7	5	
IRELAND, N.	a	42	71	57	88	47	57	52	83	30	65	48	82
"	b	42	20	31		32	29	31		43	26	34	
"	c	13	6	9		7	4	5		20	6	13	
"	d	3	3	3		14	19	12		7	3	5	
IRELAND, S.	a	36	65	51	81	54	39	47	81	17	49	33	74
"	b	42	19	30		21	47	34		50	32	41	
"	c	19	10	15		18	7	12		23	13	18	
"	d	3	6	4		7	7	7		10	6	8	

SUMMARY.

BRITISH ISLES	a	41	55	48	84	41	46	44	78	44	62	53	85
"	b	41	30	36		32	37	34		35	29	32	
"	c	14	10	12		18	8	13		13	6	10	
"	d	4	5	4		9	9	9		8	3	5	

APPENDIX XIV.

LIST of STATIONS from which DAILY SYNCHRONOUS OBSERVATIONS
(at Oh. Sm. p.m. G. M. T.) have been received in 1884.

Stations.	Observers.	Remarks.
ENGLAND AND WALES.		
Bolton - - -	Rev. T. Mackereth, F.R.A.S.	--
Bradford - - -	J. McLaudsborough, F.R.A.S., F.R. Met. Soc.	--
Chatham, School of Military Engineering.	G. A. Pickles, L.-Corp., R.E.	--
Falmouth Observatory -	The Staff.	--
Greenwich Observatory -	The Staff, for the Astronomer Royal.	--
Guernsey - - -	A. Collenette, F.R. Met. Soc.	--
Kew Observatory -	The Staff.	--
Leicester (Museum) -	J. C. Smith.	--
Liverpool Observatory (Bidston).	J. Hartnup, Jun.	--
Oxford, Radcliffe Obs. -	The Staff.	--
Plymouth - - -	J. Merrifield, LL.D., F.R.A.S.	--
Silloth - - -	Rev. F. Redford, M.A., F.R.S.E.	--
Stonyhurst Observatory -	The Staff.	--
SCOTLAND.		
Aberdeen Observatory -	The Staff.	--
Glasgow Observatory -	The Staff.	--
Orkneys (Sandwick Manse).	Rev. C. Clouston, LL.D.	--
IRELAND.		
Armagh Observatory -	Dr. J. L. E. Dreyer.	--
Galway, Queen's College	M. J. O'Donoghue.	--
Valencia Observatory -	The Staff.	--
BRITISH COLONIES, POSSESSIONS, &c.		
Barbados, W. I. - - -	Surgeon-Maj. in charge.	--
Gibraltar - - -	Surgeon Gen. in charge.	--
Malta - - -	A. King.	--
Nassau (Bahamas) -	C. L. Duncombe.	--
Natal - - -	Surgeon-Maj. in charge.	--
Scutari, British Cemetery	Serg. W. H. Lyne, R.E.	--
Sierra Leone - - -	Surgeon-Maj. in charge.	--

SUMMARY.

England and Wales -	13
Scotland - - -	3
Ireland - - -	3
British Colonies and Possessions - - -	7
Total	26

APPENDIX XV.

METHODS FOLLOWED IN DEALING WITH METEOROLOGICAL RETURNS FROM LAND STATIONS IN THE UNITED KINGDOM.

These stations are of five classes, as stated on page 18.

1.—*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 and wet-bulb thermograms, of the anemograms, and of Beekley's 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 regulations which have been adopted to secure this end will be found fully detailed in the Report of the Office for 1868. They comprise rules for the guidance of observers, as well as of the assistants charged with the examination of the work at the Office. Attention need be called here to only two of these rules, viz.: (*a*) the use of subsidiary sheets on which are entered the results of a second set of measurements of the curves, made after, and quite independently of, the first set and with a different scale the two sets of measures 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 10, and in doubtful cases to many more, per month for each element. The attention of the observers is always drawn to such errors as may be detected, and to any failures in the continuity of the curves arising from failure of the light, stoppage of the clock, defective photography, faulty action of the wet-bulb thermometer, &c.; a report containing the results of the examination of each Observatory being also submitted to the Council each month and printed in their minutes. The curves and tabulations are eventually bound and stored in the Office.

Results of
examination and
report to
Council.

Chart plates.

In the more recent numbers of the Quarterly Weather Report (for 1876) plates of charts are issued showing the conditions of barometrical pressure and wind for Western Europe for 8 a.m. and 6 p.m. each day, each plate containing 36 charts.

General super-
vision of
observatory
work.

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

Harmonic
analyser.

The photographic curves are also used in the harmonic analyser; they require little or no preparation for this purpose beyond that necessary for their reduction for the Quarterly Weather Report.

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

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

The record having been made as complete as possible, the daily, five-daily, and monthly means of the barometer and of the dry-bulb and wet-bulb thermometers are obtained by addition. Means.

The hourly vapour tension is then computed by an expansion of Glaisher's Hygrometrical Tables, prepared in the Office, and the work independently checked. Vapour tension.

A copy is next prepared of the above-mentioned hourly measurements of the barometer, dry-bulb and wet-bulb thermometers, wind and rain curves, and of the computed values of vapour tension. To these are added the daily means of the three first-mentioned elements, the extremes and daily range of pressure and temperature, and the daily totals of rainfall, and the whole series is printed and published under the title of "Hourly Readings from the Self-recording Instruments at the Seven Observatories under the Meteorological Council." Hourly Readings.

To ensure accuracy the sheets are read over in proof with the originals. The interpolated readings are printed in *italic* type, but no distinguishing mark is affixed to means which are partly based on them. When the gap in the record is too long to be dealt with by an interpolation of the missing hourly readings, the mean for the day is obtained by an interpolation from the adjacent daily means, and the result thus obtained is printed as an approximation.

The five-daily, monthly, and annual means, together with the absolute extremes of pressure and temperature for each month, have hitherto been published as an appendix to the Quarterly Weather Report, but in future, beginning with the volume for 1881, these values will be printed at the end of the "Hourly Readings." As before the tables will be repeated in French measures. Tables for the Quarterly Weather Report

The gale tables printed in the text of the Quarterly Weather Report, which show the extent, duration, and degree of severity of all the stronger gales, are prepared from the tabulations of the anemograms received from the self-recording observatories, together with those received from the six extra anemographic stations. Gale tables.

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

The anemograms received from the six stations enumerated on page 95 are regularly examined and tabulated in the Office, and the sheets bound up in volumes. Besides special inquiries on legal and other points that from time to time arise, and in which these documents are of the highest importance, the tabulations are always employed in the preparation of the chronicle and gale tables for the Quarterly Weather Report. They are also regularly used in the checking of the storm warnings issued by the Office.

III.—*Method followed with regard to the Returns from Land Stations of the Second Order.*

Ever since the year 1866 returns of more or less completeness have been received from land stations in the United Kingdom. In that year there was only one station, but by 1871 the number had increased to Origin and progress of system.

15, and five years later to 49, including 14 stations belonging to the Royal Meteorological Society, copies of the returns from which were sent to the Office under a special arrangement with the Society.

At the end of the present year the total number of stations is 68, including 15 belonging to the Royal Meteorological Society and 5 belonging to the Scottish Meteorological Society.

This number is exclusive of the self-recording observatories, and of the anemographic stations, but it includes several from which only very scanty information is received.

The stations are distributed as follows: 38 in England, 4 in Wales, 10 in Scotland, and 16 in Ireland.

The returns are received at the Office monthly, and are duly entered and stored.

Publication on
Form A.

The publication of the returns is carried out in the following way: For a certain number of stations the observations of pressure, temperature, wind, cloud amount, and weather at 9 a.m. and 9 p.m. each day, together with the computed vapour tension and relative humidity at those hours, and the daily maxima and minima of temperature, and daily rainfall, are published *in extenso* on the Form, A., proposed by the Permanent Committee of the First International Meteorological Congress at Vienna in 1874, and adopted for international use by the Second International Meteorological Congress at Rome in 1879.

The Permanent Committee assigned an inferior limit to the number of stations from which returns should be published *in extenso*, varying from two for Belgium to 100 for Russia in Asia, the number in the case of the United Kingdom being 15. In 1875, when the systematic publication of returns from Stations of the Second Order began, only nine British stations were available, but this number has steadily grown, until for 1880 returns from 33 stations were published on the A. Form. Though this list could be extended if desired, it has been thought better to curtail it somewhat on account of the size of the publication. The volume for 1881, now passing through the press, will therefore contain returns, *in extenso*, from only 30 stations.

Additions to the
list for publi-
cation.

Care is taken in adding to the list for publication to see, first, that the station is satisfactory as regards its instruments, their exposure, &c.; secondly, that the returns bear internal evidence of accuracy and care in their preparation; and thirdly, that the district represented by the station is one for which information is needed.

Examination of
the returns.

All the returns selected for publication on Form A. are carefully examined and compared before being copied for the printer. The reduction of all the barometer readings to 32° Fahr. at mean sea level, is checked, and the corrected readings are then compared with the isobars on the Daily Weather Charts and readings at neighbouring stations for the day, allowance being made for any difference in time and the corresponding change in barometric pressure.

The correction of the readings of the dry-bulb and damp-bulb thermometers is checked, and the maxima and minima temperatures are compared with the dry-bulb thermometer readings over the same periods to ensure that they are the extreme temperatures registered.

The computed values of the vapour tension and the relative humidity are examined from the tables. The cloud amount is compared with the weather at the time of observation, and finally, the sums and means are all re-calculated.

Doubtful
readings.

If any readings are doubtful, reference is made through the observer to the original observation book. If no fresh light is thrown on the question by this means, and if on reconsideration the reading still appears to be wrong, it is rejected, and the probable reading is inserted

in its place, but printed in different type as an interpolation. These probable readings are used in obtaining the monthly means. Similarly, if from any cause a set of readings has been omitted, the gap is filled by an interpolation, and the probable values are printed in different type.

Apparent errors, or discrepancies, in the working on the sheet are also referred to the observer before alteration.

The observations are taken at 9 a.m. and 9 p.m. local time each day. It sometimes happens, however, that strict punctuality cannot be observed. In such cases, if the difference in time does not exceed 30 minutes, the observations are, in most cases, printed without alteration. When the difference exceeds 15 minutes, a note is inserted in the remarks showing the exact time of observation. If the difference in time is more than half-an-hour, the readings are usually rejected and an interpolation made.

Unpunctual
observations

Besides this publication in full, the monthly means of the various elements, together with summaries of the wind direction and of the weather, are published on the Form, B., also devised by the Permanent Committee of the Vienna Congress, and adopted by the Roman Congress.

Returns from six stations were published in this manner for the year 1873, and from nine stations for the year 1874. In 1875 the list included the names of 26 stations. This number has grown to 45 for the year 1881, and might be even further increased.

All the stations, returns from which are published *in extenso* on Form A., are included in the Form B. list. But this list also includes others, either not quite so good, not so representative, or not so long established. The method of preparation is in the main the same as in the case of the Form A. But the summaries of wind and weather are specially prepared for this publication. For wind, the summary shows the number of observations at 9 a.m. and 9 p.m. under each of the bi-quadrantal points N., N.E., E., &c., the observations under intermediate points being thrown alternately forward and backward. For weather, the summary gives the number of days of rain, snow, hail, thunderstorm, clear sky, overcast, and gale. The days of clear sky and overcast are those when the mean of the cloud amounts at 9 a.m. and 9 p.m. are less than 2, and more than 8 respectively. The days of gale are those when force 7 or upwards, by Beaufort scale, is recorded.

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

New stations

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 complete and perfect the returns.

The daily records of sunshine which are now received from 29 Stations in the British Islands are examined generally to guard against accidental changes in the adjustment of the instrument. After their

Sunshine
records.

receipt has been acknowledged, the cards are duly stamped and dated and then stored in the Office.

A tabulation of these curves is published as part of the Weekly Weather Report, mentioned in Appendix VIII., and for those stations which are also Stations of the Second Order the monthly totals of bright sunshine in hours, together with the percentage of its possible duration, is published as Part IV. of "Returns from Stations of the Second Order."

spection.

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

IV.—*Telegraphic Reporting Stations.*

Full particulars relating to these stations, the information received from them, and the method of dealing with that information, will be found in Appendix VIII. A paragraph in that Appendix (p. 71) explains the use that is made of the monthly schedules sent in by the observers.

V.—*Extra Stations.*

No returns from Stations of the Fifth Class are published by the Office, but some of them are regularly used in the checking of the storm-warnings, and all are available for any special investigation that may be taken up.

The rainfall values at these stations are, however, copied and supplied to Mr. Symons, F.R.S., for publication in "British Rainfall."

APPENDIX XVI.

LIST OF DOCUMENTS RELATING TO THE LAND METEOROLOGY OF THE BRITISH ISLANDS, RECEIVED DURING THE YEAR ENDING
MARCH 31ST, 1885.

Stations.	Observers.	Nature of Information received.	Notes.
I. †Valencia -	J. E. Cullum -	Continuous records of pressure, temperature, wind, sunshine, and rain, with notes on the weather.	
†Aberdeen -	Prof. C. Niven, M.A., F.R.S. -		
†Falmouth -	E. Kitto, F.R. Met. Soc. -		
Stonyhurst -	Rev. S. J. Perry, F.R.S. -		
†Kew -	G. M. Whipple, B.Sc., F.R.A.S., F.R. Met. Soc. -		
†Armagh -	J. L. E. Dreyer, Ph.D., F.R.A.S. -		
II. †Alnwick Castle -	Lt.-Col. F. Holland, for the Duke of Northumberland. -	Continuous record of wind, rainfall, and sunshine.	
†Holyhead -	Hugh Williams, C.E. -	Continuous record of wind (direction and velocity).	
†Sandwick -	The late Rev. C. Clouston, LL.D., and Miss Clouston. -	" " and sunshine.	
†Seaham -	G. H. Aird -	" " "	
†Scilly -	W. Thomas -	" " "	
†Yarmouth -	G. T. Watson -	" " "	
†Kilkenny Castle -	The Marquis of Ormonde -	Continuous record of pressure.	
Waterford -	The Harbour Authorities -	" " "	
III. †Armagh* -	J. L. E. Dreyer, Ph.D., F.R.A.S. -	Regular observations at 9 a.m. and 9 p.m. of pressure, temperature, wind, cloud and weather, with the daily maxima and minima of temperature, and rainfall, and remarks on the weather generally.	
†Aysgarth -	Rev. Fenwick W. Stow, M.A., F.R. Met. Soc. -		
†Babbacombe -	E. E. Glyde, F.R. Met. Soc. -		
†Braemar -	James Aitken, J.P., F.R. Met. Soc. -		
†Buxton -	E. J. Sykes, M.B., F.R.A.S., F.R. Met. Soc. -		
†Carmarthen -	G. J. Heander, M.D. -		
†Chatham -	Corpl. Pickles, and W. Skipper for Instructor in Surveying. -		
†Cheadle -	J. C. Philips, Esq. -		
†Cheltenham -	R. Tyrer, B.A., F.R. Met. Soc. -		
†Churchstoke* -	Philip Wright, F.C.S., F.R. Met. Soc. -		

* The stations so marked supply sunshine records.

LIST OF DOCUMENTS—continued.

Stations.	Observers.	Nature of Information received.	Notes.
† Colebrook -	W. Ferguson, for Sir Victor Brooke, Bt., F.L.S.		
† Douglas, Isle of Man*	A. W. Moore, M.A., J.P., F.R. Met. Soc.		
† Dublin (Botanic Gardens, Glasnevin).	F. W. Moore, Esq.		
† Dublin (City)	J. W. Moore, M.D., F.R. Met. Soc.		
† Dublin (Phoenix Park)*	Maj. J. C. Macpherson, R.E., Ordnance Survey		
‡† Dundee	W. Ross McKelvie, Esq.		
‡† Dunrobin Castle	D. Melville		
† Gledeston (Suffolk)*	E. T. Dowson, F.R. Met. Soc.		
† Glendalmond -	W. Bezaunt Lowe, M.A., and Rev. A. H. S. Patrick, M.A.		
‡ Harestock, Hants	Lt. Col. H. S. Knight, F.R. Met. Soc.		
‡ Hillington*	Rev. H. E. B. Ffolkes, M.A., F.R. Met. Soc.		
† Jersey (St. Aubin's)*	J. E. Vibert, M.A.		
‡ Killarney -	Rev. G. R. Wynne, M.A., F.R. Met. Soc.		
† Llandale (Argyleshire)	A. Fletcher, for T. H. G. Newton, M.A., J.P., F.R. Met. Soc.		
‡ Llandudno,*	J. Nicol, M.D., J.P., F.R. Met. Soc.		
† Leicester*	J. C. Smith, for Museum Authorities		
† Londonderry -	J. Conroy, F.R. Met. Soc.		
‡ Margate -	J. Stokes, F.R. Met. Soc.		
† Markree Castle, Sligo*	A. Marth, F.R.A.S., for Col. Cooper, F.R.A.S.		
‡ Marlborough -	Rev. T. A. Preston, M.A., F.R. Met. Soc.		
† Newton Reigny (Pentrich)*	T. G. Benn, F.R. Met. Soc.		
† Parsonstown*	George Phillips and Benj. Budds, for the Earl of Rosse, F.R.S.		
† Peel, Isle of Man	T. H. Davis, F.R. Met. Soc.		
		Regular observations at 9 a.m. and 9 p.m. of pressure, temperature, wind, cloud and weather, with the daily maxima and minima of temperature, and rainfall, and remarks on the weather generally.	From July 1884.

LIST OF DOCUMENTS--continued.

Stations.	Observers.	Nature of Information received.	Notes.
<p>† Pinnore -</p> <p>† Prestwich -</p> <p>† Rothsay -</p> <p>† Sandwick* -</p>	<p>Peter Donald -</p> <p>T. R. H. Clunn, M.D. -</p> <p>James Kay, Esq. -</p> <p>The late Rev. C. Clouston, LL.D., and Miss Clouston.</p>		
<p>† Scabley -</p> <p>† Scarborough -</p> <p>† Seabam -</p> <p>† Southampton* -</p>	<p>R. A. Allison, F.R. Met. Soc. -</p> <p>Allan Rowntree, F.R. Met. Soc. -</p> <p>G. H. Aird -</p> <p>J. T. Cook, R.E., for Director General of the Ordnance Survey.</p>	Regular observations at 9 a.m. and 9 p.m. of pressure, temperature, wind, cloud and weather, with the daily maxima and minima of temperature, and rainfall, and remarks on weather generally.	
<p>† Stokesay -</p> <p>† Stonyhurst -</p> <p>† Stratfield Turgiss -</p> <p>† St. David's, Pembroke -</p> <p>† St. Leonards* -</p> <p>† Totnes -</p> <p>† Uppingham -</p> <p>† Wakefield -</p> <p>† Ware, Herts -</p> <p>† York* -</p>	<p>Miss M. A. Digges La Touche -</p> <p>Rev. S. J. Perry, F.R.S. -</p> <p>Rev. C. H. Griffith, B.D., F.R. Met. Soc. -</p> <p>W. P. Probert, LL.D., F.G.S., F.R. Met. Soc. -</p> <p>H. Colborne, M.R.C.S. -</p> <p>T. H. Edmunds, F.R. Met. Soc. -</p> <p>Rev. G. H. Mullins, M.A., F.R. Met. Soc. -</p> <p>H. Clarke, LL.R.C.P., F.S.S., F.R. Met. Soc. -</p> <p>Rev. B. Ward -</p> <p>H. M. Platbauer, Esq. -</p>		Till June 1884.
IV. The Telegraphic Stations, see List on p. 47.			
V. Baltimore -	J. Halsey -		
Castletownsend -	Lieut. T. W. Cobb, R.N. -		
Crookhaven -	" -		
Crosshaven -	J. W. Bridle -		
† Cooper's Hill (Egham) -	Prof. H. McLeod, F.R.S. -		

* The stations so marked supply sunshine records.

APPENDIX XVII.

ACCESSIONS TO THE LIBRARY DURING THE YEAR ENDING
31ST MARCH 1885.

A—AGRICULTURE AND BOTANY.

* || **Becquerel, [A. C.]**—Mémoire sur les forêts et leur influence climatérique. Lu le 22 mai 1865. 148 pp. 4°. [*Mém. Acad. Sc., Paris*, xxxv., 1866, p. 371.]

Commissioner of Agriculture, Washington.—Report . . . for the year 1883. 496 pp., with plates, 8°. Washington, 1883.

|| **Stellwaag, A.**—Untersuchungen über die Temperaturerhöhung verschiedener Bodenconstituenten und Bodenarten bei Condensation von flüssigem und dampfförmigem Wasser, sowie von Gasen. 19 pp. 8°. (*Forschungen auf dem Geb. Agrik.-phys., Heidelberg. Bd. v., Heft 3/4*, p. 210.)

Ufficio centrale di Meteorologia, Roma.—Rivista Meteorico-Agraria. Anno V., 1884, Nos. 1-36. la. 8°. (Roma, 1884-85.)

|| **Wollny, E.**—Beiträge zur Frage des Einflusses des Klimas und der Witterung auf den Kohlensäuregehalt der Bodenluft. 18 pp. 8°. (*Forschungen auf dem Geb. Agrik.-phys., Heidelberg. Bd. v., Heft 3/4*, p. 299.)

|| ———.—Bericht über die Verhandlungen und Ergebnisse der internationalen Conferenz für land- und forstwirtschaftliche Meteorologie, abgehalten in Wien in den Tagen vom 6-9 September 1880. Aus den Sitzungsprotokollen zusammengestellt und mit Bemerkungen versehen. 31 pp. 8°. (*Forschungen auf dem Geb. Agrik.-phys., Heidelberg. Bd. iv., Heft 3/4*.)

* ———.—Der Einfluss der Pflanzendecke und Beschattung auf die physikalischen Eigenschaften und die Fruchtbarkeit des Bodens. vi. + 197 pp., 10 plates, la. 8°. Berlin, 1877.

|| ———.—Die Hochwasserschäden und deren Verhütung in Rücksicht auf die Bodenkultur. 37 pp. 8°. (*Forschungen auf dem Geb. Agrik.-phys., Heidelberg. Bd. vi., Heft 3/4*.)

|| ———.—Ueber die Thätigkeit niederer Organismen in Boden. Vortrag, gehalten am 30 Juni 1883 auf der hygienischen Ausstellung in Berlin von Dr. E. Wollny. 26 pp. 8°. Braunschweig, 1883. (*Deutsch. Vierteljahrsschr. für öffentliche Gesundheitspflege*.)

|| ———.—Untersuchungen über den Einfluss der Exposition auf die Erwärmung des Bodens. 32 pp. 8°. (*Forschungen auf dem Geb. Agrik.-phys., Heidelberg. Bd. i., Heft 4*.)

|| ———.—Untersuchungen über den Einfluss des Wassers auf die Bodentemperatur. 44 pp., 2 plates, 8°. (*Forschungen auf dem Geb. Agrik.-phys., Heidelberg. Bd. iv., Heft 3/4*.)

|| ———.—Untersuchungen über den Einfluss der Exposition des Bodens auf dessen Feuchtigkeitsverhältnisse. 12 pp. 8°. (*Forschungen auf dem Geb. Agrik.-phys., Heidelberg. Bd. vi., Heft 5*.)

|| ———.—Untersuchungen über den Einfluss der Pflanzendecke und der Beschattung auf die physikalischen Eigenschaften des Bodens. Erste Mittheilung. 60 pp., 2 plates, 8°. (*Forschungen auf dem Geb. Agrik.-phys., Heidelberg. Bd. vi., Heft 3/4*.)

|| ———.—Untersuchungen über den Einfluss des Bodens und der landwirthschaftlichen Kulturen auf die Temperatur- und Feuchtigkeitsverhältnisse der atmosphärischen Luft. Erste Mittheilung. 25 pp. 8°. (*Forschungen auf dem Geb. Agrik.-phys., Heidelberg. Bd. vii., Heft 1/3*, p. 209.)

|| ———.—Untersuchungen über die Wasserverbrauchsmengen der landwirthschaftlichen Kulturpflanzen in Rücksicht auf die agrarmeteorologischen Verhältnisse. 28 pp. 8°. (*Forschungen auf dem Geb. Agrik.-phys., Heidelberg. Bd. iv., Heft 1/2*.)

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.

B—ASTRONOMY.

Billotti, L.—Teoria degli stromenti ottici con applicazioni ai telescopi ed alla fotografia celeste. (Pubbl. R. Osserv. di Brera in Milano, N. xxv.) xx. + 237 pp., 7 plates, sm. 8°. Milano, 1883.

Copeland, R.—An account of some recent astronomical experiments at high elevations in the Andes. 39 pp. 4°. Dublin, 1884. (*Copernicus*, vol. 3, 1883, p. 193.)

|| (**D[reyer], J. L. E.**)—Observatory. 8 pp. 4°. (*Encyclop. Brit.*, 9th ed.)

K. K. Sternwarte zu Prag.—Astronomische, magnetische und meteorologische Beobachtungen an der k. k. Sternwarte zu Prag im Jahre 1883. Auf öffentliche Kosten herausgegeben von **L. Weinek**. 44 Jahrg. xix. + 56 pp., 1 plate, la. 4°. Prag, s.a.

Oppolzer, T. von.—Über den Zusammenhang der Refraction mit der Temperaturvertheilung in der Atmosphäre. Vortrag gehalten in der Festsitzung, welche die meteorologische und die geographische Gesellschaft zu Ehren der in Wien versammelten Polarcommission am 21 April 1884 veranstaltet haben. 14 pp., la. 8°. Wien, 1884. (*Beilage zum Maiheft 1884 der Zeitschr. Oesterr. Gesellsch. Meteor.*)

Royal Astronomical Society, London.—Memoirs. Vol. xviii., Part I, 1884. 1 vol. with plates, 4°. London, 1884.

———.—Monthly Notices . . . containing papers, abstracts of papers, and reports of the proceedings of the Society, from November 1883 to November 1884. Vol. xlv., with plates, 8°. London, 1884.

Royal Observatory, Greenwich.—Report of the Astronomer Royal to the Board of Visitors of the Royal Observatory, Greenwich, read at the annual visitation of the Royal Observatory, 1884, June 7. (By **W. H. M. Christie**.) 15 pp. la. 4°. [London, 1884.]

C—ATMOSPHERIC PRESSURE.

|| (**Blanford, H. F.**)—[On the autographic trace of the Calcutta barograph on the days of 26th—30th August, 1883, showing the effects of the eruption of Krakatoa.] 3 pp., 1 plate, 8°. (*Proc. Asiatic Soc. Bengal*, 1884. *Mch.*)

|| **Denza, F.**—Confronti di barometri. 16 pp., la. 8°. (*Suppl. Meteor. Ital.*, 1869.)

———.—Studi sui barometri normali dell' Osservatorio centrale di Moncalieri con alcuni cenni sui termometri normali dell' Osservatorio medesimo. 60 pp., sm. 8°. Torino, 1881.

———.—Studi sui barometri normali dell' Osservatorio centrale di Moncalieri. Nota seconda. 23 pp., sm. 8°. Torino, 1883.

|| **Paul, H. M.**—Barometric waves of very short period. 11 pp. la. 8°. Detroit, [1884]. (*Amer. Meteor. Journ.*, I., No. 1, p. 17.)

|| ———.—Electric potential and gaseous pressure. 4 pp. la. 8°. Detroit, [1884]. (*Amer. Meteor. Journ.*, I., 1884, Aug., p. 150.)

|| **Ragona, D.**—Onde atmosferiche prodotte dalla eruzione del Krakatoa in Agosto 1883. 7 pp., 2 plates, sm. 8°. Torino, 1884. [*Boll. mensile Soc. meteor. ital.* Serie II., vol. iv., p. 49.]

|| **Rykatchew, —.**—Note sur les ondes atmosphériques produites par l'éruption de Krakatoa. 21 pp., 1 plate, 8°. (*Mél. Phys. et Chim.*, St. Petersburg, xii., p. 167.)

|| **Schiaparelli, E. G.**—Osservazioni fatte a Milano sopra il passaggio delle onde atmosferiche prodotte dall' eruzione del vulcano Krakatoa nello Stretto della Sonda. 13 pp., 1 plate, la. 8°. (Milan, 1884.) (*Rend. R. Ist. Lombardo*, Serie II., vol. xvii., fasc. v.)

|| **Scott, R. H.**—Note on a series of barometrical disturbances which passed over Europe between the 27th and the 31st of August, 1883. Note on the foregoing Paper by Lieut.-General **R. Strachey**. 13 pp., 1 plate, 8°. (*Proc. R. Soc.*, xxxvi., 1883, p. 139.)

D—AURORA.

|| **Denza, F.**—Le aurore polari in Italia nell' anno 1882. Nota prima. L'aurore polare del 16–17 Aprile 1882. 22 pp., la. 8°. Torino, 1883. (*Atti R. Accad. Sc. Torino*, xviii., 1883.)

|| **Denza, F.**—Le aurore polari in Italia nell' anno 1882. Nota seconda. L'aurore polare del 19-20 Aprile 1882. 15 pp. la. 8°. Torino, 1883. (*Atti R. Accad. Sc. Torino*, xviii., 1883.)

E—BIBLIOGRAPHY.

* **Hellmann, G.**—Repertorium der deutschen Meteorologie. Leistungen der Deutschen in Schriften, Erfindungen und Beobachtungen auf dem Gebiete der Meteorologie und des Erdmagnetismus von den ältesten Zeiten bis zum Schlusse des Jahres 1881. xxii. + 966 pp., 2 plates, la. 8°. Leipzig, 1883.

F—CLIMATE AND HYGIENE.

Danckelman, A. v.—Bemerkungen zu der klimatologischen Tafel der meteorologischen Station Omaruru (Damaraland). 7 pp. 8°. s.l.e.a.

Doering, O.—Ideas sobre una exploracion sistematica del clima de la provincia de Córdoba sin instrumentos. Conferencia pública dada en el Instituto Geográfico Argentino, Sección Córdoba, el 17 de Agosto de 1883. 12 pp. 8°. Córdoba, 1883.

* **Hettner, A.**—Das Klima von Chile und Westpatagonien. Erster Theil. Luftdruck und Winde. Meeresströmungen. 55 pp., 1 plate, 8°. Bonn, 1881.

Inspector General of Customs, Peking.—Medical reports for the half-years ended 30th September 1883 and 31st March 1884. 26th and 27th Issues. 2 parts. 4°. Shanghai, 1884.

* **International Health Exhibition, London, 1884.**—Meteorology in relation to Health. Conferences by the Royal Meteorological Society, Thursday and Friday, July 17 and 18. Some relations of meteorological phenomena to health. (By **J. W. Tripe**.) English climatological stations. (By **G. J. Symons**.) The Equinoctial gales—do they occur in the British Isles? (By **R. H. Scott**.) Some occasional winds and their influence on health. (By **W. Marriott**.) Cumulative temperature. (By **R. H. Scott**.) 72 pp., 3 plates, 8°. London, 1884.

|| **Liais, E.**—Influence de la mer sur les climats, ou résultats des observations météorologiques faites à Cherbourg en 1848, 1849, 1850, 1851. 70 pp. 8°. Paris, 1860. (*Mém. Soc. Imp. Sc. nat. Cherbourg*, vii.)

|| **Mohn, H.**—Klima von Norwegen. Luftdruck und Temperatur. 10 pp., 1 plate, la. 8°. (*Zeitschr. oesterr. Gesellsch. Meteor.*, Wien, 1884, April, p. 145.)

* **Morris, M.**—The book of health. Edited by M. Morris. xi. + 1079 pp. la. 8°. London, 1883.

New South Wales.—Physical geography and climate. 33 pp., 3 plates, la. 8°. (Sydney, 1884.)

|| **Physiographical Commission of the I. R. Academy of Science at Cracow.**—Materials for Galician climatology, collected by the meteorological section . . . 1883. 308 pp. la. 8°. Cracow, 1884. (*Extract Rep. Physiogr. Comm.*)

In the Polish language.

* **Ramsay, A.**—A bibliography, guide and index to climate. 449 pp. 8°. London, 1884.

This was originally published in parts under the title of "The Scientific Roll and Magazine of Systematized Notes."

Registrar General, London.—Weekly return of births and deaths in London and in twenty-seven other great towns. Vol. xlv., 1884. Nos. 1-53. la. 8°. London, 1884.

Registrar General of Births, Deaths and Marriages in Ireland.—Quarterly returns of the marriages, births, and deaths registered . . . in Ireland; . . . 1884. 1st-4th quarters, Nos. 81-84. la. 8°. Dublin, 1884-85.

———Weekly returns of births and deaths in Dublin (including its suburban districts), and in fifteen of the principal urban sanitary districts in Ireland, 1884. Vol. xxi., la. 8°. Dublin, 1885.

Royal Meteorological Society.—Memorandum on climatological observations and their relation to public health. Prepared for the International Health Exhibition, 1884. 8 pp. sm. 8°. (London, 1884.)

(**Sanitary Commissioner, Punjab.**)—Report on the Sanitary Administration of the Punjab for the year 1883. 1 vol., with plates, sm. 8°. Lahore, 1884.

Société de Médecine et de Climatologie de Nice.—Nice-Médical. 8^e Année, 1883-84, Nos. 1-12. la. 8°. Nice, 1883-84.

Thomson, W.—Is our climate deteriorating? An inquiry. 28 pp. sm. 8°. Edinburgh and London, 1884.

|| **Woeikof, A.**—Klima von Ostsibirien. 19 pp. sm. 8°. (*Meteor. Zeitschr. deutsch. meteor. Gesellsch.*, I., 1884, p. 443.)

G—EARTHQUAKES.

* **Rockwood, C. G., Jr.**—Notices of recent American earthquakes. No. 9. 5 pp. 8°. [*Amer. Journ. Sc.*, 3rd series, xix., 1880, p. 295.]

H—ELECTRICITY AND MAGNETISM.

|| **Bezold, W. von.**—Ueber zündende Blitze im Königreich Bayern während des Zeitraumes 1833 bis 1882. 60 pp., 1 plate, 4°. München, 1884. (*Abhandl. h. bayern. Akad. Wissensch.*, ii. Cl., xv. Bd., i. Abth.)

|| **Brioschi, F., e Angeletti, F.**—Determinazioni assolute della declinazione magnetica nel R. Osservatorio di Capodimonte. Prima comunicazione del Direttore **A. de Gasparis**. Agosto-Dicembre 1883. 9 pp. la 4°. Napoli, 1884. (*Rend. R. Accad. Sc. Fis. e Mat. Napoli*, Fasc. 3°, Marzo, 1884.)

Colonial Secretary's Office, Hongkong.—[Observations of the Dip of the magnetic needle at various places in China during October and November 1883.] (By **W. Doberck**.) sm. 8°. Sheet.

|| **Ferrari, C.**—Sulla dinamica dei temporali. Letta nella seduta del 15 giugno 1884. 3 pp. la 4°. (*R. Accad. Lincei*, viii., serie 3ª, *Transunti*.)

|| **Giese, W.**—Ueber die in einer geschlossenen Kreisleitung auf der deutschen Polarstation zu Kingawa beobachteten Erdströme und eine sich daran knüpfende Methode zur Bestimmung des Ohm. 5 pp. la. 8°. Berlin, sa. (*Elektrotechn. Zeitschr.*, 1885, Feb.)

Government Observatory, Bombay.—Magnetical and meteorological observations made at the Government Observatory, Bombay, in the years 1879 to 1882, under the superintendence of **C. Chambers** and **F. Chambers**, together with appendices containing accounts of magnetic researches, embracing observations extending over a period of thirty-seven years. 7 + xix. + 56 + 27 + xiii. + 241 pp., 42 plates, 8°. Bombay, 1883.

* **Liznar, J.**—Anleitung zur Messung und Berechnung der Elemente des Erdmagnetismus. 79 pp. la. 8°. Wien, 1883.

Mascart, E., De Nerville, F., et Benoit, R.—Résumé d'expériences sur la détermination de l'ohm et de sa valeur en colonne mercurelle. 71 pp. la. 8°. Paris, 1884.

|| **Nipher, F. E.**—Magnetic survey of Missouri. Fifth Annual Report. 19 pp. 8°. (*Trans. St. Louis Acad. Sc.*, iv., No. 3, p. 516.)

Office of the Chief Signal Officer, Washington.—The relation between northerners and magnetic disturbances at Havana, Cuba. Signal Service Notes, No. xiii. Prepared under the direction of **W. B. Hazen** by **G. E. Curtis**. 16 pp. la. 8°. Washington, 1885.

———.—A first report upon observations of atmospheric electricity at Baltimore, Maryland. Signal Service Notes, No. xvii. Prepared under the direction of **W. B. Hazen** by **P. Morrill**. 8 pp., 6 plates, la. 8°. Washington, 1884.

* **Palmieri, L.**—Die atmosphärische Elektrizität. Mit Zustimmung des Verfassers aus dem italienischen übersetzt von **H. Discher**. 52 pp. 8°. Wien, 1884.

Pini, E.—Sui temporali osservati nell' Italia Superiore durante l'anno 1879. Pubbl. R. Osserv. di Brera in Milano. N. xviii. 150 pp., 15 plates, sm. 8°. Milano, 1885.

|| (**Ragona, D.**)—Studi sulla oscillazione diurna della declinazione magnetica. 17 pp. sm. 8°. (*Mem. R. Accad. Sc.*, *Modena*, col. ii., serie ii., p. 305.)

Rajna, M.—Sulle variazioni diurne del magnetismo terrestre risultati di osservazioni fatte a Milano negli anni 1872 e 1877. Pubbl. R. Osserv. di Brera in Milano, N. xxvi. 60 pp., 8 plates, sm. 8°. Milano, 1884.

Real Colegio de Belen . . . en la Habana.—Observaciones magnéticas y meteorológicas. Año de 1875. (Prologo por **B. Viñes**.) 57 pp., 12 plates, 8°. Habana, 1884.

Reinold, A. W., and Rücker, A. W.—The influence of an electric current in modifying the rate of thinning of a liquid film. Read before the Phys. Soc. on Dec. 13, 1884. 7 pp. 8°. (*Phil. Mag.*, 1885, Feb., p. 94.)

Rowell, G. A.—Electric meteorology. What is gas? How the theory was worked up, an appendix 1884. 16 pp. 8°. Oxford, 1885.

Royal Observatory, Greenwich.—Results of the magnetical and meteorological observations made at the Royal Observatory, Greenwich, in the year 1882: under the direction of **W. H. M. Christie**. v. + xviii. + lxxxi. pp., 22 plates, la. 4°. London, 1884.

Seeland, F.—Magnetische und meteorologische Beobachtungen zu Klagenfurt. Dec. 1882—Nov. 1884, and year. 8°. s.l.e.a.

|| **United States Coast and Geodetic Survey.**—Methods and results. Report upon magnetic observations made at the U. S. Polar station Ooglaamie, Point Barrow, Alaska, 1881-1882-1883. (Lieut. P. H. Ray, Commanding Post. Reduction and discussion by **C. A. Schott**.) 45 pp., 1 plate, la. 4°. Washington, 1884. (*App. No. 13, Report for 1883*, p. 321.)

I—GEODESY.

|| **Guisan, R.**—Notice sur le nivellement de précision de la Suisse. 48 pp., 1 plate, la. 8°. Paris, 1884. (*Mém. Soc. ingén. civils*, 4^{ème}. série, 8^{ème}. vol., 1883.)

Lorenzoni, G., Celoria, G., e Nobile, A.—Operazioni eseguite nell'anno 1875 negli Osservatori astronomici di Milano, Napoli e Padova in corrispondenza coll'Ufficio idrografico della R. Marina per determinare le differenze di longitudine fra Genova, Milano, Napoli e Padova. Pubbl. R. Osserv. di Brera in Milano, N. xxiv. 128 pp., sm. 8°. Milano, 1883.

Surveyor General of India.—General report on the operations of the Survey of India Department, administered under the Government of India, during 1882-83. Prepared under the direction of Colonel **G. C. De Prée**. 75 + 96 + 21 + 5 pp., 40 plates, sm. 8°. Calcutta, 1884.

K—HYDRAULICS, HYDROLOGY, AND TIDES.

Admiralty, London.—Tide tables for the British and Irish Ports, for the year 1885; also the times and heights of high water at full and change for the principal places on the Globe. Computed by **H. R. Harris**. vi. + 234 pp. la. 8°. London, (1884).

Office of the Chief Signal Officer, Washington.—Danger lines and river floods of 1882. Prepared under the direction of **W. B. Hazen** by **H. A. Hazen**. Signal Service Notes, No. xv. 30 pp. la. 8°. Washington, 1884.

Service hydrométrique du Bassin de la Seine.—Manuel hydrologique du bassin de la Seine, par **A. De Préaudeau**, sous la direction de **Ch. L. De Fourcy**, et **G. Lemoine**. ii. + 120 pp., 9 plates, 4°. Paris, 1884.

———.—Observations sur les Cours d'Eau et la Pluie centralisées pendant l'année 1882, sous la direction de **Ch. L. De Fourcy** par **G. Lemoine** et **A. Goupil**. 7 plates, 8°. Versailles, s.a.

|| ———.—Résumé des observations centralisées . . . pendant l'année 1882 par **[A.] Goupil**, sous la direction de **[Ch.] L. De Fourcy** et de **G. Lemoine**. 43 pp. la. 8°. Versailles, 1884. (*Ann. Soc. météor. France*, xxxi., 1883, Oct.)

|| **(Surveyor General's Office, Colombo.)**—Report on tidal waves in Ceylon resulting from the eruptions in the Straits of Sunda in August, 1883. By the Hon. **J. Stoddart**. 8 pp. 8°. Colombo, 1884. (*Sessional Papers*, 1884, p. 21.)

Whall, W. B.—Handy book of the tides, with twelve charts shewing the state of the tide at every hour at Dover. 6 pp., 13 charts, oblong 8°. London, [1885].

L—METEOROLOGY.—MISCELLANEOUS.

Académie des Sciences, Paris.—Mission scientifique du Cap Horn, 1882-83. Rapports préliminaires. 79 pp. 4°. Paris, 1884. (*Compt. rend. acad. sc.*, xcvi.)

|| **Aitken, J.**—The remarkable sunsets. 2 papers, 8°. (*Proc. R. Soc. Edinb.*, xii., session 1883-84, pp. 448 and 647.)

|| **Archibald, E. D.**—Sunspots and the weather: a new view. 5 pp. la. 8°. (*Science Monthly*, II., No. 14, 1884.)

* **B.**—The science of the weather, in a series of letters and essays, by several authors; showing the fallacies and deficiencies of meteorological science, past and present, and the practicability of establishing a sound and useful philosophy of the nature and periods of weather changes. Edited by "B." 382 pp., 16 plates, sm. 8°. Glasgow, 1867.

* [**Barlow, E.**—Meteorological essays concerning the origin of springs, generation of rain, and production of wind. With a rational and historical account of the causes and course of the tide: . . . 14 + 212 pp., 12 plates, sm. 8°. London, 1715.

|| **Bebber, J. van.**—Die Untersuchungen von Hoffmeyer und Teisserenc de Bort über Wintertypen und der Winter 1883–84. 2 papers, 2 plates, sm. f°. (*Meteor. Zeitschr. deutsche meteor. Gesellsch.*, I. Jahrg., 1884, p. 22 und 70.)

|| (**Bezold, W. von.**)—Ueber die ausserordentlichen Dämmerungs-Erscheinungen. 3 pp. la. 8°. (*Zeitschr. oesterr. Gesellsch. Meteor.*, Wien, 1884, p. 72.)

Billwiller, R.—Bericht über die Errichtung der meteorologischen Station auf dem Säntis und ihre Thätigkeit vom 1 September 1882 bis Ende August 1884. 20 pp., 2 plates, 8°. Zürich, 1884.

* **Cann, F., et Larbalétrier, A.**—Manuel de météorologie agricole appliquée aux travaux des champs, à la physiologie végétale et à la prévision du temps. viii. + 167 pp. sm. 8°. Paris, [1884].

Chase, P. E.—Elements of meteorology. For schools and households. Part I. Practical instructions. Part II. Principles and Scholia. 2 vols., with plates, sm. 8°. Philadelphia, s.a.

(**Clayton, H. H., Jr.**)—A lately discovered meteorological cycle. 15 pp. la. 8°. (*Amer. Meteor. Journ.*, I., 1884, No. 4, p. 130.)

Colonial Secretary's Office, Hong-Kong.—On the mean cloudiness of Hong-kong. (By **W. Doberck.**) 2 pp. sm. f°. s.l.e.a.

|| **Dawson, H. P.**—Report on the circumpolar expedition to Fort Rae. 7 pp. 8°. (*Proc. R. Soc.*, 1883, No. 229, p. 173.)

Ekholm, N.—L'expédition Suédoise au Spetsberg, 1882–1883. 32 + 14 pp. la. 8°. Upsala, 1884.

Freeden, W. v.—Barometerbuch zum Gebrauch der Seelente. Nach der neuesten Ausgabe des "Barometer Manual for the use of Seamen" des "Meteorological Office" zu London aus dem Englischen übersetzt von W. v. Freeden. 43 pp. 2 plates, la. 8°. Oltenberg, 1885.

Friesenhof, F. G.—Können Grubengas-Katastrophen verhütet werden? Zusammenhang der Grubengasexplosionen mit den Vorgängen in der Atmosphäre, und Möglichkeit die Gefahr solcher Explosionen rechtzeitig voranzuerkennen. 16 pp. la. 8°. Dated, Nedanöcz, März, 1885.

Gamble, J. G.—The barometer and the winds. Annual address to the Members of the South African Phil. Soc., July 26, 1882. [Together with an address on various subjects delivered on July 25, 1883.] 29 pp. 8°. s.l.e.a.

|| **Glaisher, J.**—Meteorology. Excerpt paper from Hughes's "Reading Lesson Books." 68 pp., 1 plate, sm. 8°. London, 1857.

|| **Guisan, R.**—Le réseau météorologique suisse. 38 pp., 3 tabular forms, 8°. Lausanne, 1885. (*Bull. soc. cand. ingén. archit.*, Lausanne.)

|| **Hellmann, G.**—Über gewisse Gesetzmässigkeiten im Wechsel der Witterung aufeinanderfolgender Jahreszeiten. 10 pp. la. 8°. (*Sitzungsb. k. preuss. Akad. Wissensch.* Berlin, xiv., 1885, p. 205.)

|| **Hepites, St. C.**—Serviciulă meteorologică în Europa. 164 pp. 4°. Buenosai. 1884. (*Anul. Acad. Române, Seria II.*, Tom. vi., Sect. ii.)

Hydrographic Office, Washington.—Meteorological chart of the North Atlantic Ocean for the months of January to December. 12 charts, la. f°. Washington, 1883–84.

——— —Pilot charts of the North Atlantic Ocean. December 1883—December 1884. 13 charts, la. f°.

* **Ideler, I. L.**—*Meteorologia veterum Græcorum et Romanorum. Prolegomena ad novam Meteorologicorum Aristotelis editionem adornandam.* iv. + 258 pp. 8°. Berlin, 1832.

Institut météorologique danois.—Résumé des travaux de l'expédition polaire danoise internationale, suivi d'un sommaire des observations météorologiques faites pendant la dérive du *Dijmphna* dans la mer de Kara. 41 pp., 4 plates, la. 8°. Copenhagen, 1884.

|| **Krümmel, O.**—*Bemerkungen über die Meeresströmungen und —Temperaturen der Falklandsee.* 24 pp., 1 plate, 4°. Hamburg, 1882. (*Archiv. der Deutschen Seewarte.*, V. Jahrg., 1882.)

|| **Laughton, J. K.**—An address delivered at the annual general meeting of the Royal Meteorological Society, January 16th, 1884. 11 pp., la. 8°. (*Quart. Journ. R. Meteor. Soc.*, x., 1884, p. 77.)

|| **Loomis, E.**—Contributions to meteorology. 20th paper. Read before the Nat. Acad. Sc., November 13, 1883, and April 15, 1884. 29 pp., 2 plates, la. 8°. (*Amer. Journ. Sc.*, 3rd series, xxviii., 1884, No. 163.)

M.—"Can man affect the weather?" (Sir J. Herschel on "Weather and Weather Prophets"), or, the vapour year. 24 pp. 8°. s.l.e.a.

Meteorological Council, London.—A barometer manual for the use of seamen. 41 pp., 2 plates, la. 8°. London, 1884.

Meyer, L.—*Die Bewölkung in Württemberg mit Zugrundlegung der Beobachtungen von 1878–82 und mit besonderer Berücksichtigung meteorologischer Gebiete.* 91 pp., 1 map, la. 8°. Stuttgart, s.a.

(**Mocenigo, A. G.**)—*Le ceneri dei vulcani di Giava supposta causa dei bagliori crepuscolari.* 15 pp. 8°. (Vicenza, 1884.)

———, *L'Isola di Java ed i crepuscoli del Novembre e Dicembre 1883.* 22 pp. 8°. Vicenza, 1884.

|| **Montigny, C.**—De l'accord entre les indications des couleurs dans la scintillation des étoiles et les variations atmosphériques. 28 pp. 8°. Bruxelles, 1885. (*Bull. acad. roy. Belgique*, 3me. série, t. ix., 1885, No. 2.)

Mühry, A.—*Aufgaben der Meteorologie.* 2 pp. sm. f°. (*Meteor. Zeitschr. deutsche meteor. Gesellsch.*, I. Jahrg., 1884, p. 470.)

|| **Neumayer, [G.]**—Bericht über die vulkanischen Ausbrüche des Jahres 1883 in ihrer Wirkung auf die Atmosphäre. 6 papers, sm. f°. (*Meteor. Zeitschr. deutsche meteor. Gesellsch.*, I. Jahrg., 1884, pp. 1, 49, 156, 181, 277, 311.)

Office of the Chief Signal Officer, Washington.—The study of meteorology in the higher schools of Germany, Switzerland, and Austria. Signal Service Notes, No. viii. Prepared under the direction of **W. B. Hazen** by **F. Waldo**. 9 pp. la. 8°. Washington, 1883.

(**Paul, H. M.**)—A proposed new departure in hygrometry. 2 pp. la. 8°. (*Science*, iv., 1884, p. 137.)

———, *Krakatoa.* [Notes on the explosion at Krakatoa on August 27, 1883.] 2 pp. la. 8°. (*Science*, iv., 1884, p. 135.)

|| **Paul, H. M.**—Thermometer exposure. 8 pp. 8°. Detroit, s.a. (*Amer. Meteor. Journ.*, 1884, Dec., p. 305.)

Porro, F.—*Elementi di meteorologia applicabili all'igiene.* (Preface by **G. V. Schiaparelli**.) 58 pp. sm. 8°. Milano, 1883.

* **Radau, R.**—*La météorologie nouvelle et la prévision du temps.* 115 pp. sm. 8°. Paris, 1883.

|| **Rivière, E.**—*Expédition scientifique du Cap Horn. Exposition des instruments et collections.* 16 pp. sm. f°. Paris, 1884. (*Rev. Scient.*, 1884, Mars 29.)

* **Ruskin, J.**—The storm cloud of the nineteenth century. Two lectures delivered at the London Institution, February 4th and 11th, 1884. 152 pp. 4°. Orpington, 1884.

* **Schübler, G.**—*Grundsätze der Meteorologie in näherer Beziehung auf Deutschland's Klima.* Neu bearbeitet von **G. A. Jahn**. xii. + 244 pp., 4 tables, 9 plates, 8°. Leipzig, 1849.

|| **Shaw, W. N.**—Report on evaporimeters. Comparison of observations of the rate of evaporation of water as given by different instruments. 8 pp., 2 plates, la. 4°. (*Quart. Weather Rep.*, 1877, App. iii., p. [35].)

|| **Stewart, B., and Carpenter, W. L.**—Report to the solar physics Committee on a comparison between apparent inequalities of short period in sun-spot areas and in diurnal temperature-ranges at Toronto and Kew. 27 pp. 8°. (London, s.a.) (*Proc. Roy. Soc.*, 1884, No. 233.)

|| **Wohlgemuth, E. E. von.**—Bericht des Leiters der österreichischen arktischen Beobachtungsstation auf Jan Mayen. 23 pp. la. 8°. Pola, 1883. (*Mitth. Geb. Sciences, Nr. ix. und x.*)

Woods, J.—Elements and influence of the weather. Defence of the cycle of the seasons. Including a brief memoir of the late Lieutenant George Mackenzie, of the Perth Royal Militia, with a synopsis of his discoveries in atmospheric phenomena. xvi. + 114 pp., 1 plate, 8°. London, 1861.

M—METEOROLOGY.—CONFERENCES.

Copenhagen.—Rapport du Comité météorologique international. Réunion de Copenhagen. 1882. (Publié par le Bureau central météorologique de France.) 147 pp. la. 8°. Paris, 1884.

Kopenhagen.—Bericht über die Verhandlungen des internationalen meteorologischen Comité. Versammlung in Kopenhagen vom 1. bis 4. August 1882. (Vorwort von G. Neumayer.) 4 + 102 pp. la. 8°. Hamburg, 1884.

Wien.—Protokolle der IV. internationalen Polar-Conferenz zu Wien, 17–24 April, 1884. 65 pp. sm. 8°. St. Petersburg, 1884. (*Mittheil. internat. Polar-Comm., Heft. vi., p. 215.*)

———Vorläufige Mittheilung über die wichtigeren Ergebnisse der internationalen Polar-Conferenz, Wien, 1884. 61 p. 4°. (Wien, 1884.)

N—METEOROLOGY.—INSTRUCTIONS.

Denza, F.—Istruzioni per le osservazioni meteorologiche e per l'altimetria barometrica. Parti I. e II. 2 vols. sm. 8°. Torino, 1883.

Galli, I.—Istruzioni per le osservazioni delle correnti terrestri. 7 pp. sm. 8°. Torino, 1884.

K. K. Central-Anstalt für Meteorologie und Erdmagnetismus, Wien.—Jelinek's Anleitung zur Ausführung meteorologischer Beobachtungen nebst einer Sammlung von Hilfstafeln. Neu herausgegeben und umgearbeitet von J. Hann. vi. + 185 pp. la. 8°. Wien, 1884.

Meteorological Committee, Cape of Good Hope.—Instructions to meteorological observers. 10 pp. 8°. Cape Town, 1879.

Meteorologiska Central-Anstalten, Stockholm.—Instruktion för observation af maxim- och minimi-termometrar. 3 pp. 4°. (Stockholm, 1879.)

Roberto, G.—Istruzioni per le osservazioni sul mare e sulle brezze. 6 pp. sm. 8°. Torino, 1883.

Scottish Meteorological Society.—[Remarks on the methods of reading different instruments in use at the Society's stations.] 4 pp. la. 8°. s.l.e.a.

Serpieri, A.—Istruzioni per le osservazioni della luce zodiacale in Italia. 14 pp. sm. 8°. Torino, 1883.

O—METEOROLOGY.—INSTRUMENTS.

|| **Aitken, J.**—Thermometer screens. 36 pp., 1 plate, 8°. (*Proc. R. Soc. Edinb.*, xii., 1883–84, p. 661.)

|| **Angström, K.**—Un nouveau géothermomètre. Note présentée à l'Acad. R. Sc. Suède, le 10 Oct. 1883. 10 pp., 1 plate, 8°. Stockholm, 1884. (*K. Sc. Vet.-Akad. Handl., Bd. 8, No. 19.*)

* **Foerster, W.**—Thermometrische Untersuchungen. 1. Vergleichen von Quecksilber-Thermometern, von Dr. M. Thiesen. 2. Vergleichen von Quecksilber-Thermometern mit dem Luft-Thermometer, von Dr. L. Grunmach. 3. Ueber die Bewegungen der Fundamentalpunkte von Thermometern, von H. F. Wiebe. 4. Ueber die Reduktion der Angaben von Gas-Thermometern auf absolute Temperaturen, von Dr. B. Weinstein. Herausgegeben von W. Foerster. iv. + 91 + 127 pp. la. 4°. Berlin, 1881.

|| **Hellmann, G.**—Neue Regen- und Schneemesser. 2 pp. la. 8°. (*Zeitschr. Instrumentenkunde*, 1885, *Heft* iii., *Marz*.)

|| **Joly, J.**—On an apparatus for obtaining telegraphically the readings of meteorological instruments placed at a distance from the Observer. Read, Feb. 19, 1883. 8 pp., 2 plates, 8°. (*Proc. R. Dublin Soc., N.S.*, vol. iv., p. 158.)

|| **Rung, G.**—Ombrograph mit Sinuswage. 4 pp. la. 8°. (*Meteor. Zeitschr. deutsche meteor. Gesellsch. I.*, 1884, p. 461.)

[**Russell, H. C.**]—Description of electrical barograph. 1 p., 1 plate, la. 8°. [*Results of met. obs. New South Wales*, 1873, p. 6.]

|| **Scott, R. H.**—Brief notes on the history of thermometers. 6 pp. la. 8°. (*Quart. Journ. R. Meteor. Soc.*, x., 1884, p. 167.)

P—METEOROLOGY.—OBSERVATIONS.

A. EUROPE. a. AUSTRIA.

Hydrographisches Amt der k. k. Kriegsmarine zu Pola.—Meteorologische und magnetische Beobachtungen. 1884, Jan.—Dec., and Results. Oblong la. 8°.

I. R. Accademia di Commercio e Nautica in Trieste.—Osservazioni meteorologiche. 1884, Jan.—Dec., and Results. Oblong la. 8°. Sheets.

K. K. Central-Anstalt für Meteorologie in Wien.—Telegrafischer Wetterbericht. Jahrg. viii., 1884. Jan. 1—Dec. 31. la. 4°. Sheets.

K. K. Central-Anstalt für Meteorologie und Erdmagnetismus, Hohe Warte bei Wien.—Beobachtungen. 1884, Jan.—Dec., and Results. 8°.

K. K. Marine-Akademie, Fiume.—Meteorologische Beobachtungen. 1884, Jan.—Dec., and Results. la. 8°. Sheets.

K. K. Sternwarte in Krakau.—Meteorologische Beobachtungen. 1884, Jan.—Dec., and Results. 8°. Sheets.

b. BELGIUM.

Observatoire royal de Bruxelles.—Annales . . . publiées aux frais de l'État. Deuxième série. Annales météorologiques. Tomes I.—II. 2 vols., 2 plates, la. 4°. Bruxelles, 1881 et 1885.

———, —Bulletin météorologique. 1884, Jan. 1—Dec. 31. fo. Sheets.

———, —Observations météorologiques faites aux stations internationales de la Belgique et des Pays Bas, sous la direction de **J.-C. Houzeau**, pour la Belgique, et de **C.-H.-D. Buijs-Ballot** pour les Pays-Bas. Années I.—IV., 1877–80. 4 vols. la. 4°. Bruxelles, 1877–1884.

c. DENMARK.

Dansk meteorologisk Institut.—Bulletin météorologique du Nord, publié par les Instituts météorologiques de Norvège, de Danemark et de Suède. Année 1884. (Oblong 8°. Copenhagen, s.a.)

———, —Maanedsoversigt over Vejrforholdene. 1884, Jan.—Dec. fo.

d. FRANCE.

|| **Bureau central météorologique de France.**—Annales . . . publiées par **E. Mascart**. Années 1881–82. Bulletin des observations françaises. Saint-Martin-de-Hinx. 2 vols. la. 4°. Paris, 1883–84.

———, —Bulletin international. xxviii^e Année. 1884, Jan. 1—Dec. 31. 4°.

Carlier, H.—Observations météorologiques faites à Saint-Martin-de-Hinx, France (Landes). 1^{er} Décembre 1864 au 30 Novembre 1884. 31 pp. la. 4°. Bayonne, 1885.

———, —Observations météorologiques faites à Saint-Martin-de-Hinx, France (Landes). 1^{er} Décembre 1883—30 Novembre 1884. 4 + 20 pp., 26 plates, la. 4°. Bayonne, 1885.

Commission météorologique départementale des Pyrénées-Orientales—Bulletin météorologique du Département des Pyrénées-Orientales, publié . . . par le Dr. **Fines**. xii^e année, 1883. 87 pp., 1 plate, 4°. Perpignan, 1884.

Observatoire du Pic du Midi.—Ascensions et observations faites au Pic, pendant l'hiver 1873-1874. 8 pp. la. 8°. s.l.e.a.

[**Observatoire du Pic du Midi.**]—Note sur les observations météorologiques faites en 1874 au Pic du Midi de Bigorre. Présentée au nom de la Société Ramond. 9 pp. la. 8°. (Bagnères, s.a.)

(**Observatoire du Pic du Midi.**)—Observations météorologiques (fin de la campagne de 1874.) 30 pp., 1 plate, la. 8°. Bagnères, 1875.

C. GERMANY.

Centralbureau für Meteorologie und Hydrographie im Grossherzogthum Baden.—Uebersicht der Ergebnisse der an den badischen meteorologischen Stationen angestellten Beobachtungen, nebst Wasserstandsaufzeichnungen an den wichtigsten Hauptpegeln des Rheins im Monats Jan.—Dez. 1884, Nos. 183-194. f°. Sheets.

Deutsche Seewarte, Hamburg.—Meteorologische Beobachtungen in Deutschland von 18 Stationen II. Ordnung, sowie von 8 Normal-Beobachtungsstationen und den Signalstellen der Deutschen Seewarte für 1879, 1881, 1882. Jahrg. ii., iv., v. 3 vols. sm. f°. Hamburg, 1881-1884.

———, —Wetterbericht. Jahrg. ix. 1884, Jan. 1—Dec. 31. f°. Sheets.

[**Grossh. badische meteorologische Centralstation.**]—Ergebnisse der an den meteorologischen Stationen des Grossherzogthums Baden im Jahre 1882 angestellten Beobachtungen. 13 pp. la. 8°. s.l.e.a.

[**Hauptstation des forstlichen Versuchswesen in Preussen.**]—Beobachtungs-Ergebnisse der von den forstlichen Versuchsanstalten des Königreichs Preussen, des Herzogthums Braunschweig, der thüringischen Staaten, der Reichslände und dem Landesdirectorium der Provinz Hannover eingerichteten forstlich-meteorologischen Stationen. Herausgegeben von A. Müttrich. Zehnter Jahrg., 1884, Jan.—Dec. 8°. Berlin, s.a.

[———.]—Jahresbericht über die Beobachtungs-Ergebnisse der von den forstlichen Versuchsanstalten des Königreichs Preussen, des Königreichs Württemberg, des Herzogthums Braunschweig, der thüringischen Staaten, der Reichslände und dem Landesdirectorium der Provinz Hannover eingerichteten forstlich-meteorologischen Stationen. Herausgegeben von Dr. A. Müttrich. Neunter Jahrg., 1883. 124 pp. 8°. Berlin, 1884.

|| **K. b. meteorologische Centralstation, Munich.**—Uebersicht über die Witterungsverhältnisse im Königreiche Bayern. 1884, Jan.—Dec. la. f°. Sheets. (*Separat-Abdruck aus der "Augsburger Abendzeitung."*)

Königliche meteorologische Central-Station, Munich.—Beobachtungen der meteorologischen Stationen im Königreich Bayern unter Berücksichtigung der Gewittererscheinungen im Königreich Württemberg. Herausgegeben . . . durch W. von Bezold und C. Lang. Fünfter Jahrg., 1883. With plates, sm. f°. München, 1884.

Königliches meteorologisches Institut, Berlin.—Preussische Statistik. lxxviii. Ergebnisse der meteorologischen Beobachtungen im Jahre 1883. xiv. + 158 pp., 1 plate, sm. f°. Berlin, 1884.

Königl. sächs. meteorologisches Institut.—Wetterbericht. 1883, Jan. 1—Meh. 31. Oblong sm. 8°. Sheets.

After this date these Reports are included in the "Jahrbuch" of the Chemnitz meteor. Inst.

Königliches statistisches Bureau in Berlin.—Witterung nach den Beobachtungen des königlichen meteorologischen Instituts. 1884, Jan.—Dec. 4°. (*Statist. Correspondenz, Jahrg. x.-xi., 1884-85.*)

Meteorologische Centralstation, Stuttgart.—Meteorologische Beobachtungen angestellt im Jahre 1883 und 1884 . . . von Prof. Dr. Schoder. 2 parts, oblong 8°. s.l.e.a.

———, —Resultate. Januar—Dezember, 1880-84. 5 parts, la. 8°. s.l.e.a.

[**Meteorologische Centralstation, Stuttgart.**]—Uebersicht über die Witterungsverhältnisse . . . nach den Beobachtungen der württemb. meteorol. Stationen (Vom Prof. Dr. Schoder.) 1880, 1883, 1884. 3 parts, oblong la. 8°. s.l.e.a.

Ministerial-Kommission zur Untersuchung der deutschen Meere in Kiel.—Ergebnisse der Beobachtungsstationen an den deutschen Küsten über die physikalischen Eigenschaften der Ostsee und Nordsee und die Fischerei. Jahrg. 1883. Heft i.—xii. Oblong 8°. Berlin, 1884.

Prestel, M. A. F.—Beiträge zur Kenntniss des Klima's von Ostfriesland. Enthaltend Beobachtungen über die in landwirthschaftlicher und medizinischer Beziehung so höchst wichtigen Faktoren der Witterung, Sonnenlicht und Feuchtigkeit, so wie über den Ozongehalt der Luft. 26 pp. 8°. Emden, 1858. (*Klein. Schrift. naturf. Gesellsch. Emden*, v.)

Wetterwarte der Magdeburgischen Zeitung.—Jahrbuch der meteorologischen Beobachtungen der Wetterwarte der Magdeburgischen Zeitung, Station I. Ordnung. Herausgegeben von Dr. R. Assmann. Jahrg. II., 1883. v. + 60 pp., 12 plates, la. 4°. Magdeburg, 1884.

F. GREAT BRITAIN AND IRELAND.

Army Medical Department, London.—Annual abstract of meteorological observations taken at Netley and foreign stations in the year 1882. 12 pp. la. 8°. (*Army Med. Dep. Rep.*, 1882, App. xiv., p. 327.)

C[apron], J. R.—Meteorological readings taken at Guildown, Guildford. Dec. 28, 1883—Jan. 1, 1885. Slips, la. 8°.

|| **Fox, W. L.**—Tables of sea temperature, bright sunshine and climate at Falmouth, for the year 1883, and notes by W. L. Fox, with other meteorological tables for West Cornwall and the Scilly Islands. 20 pp., 1 diagram, 8°. (*Rep. R. Cornwall Polyt. Soc.*, 1883.)

Hoskins, [S. E.], and Collenette, A.—Elements of the climate of Guernsey for 40 years—mean results of observations taken twice a day, from January 1, 1843, to December 31, 1882. sm. 8°. Sheet.

McLandsborough, J., and Preston, A. E.—Meteorology of Bradford for 1884. Computed from daily observations made at the Exchange, Bradford. Oblong 8°. Sheet.

Marriott, W.—The meteorological record. Monthly results of observations made at the stations of the Royal Meteorological Society, with remarks on the weather for the year 1883. Vol. iii., with map, la. 8°. London, 1884.

Mawley, E.—The weather of 1884 as observed in the neighbourhood of London, and compared in all respects with that of an average year. With tables of daily observations and a diagram. viii. + 81 pp., 1 plate, 8°. London, s.a.

|| **Merrifield, J.**—Meteorological summary [of observations recorded at Plymouth] for the year 1884. Oblong la. 8°. Sheet. (*“Western Daily Mercury,”* 1885, Jan. 16.)

Meteorological Council, London.—Hourly readings from the self-recording instruments at the seven observatories under the Meteorological Council. 1882. (Preface by R. H. Scott.) 2 + xx. + 507 pp. la. 4°. London, 1885.

Meteorological Office, London.—Daily weather report. 1884, Jan. 1—Dec. 31. 2 vols., la. 4°. s.l.e.a.

———.—The Weekly weather report of the Meteorological Office for the year 1884 (new series), containing synoptic charts and descriptive summaries of the weather for each day; also tabular summaries of temperature, rainfall, and bright sunshine for each week. New series, vol. i., 1884. la. 4°. London, s.a.

Prince, C. L.—The summary of a meteorological journal, kept by C. L. Prince, at his observatory, Crowborough, Sussex. 1883, 1884. 2 papers, sm. 8°. s.l.e.a.

Radcliffe Observatory, Oxford.—Results of meteorological observations made at the Radcliffe Observatory, Oxford, in the year 1884, under the superintendence of E. J. Stone. Vol. xxxix. xii. + 131 pp. la. 8°. Oxford, 1884.

|| **Richards, W. H.**—Abstract of the weather at Penzance and neighbourhood for the years 1883, 1884. la. 8°. Sheets. (*Cornish Telegraph*, Jan. 3, 1884, and Jan. 1, 1885.)

Stonyhurst College Observatory.—Results of meteorological and magnetical observations, by the Rev. S. J. Perry. 1883. 93 pp., 1 plate, sm. 8°. Roehampton, 1884.

The Appendix contains “Results of met. obsns. taken at St. Ignatius’ College, Malta, by the Rev. J. Scoles.” June 1 to December 31, 1883.

Waterhouse, J.—Eight years' meteorology of Halifax, being a record of observations taken at Well Head during the years 1866 to 1873 inclusive. 20 pp., 2 diagrams, 4°. Halifax, s.a.

g. HOLLAND.

Koninklijk nederlandsch meteorologisch Instituut.—Nederlandsch meteorologisch Jaarboek voor 1883 en 1884. xxxv. en xxxvi. Jaarg. 2 vols., oblong 8°. Utrecht, 1884—85.

h. ITALY.

Associazione meteorologica italiana.—Bollettino decadico pubblicato per cura dell'Osservatorio centrale del Real Collegio Carlo Alberto in Moncalieri. Anno xii., 1882-83. la. 8°. (Torino, 1882-84.)

|| **Brioschi, F.**—Riassunti decadi e mensili delle osservazioni meteoriche fatte nel R. Osservatorio di Capodimonte nell'anno 1883. 8 pp. la. 4°. Napoli, 1884. (*Rend. R. Accad. Sc. Fis. e Mat. Napoli, Fasc. 4^a e 5^a, Aprile e Maggio, 1884.*)

Osservatorio della Regia Università di Torino.—Bollettino. Anno xviii. 1883. Oblong la. 8°. Torino, 1884.

|| **(Ragona, D.)**—Sulle condizioni meteoriche di Giugno 1884. 25 pp. sm. f°. (*Mem. R. Accad. Sc., serie ii., vol. iv., p. 3.*)

Ufficio centrale di Meteorologia, Roma.—Bollettino meteorico. Anno vi., 1884, Jan. 1—Dec. 31. la. 4°. Sheets.

i. NORWAY.

Norwegisches meteorologisches Institut.—Jahrbuch . . . für 1883. Herausgegeben von **H. Mohn.** v. + 99 + 6 pp. sm. f°. Christiania, 1884.

j. PORTUGAL.

Observatorio do Infante D. Luiz.—Annaes. 1880—1882. Vols. xviii.—xx. 3 vols., with plates, f°. Lisboa, 1883-84.

———Annaes . . . Observações dos postos meteorologicos segundo o plano adoptado no Congresso de Vienna d'Austria. 1881, 1882. 2 vols. f°. Lisboa, 1883-1884.

———Boletim meteorologico. 1884, Jan. 1—Dec. 31. sm. f°. Sheets.

———Postos meteorologicos. 1878. Annexos aos Annaes do Observatorio do Infante D. Luiz. 32 + 32 pp. f°. Lisboa, 1883.

Observatorio meteorologico e magnetico da Universidade de Coimbra.—Observações meteorologicas feitas . . . no anno de 1883. (Prefacio por **A. S. Viégas.**) ix. + 136 pp. f°. Coimbra, 1884.

k. RUSSIA.

Physikalisches Central-Observatorium, St. Petersburg.—Annalen. . . Herausgegeben von **H. Wild.** Jahrg. 1882. Theil I. und II. 2 vols, 1 map. sm. f°. St. Petersburg, 1883.

In the Russian language also.

———Meteorologisches Bulletin. 1884, Jan. 1—Dec. 31. f°. Sheets.

In the Russian language also.

Weihrauch, K.—Meteorologische Beobachtungen angestellt in Dorpat in den Jahren 1877-1880 redigirt und bearbeitet von Dr. K. Weihrauch. Zwölfter bis fünfzehnter Jahrg. Dritter Band. Zweites bis fünftes Heft. 2 vols. la. 8°. Dorpat, 1884.

l. SPAIN.

Instituto y Observatorio de Marina de San Fernando.—Anales. . . Publicados de Orden de la Superioridad, por el Director Don **C. Pujazon.** Sección 2^a. Observaciones meteorológicas. Año 1883. iv. + 134 pp. f°. San Fernando, 1884.

m. SWEDEN.

Meteorologiska Central-Anstalt, Stockholm.—Månadsöfversigt af Väder-
leken i Sverige till Landbrukets tjenst utgifven under meteorologiska Central-
Anstaltens inseende af Dr. **H. E. Hamberg.** Fjerde Ärgång., 1884. f°. Stockholm, 1885.

Observatoire météorologique de l'Université d'Upsal.—Bulletin mensuel. Vol. xv. Année 1883. Par Dr. H. H. Hildebrandsson. 74 pp. la. 4°. Upsal, 1883-84.

II. SWITZERLAND.

|| **Gautier, E.**—Nouvelle organisation des observations météorologiques à Genève, au Grand Saint-Bernard et à Martigny. 9 pp. 8°. (*Arch. sc. phys. nat.*, 3^e période, xi., 1884, p. 107.)

|| **Kammermann, A.**—Résumé météorologique de l'année 1883 pour Genève et le Grand Saint-Bernard. 44 + 95 pp. 8°. Genève, 1884. (*Arch. sc. phys. nat.*, 1884, Oct.)

Schweizerische meteorologische Centralanstalt in Zürich.—Wetterbericht. 1884, Jan. 1—Dec. 31. 4°. Sheets.

In the French language also.

q. GREECE.

Association littéraire Parnasse.—Description physique d'Attique. Météorologie et phénoménologie par Dr. J. F. J. Schmidt. 2 + 28 pp. la. 4°. Athènes, 1884.

B. — ASIA. a. GENERAL.

China Coast Meteorological Register.—1883, Jan. 1 to Dec. 21. Slips.

Hong-Kong.—Meteorological register at [four stations in Hong-Kong]. 1882, Dec. 30—1883, June 29. sm. f°. Sheets.

Imperial meteorological observatory, Tokio.—Monthly summaries (March—December) and monthly means for the year 1883, with 37 maps. 159 pp. 4°. s.l.e.a.

In the Japanese language also.

———, —Report of the meteorological observations at Aomori for the year 1882. 52 pp. sm. f°. s.l.e.a.

———, —Hiroshima. 52 pp. sm. f°. s.l.e.a.

———, —Kansawa. 52 pp. sm. f°. s.l.e.a.

———, —Kioto. 52 pp. sm. f°. s.l.e.a.

———, —Kochi. 44 pp. sm. f°. s.l.e.a.

———, —Nagasaki. 52 pp. sm. f°. s.l.e.a.

———, —Niigata. 52 pp. sm. f°. s.l.e.a.

———, —Nobiru. 52 pp. sm. f°. s.l.e.a.

———, —Tokai. 142 pp. 13 diagrams, sm. f°. s.l.e.a.

———, —Wakayama. 52 pp. sm. f°. s.l.e.a.

In the Japanese language also.

———, —Weather maps. 1884, Jan. to Dec. 12 vols. 4°. s.l.e.a.

In the Japanese language also.

(Knipping, E.)—Notes on the meteorology of Japan. Slip.

Observatoire magnétique et météorologique de Zi-ka-wei.—Bulletin mensuel. Tome ix., 1883. With plates, sm. f°. Zi-ka-wei, 1884.

(Principal Civil Medical Officer, Straits Settlements.)—Meteorological returns, Straits Settlements, 1883. sm. f°. Sheets.

Surveyor General's Office, Colombo.—Results of meteorological observations in Ceylon during the months of January to December 1883. f°. Sheets. (*Suppl. to the Ceylon Gov. Gazette*, 1883-84.)

|| (Surveyor General's Office, Colombo.)—The meteorology of Ceylon in 1882 and 1883, and average results from 1869. (1882 by C. H. Allen. 1883 by J. Stoddart.) 2 vols. f°. (*Administration Rep.*, 1882, p. 26 B., 1883, p. 24 B.)

b. INDIA.

[**Meteorological Office, Bengal.**]—Bay of Bengal weather chart. 1883. June 1, to 1884, Dec. 31. sm. f°. Sheets.

Meteorological Office, Bengal.—Bengal daily weather report. 1883, May 16 to Nov. 9; 1884 May 16 to Nov. 7. sm. f°. Sheets.

These reports are only published during the rainy season.

(Meteorological Office, Bengal.)—Meteorological and rainfall table of the Province of Bengal for the months of January to December 1884, with annual tables. sm. f°. 19.

This is a continuation of the monthly "Table of rainfall recorded at stations in Bengal."

—.—.—Meteorological report of the province of Bengal for the weeks ending June 8, 1883, to January 2, 1885. f°. 19.

After May 30, 1884, the title changes to "Meteorological and Rainfall Table of the Province of Bengal."

For previous dates see "Statement of rainfall in Bengal."

[Meteorological Office, Calcutta.]—Note on the meteorology of the years 1882 and 1883, by the Meteorological Reporter to the Government of India. 2 vols. f°. s.l.e.a.

[—.—.—.]—Report on the meteorology of India in 1882. By **H. F. Blanford**. Eighth year. 1 vol., with plates, f°. Calcutta, 1884.

Meteorological Office, India.—Abstract of the results of meteorological observations taken at the Alipore Observatory in the months of Jan.—Dec., 1884. sm. f°. Sheets.

[Meteorological Office, India.]—Meteorological observations recorded at six stations in India in the year 1883, corrected and reduced. Published . . . under the direction of **H. F. Blanford**. xi. + 191 pp. f°. Calcutta, 1884.

Meteorological Office, India.—Results of the meteorological observations taken at the Alipore Observatory from 30th December 1883 to 3rd January 1885. sm. f°. Sheets.

[Meteorological Office, India.]—Weather report. 1884, Jan. 1—Dec. 31. f°. Sheets.

☞.—AFRICA.

Danckelman, A. von.—Mémoire sur les observations météorologiques faites à Vivi (Congo Inférieur) et sur la climatologie de la Côte Sud-Ouest d'Afrique en général. viii. + 92 pp., 2 plates, 1 map, sm. f°. Berlin, 1884.

|| **Hann, J.**—Einige Resultate aus Major von Mechow's meteorologischen Beobachtungen im Innern von Angola. 29 pp. la. 8°. (*Sitzb. k. Akad. Wissensch., Wien*, lxxxix., ii. *Abth.*, 1884, p. 191.)

(Royal Alfred Observatory, Mauritius.)—Mauritius meteorological results from the Blue Books for 1882 and 1883. 2 vols. f°. Port Louis, 1883–84.

[Service météorologique du Gouvernement général de l'Algérie.]—Bulletin météorologique du Gouvernement général de l'Algérie. Année x^e, 1884, Jan. 1—Dec. 31. Oblong sm. f°. Sheets.

Service météorologique du Gouvernement général de l'Algérie.—Résumé climatologique du mois. 1882, Jan.—Sept. f°. Sheets.

☛.—AMERICA. a. CANADA.

Cundall, H. J.—Abstract of meteorological register for the year 1883. Charlottetown, Prince Edward Island. Oblong la. 8°. Sheet.

(Magnetical Observatory, Toronto.)—General meteorological register for the year 1884. 6 pp. 8°. s.l.e.a.

Office of the Chief Signal Officer, Washington.—Physical observations during the Lady Franklin Bay Expedition of 1883. Signal Service Notes, No. xiv., supplement to Signal Service Notes, No. x. Prepared under the direction of **W. B. Hazen** by **W. H. Lamar, Jr.**, and **F. W. Ellis**. 62 pp., 14 plates, 1 chart, la. 8°. Washington, 1884.

b. UNITED STATES.

Kirkpatrick, J. A.—A general abstract of meteorological observations made at Philadelphia, Pa., for 30^y years from July 1st, 1851, to December 31st, 1881, . . . Oblong la. 8°. Sheet.

New York Meteorological Observatory.—Abstract of registers from self-recording instruments. 1883, Jan.—Dec., and annual tables. 4°.

Nipher, F. E.—[Bulletin of the] Missouri Weather Service. 1884, Jan.—Dec. 19

Office of the Chief Signal Officer, Washington.—Bulletin of international meteorology for the months of January to December, 1882. With plates, la. 4°. Washington, 1883-84.

This bulletin contains daily synchronous observations recorded in various countries throughout the Globe, and is a continuation of the "International simultaneous meteorological observations, &c."

—War Department weather map. 1884, Jan. 1—Dec. 31. la. f°. Sheets.

United States Naval Observatory.—Meteorological observations made at the United States Naval Observatory during the years 1875, 1878, and 1880. 3 vols. la. 4°. Washington, 1877, 1882, 1884.

1879 was never published separately.

c. CENTRAL AMERICA.

Ministerio de Fomento de la República Mexicana.—Boletín. Tomo viii., 1883, Nos. 1-3, 5-156. la. f°. Sheets.

d. SOUTH AMERICA.

|| **Doering, O.**—Observations météorologiques faites à Córdoba (République Argentine) pendant l'année, 1883. 144 pp. la. 8°. Buenos Aires, 1884. (*Bol. Acad. Nac. Cienc. Córdoba*, vi., p. 341.)

Oficina meteorológica Argentina.—Anales . . . por su Director **B. A. Gould.** Tomo iv. 1 vol., with map, la. 4°. Buenos Aires, 1884.

Osservatorio astronomico de Santiago.—Observaciones meteorológicas, 1873-1881. **J. I. Vergara,** Director. xcv. + 266 pp., 28 plates, la 8°. Santiago, 1884.

e. WEST INDIES.

* **Déville, C. Sainte-Claire.**—Recherches sur les principaux phénomènes de météorologie et de physique terrestre aux Antilles. Tome premier, comprenant 1° Observations sur le tremblement de terre du 8 Février 1843; 2° Tableaux météorologiques. 323 pp., 1 plate, 4°. Paris, 1860.

|| (**Hall, M.**)—Weather report for the months of Jan.—Dec. 1884. sm. f°. Jamaica, 1884-85. [*From the Jamaica Gazette.*]

Jefatura de Obras Públicas de la Ysla de Puerto-Rico.—Resumen de las observaciones meteorológicas verificadas . . . 1884, Jan.—Dec. 4°. Sheets.

W[alcott], R. B.—Meteorological observations taken at the Commercial Hall, by T. L. Ince, and at Joes River House, St. Joseph's, Barbados, during the weeks ending 6th Jan.—28th Dec., 1884. Slips.

[**Walcott, R. B.**]—Meteorological observations . . . taken at Joes River House, St. Joseph's, Barbados . . . during the year 1883. sm. f°. Sheet.

—The meteorology of the year 1883. 2 pp. la. 8°. (*Barbados Agric. Gazette*, May 1, 1884.)

f. AUSTRALASIA.

Adelaide Observatory.—Meteorological observations made at the Adelaide Observatory and other places in South Australia and the northern territory during years 1881, 1882, under the direction of **C. Todd.** 2 vols., with plates, sm. f°. Adelaide, 1884-85.

Colonial Museum and Geological Survey Department, Wellington.—Meteorological report, 1883: including returns for 1880, 1881, 1882, and averages for previous years. (Preface by **J. Hector.**) xvi. + 68 pp., 19 plates, la. 8°. Wellington, 1884.

Gore, R. B.—Meteorological observations, Wellington. 1883, Jan.—Dec. Slips.

|| **Hector, J.**—Abstract of meteorological observations, New Zealand, for the quarters ending March, June, September, and December 1883. sm. f°. Sheets. (*New Zealand Gazette*, 1883-84.)

|| (**Hector, J.**)—Meteorological observations in New Zealand, 1883. 3 pp. sm. f°. (*Statistics of New Zealand*, 1883, p. 60.)

Melbourne Observatory.—Monthly record of results of observations in meteorology, terrestrial magnetism, etc., etc., taken at the Melbourne Observatory, together with abstracts from meteorological observations obtained at various localities in Victoria. Under the superintendence of **R. L. J. Ellery**. 1883, Jan.—Dec. 12. 8°. Melbourne, s.d.

Meteorological Observer, Hobart.—Report of the meteorological observer for the year 1883. (By **J. Shortt**.) 14 pp. f°. s.l.e.a.

* (**Rochefort, E.**)—Mission de l'Île Saint-Paul. Observations météorologiques recueillies à l'Île Saint-Paul. 48 pp. 4°. (*Recueil de Mém., Rapports et Documents relatifs à l'observation du passage de Vénus sur le Soleil du 9 Déc. 1874. II., 2^e part., No. 2.*)

[**Surveyor General, Perth.**]—Meteorological report for the year 1883. 12 pp., 13 plates, f°. Perth, 1884.

|| **Upton, W.**—Report of observations made on the expedition to Caroline Island to observe the total solar eclipse of May 6, 1883. 64 pp., 7 plates, la. 4°. Washington, 1884. (*Mem. Nat. Acad. Sc., vol. ii.*)

Western Australia.—Meteorological curves for the year 1883. 25 pp. sm. f°. s.l.e.a.

FF.—SEA.

Dänisches meteorologisches Institut und deutsche Seewarte.—Tägliche synoptische Wetterkarten für den nordatlantischen Ocean und die anliegenden Theile der Kontinente. Zweites und drittes Quart. (Marz bis Aug. 1881.) 2 vols., with charts, f°. Copenhagen et Hambourg, 1884.

Gaimard, P.—Voyages de la Commission Scientifique du Nord, en Scandinavie, en Laponie, au Spitzberg et aux Féroë, pendant les années 1838, 1839 et 1840, sur la corvette La Recherche, commandée par M. Fabvre; publiés par ordre du Roi sous la direction de M. P. Gaimard. Meteorologie; par **V. Lottin, A. Bravais, C. B. Lilliehöök, P. A. Siljeström, Ch. Martins, J. De Laroche-Poncié, L. L. Læstadius, et E. Pottier**. Tomes I. et II. 2 vols. la. 8°. Paris, s.d.

Koninklijk nederlandsch meteorologisch Instituut.—Tabellarisch overzicht der meteorologische waarnemingen van nederlandsche en duitsche schepen in de chineesche zee. Quadraat 97°. (Voorrede door **P. F. van Heerdt**.) iv. + 49 pp. la. 4°. Utrecht, 1884.

* **Vincendon-Dumoulin, C. A. et Coupvent-Desbois, —**—Voyage au Pole Sud et dans l'Océanie sur les corvettes L'Astrolabe et La Zélée, exécuté par ordre du Roi pendant les années 1837–1838–1839–1840, sous le commandement de J. Dumont D'Urville, Capitaine de Vaisseau. Physique, par MM. Vincendon-Dumoulin et Coupvent-Desbois. Tome premier. xxi. + 387 pp. la. 8°. Paris, 1842.

Q—METEOROLOGY.—TABLES.

|| **Glaisher, J.**—On the corrections to be applied to the monthly means of meteorological observations taken at any hour, to convert them into mean monthly values. 15 pp. 4°. [*Phil. Trans., 1848, p. 125.*]

* **Ronketti, J. G. H.**—Formula and tables for ascertaining the force and weight of aqueous vapour in the atmosphere, and the corresponding degrees of evaporation, with J. G. H. Ronketti's improved wet and dry bulb hygrometer. 15 pp., 1 plate, 8°. London, 1842.

Salino, F.—Tavole-Prontuario da 1 a 5000 metri per la misura delle altezze col mezzo del barometro colle pressioni normali per ogni metro di elevazione, e correzioni per l'influenza de' Raggi Veteri della Terra posizione del variabile pei barometri fissi colla riduzione al mare delle osservazioni barometriche. x. + 24 pp. 8°. Belluno, 1883.

|| **Schreiber, P.**—Beitrag zur Frage der Reduction von Barometerständen auf ein anderes Niveau. 18 pp. sm. f°. Halle, 1884. (*Leopoldina, Heft xx.*)

T—PERIODICALS, PROCEEDINGS, TRANSACTIONS, AND ANNUAL REPORTS.

Academia nacional de ciencias en Córdoba (Republica Argentina).—Boletín. Tom. v.—vi. 2 vols. with plates, la. 8°. Buenos Aires, 1883–84.

Académie des Sciences, Paris.—Comptes Rendus hebdomadaires des séances. . . . Tomes xvi.—xix., 1884. 2 vols. 4°. Paris, 1884.

Archives des sciences physiques et naturelles.—Troisième période. Tomes xi.-xii. 2 vols., with plates, 8°. Genève, 1884.

Assmann, R.—Das Wetter-Meteorologische Monatsschrift für Gebildete aller Stände. Herausgegeben von R. Assmann. Zugleich Organ des Vereines für Wetterkunde zu Magdeburg, Zweigverein der deutschen meteorologischen Gesellschaft. I. Jahrg., 1-84. 1 vol. la. 8°. Magdeburg, 1885.

Association scientifique de France.—Bulletin hebdomadaire. Deuxième série. Tomes ix.-x., 1884-85. 2 vols. 8°. Paris, 1884.

Associazione meteorologica italiana.—Bollettino mensile pubblicato per cura dell'Osservatorio centrale del Real Collegio Carlo Alberto in Moncalieri. Serie II., vol. iii. (della intera Collezione, vol. xviii.) Anno 1882-83. 1 vol. sm. 8°. Torino, 1883.

Botanic Gardens, Trinidad.—Report on Botanic Gardens Department for 1883, together with meteorological returns, including annual rainfall 1862 to 1883. (By H. Prestoe.) 14 pp. f°. s.l.c.a.

British Association for the Advancement of Science.—Report of the fifty-third meeting . . . held at Southport in September 1883. lxxx. + 700 + 103 pp., 16 plates, 8°. London, 1884.

Bureau central météorologique de France.—Annales . . . publiées par E. Mascart:—

Année 1881. II. Bulletin des observations françaises et revue climatologique. 1 vol., with plates, la. 4°. Paris, 1883.

1882. I. Étude des orages en France, et mémoires divers. 1 vol., with plates, la. 4°. Paris, 1884.

III. Pluies en France. 1 vol., with plates, la. 4°. Paris, 1884.

IV. Météorologie générale. 1 vol., with plates, la. 4°. Paris, 1884.

Centralbureau für Meteorologie und Hydrographie im Grossherzogthum Baden.—Jahres-Bericht . . . nebst den Ergebnissen der meteorologischen Beobachtungen und der Wasserstandsaufzeichnungen am Rhein und an seinen grössern Nebenflüssen für das Jahr 1883. iv. + 77 pp., 8 plates, la. 4°. Karlsruhe, 1884.

* **Ciel et Terre.**—Revue populaire d'astronomie, de météorologie, et de physique du globe. Cinquième année. 1^{re} Mars 1884—15 Février 1885. 1 vol., with plates, 8°. Bruxelles, 1885.

Comité international des Poids et Mesures.—Procès-verbaux des séances de 1883. 144 pp. 8°. Paris, 1884.

Commission météorologique du Département de Vaucluse.—Compte-Rendu pour l'année 1883. 28 pp., 5 plates, sm. 8°. (Avignon, s.a.)

Department of Marine and Fisheries, Ottawa.—Seventeenth annual report . . . being for the fiscal year ended 30th June, 1884. lxx. + 260 pp., 1 chart, la. 8°. Ottawa, 1885.

Dépôt des Cartes et Plans de la Marine, Paris.—Annales hydrographiques. 2^e série. Tomes v.-vi. Années, 1883-84. 2 vols., with plates, la. 8°. Paris, 1883-85.

* **Deutsche meteorologische Gesellschaft.**—Meteorologische Zeitschrift. Herausgegeben von der deutschen meteorologischen Gesellschaft. Redigirt von W. Köppen. Erster Jahrg., 1884. 1 vol., with plates, sm. 8°. Berlin, s.a.

Deutsche Seewarte.—Aus dem Archiv der Deutschen Seewarte. iv. Jahrg. 1881. iv. + 57 + xxii. + 4 + 4 + 50 pp., 4 plates, 4°. Hamburg, 1884.

———, —Monatliche Uebersicht der Witterung für jeden Monat des Jahres 1883. Jahrg. viii. With plates, la. 8°. Hamburg, s.a.

Devonshire.—First report of the Committee on the meteorology of Devonshire. (By W. C. Lake, Secretary.) 3 pp. 8°. (Trans. Devonsh. assoc. adv. sc., 1876.)

Finska Vetenskaps-Societeten.—Öfversigt af Finska Vetenskaps-Societeten's Förhandlingar. xxv. 1882-1883. With plates, 8°. Helsingfors, 1883.

* **Flammarion, C.**—L'Astronomie. Revue d'astronomie populaire, de météorologie et de physique du globe, exposant les progrès de la science pendant l'année. . . . Troisième année, 1884. 1 vol. la. 8°. Paris, 1885.

Franklin Institute, Philadelphia.—The journal of the Franklin Institute, devoted to science and the mechanic arts, . . . Vols. cxvii.-cxviii. Third series, vols. lxxxvii.-lxxxviii., 1884. 2 vols., with plates, 8°. Philadelphia, 1884.

Geological and Natural History Survey of Canada.—Report of progress for 1880-81-82. 1 vol., with plates and maps, la. 8°. Montreal, 1883.

(Government Observatory, Bombay.)—Report on the condition and proceedings of the Government Observatory, Colaba, for the year which ended with the 30th June, 1884. 9 pp. sm. f°. s.l.e.a.

Hansa.—Zeitschrift für Seewesen. (Redigirt und herausgegeben von W. von Freeden.) xxi. Jahrg., 1884. sm. f°. Hamburg, s.a.

Hinrichs, G.—Bulletin of the Iowa Weather Service, 1881. Nos. 91-102. 58 pp. la. 8°. Iowa, 1881.

Hong-Kong Observatory.—Annual report for 1884. 8 pp. sm. f°. Dated Hong-Kong, 17th January, 1885.

(Hydrographic Office, Washington.)—Annual report of the Hydrographer to the Bureau of Navigation for the fiscal year ending June 30, 1884. 14 pp. la. 8°. Washington, 1884.

Hydrographisches Amt der Admiralität, Berlin.—Annalen der Hydrographie und maritimen Meteorologie. Organ des hydrographischen Amtes und der deutschen Seewarte. Zwölfter Jahrg., 1884. With plates, la. 8°. Berlin, s.a.

Kais. Königl. geographische Gesellschaft in Wien.—Mittheilungen. 1883. xxvi. Band (der neuen Folge xvi.). With plates, la. 8°. Wien, 1883.

K. K. hydrographisches Amt, Pola.—Mittheilungen aus dem Gebiete des Seewesens. Jahrg. 1884. xii. Bd. With plates, la. 8°. Pola, 1884.

Contains also some unnumbered pages of meteorological observations recorded at Pola during 1883-84.

Kaiserliche leopoldino-carolinische deutsche Akademie der Naturforscher.—Leopoldina. Herausgegeben von C. H. Knoblauch. Heft. xviii.-xix., 1882-83. 2 vols. la. 4°. Halle, 1882-83.

* **Kettler, J. I.**—Zeitschrift für wissenschaftliche Geographie. Band iv. With plates, la. 8°. Wien, 1883.

|| **Kew Observatory.**—Report of the Kew Committee for the years ending October 31, 1883 and 1884, with appendices containing results of magnetical, meteorological, and solar observations made at the Observatory. 2 vols. 8°. London, 1883-84. (*Proc. Roy. Soc., 1883 and 1884.*)

Knowledge.—An illustrated magazine of science plainly worded, exactly described. Conducted by R. A. Proctor. Vols. v.-vi., 1884. 2 vols., 4°. London, 1884.

Kongelige danske videnskabernes Selskab.—Oversigt over det . . . Forhandlinger og dets Medlemmers Arbejder i Aaret 1883. With plates, la. 8°. Kjøbenhavn, 1883-84.

Königl. sächsisches meteorologisches Institut.—Jahrbuch, 1883. 299 + 64 + iv. 136 pp., 8 plates, la. 4°. Chemnitz, 1884.

Koninklijk nederlandsch meteorologisch Instituut.—Nederlandsch meteorologisch Jaarboek voor 1877. Zes en twintigste Jaargang, Tweede Deel. vii. + 292 pp., oblong 8°. Utrecht, 1884.

Laboratoire de Chimie du Caire.—Bulletin. Année 1881-82. Décembre. 1882. 53 pp. 8°. Caire, s.a.

Leicester Literary and Philosophical Society.—Report of the Council . . . presented to the annual general meeting, assembled June 23rd, 1884. 35 pp. 8°. Leicester, [1884].

—Transactions. Forty-ninth session, 1883-84. pp. 61-91. 8°. s.l.e.a.

Literary and Philosophical Society, Manchester.—Memoirs. Third series. Vols. vii. and ix., 2 vols., 1 plate, 8°. London, 1882-83.

Vol. ix. has a separate title page—"A centenary of science in Manchester (in a series of notes) by R. Angus Smith."

—Proceedings. Vols. vi.-viii., Sessions 1880-83. 3 vols., 8°. Manchester, 1881-82.

London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science. Conducted by Sir R. Kane, Sir W. Thomson, and W. Francis. Fifth series. Vols. xvii.-xviii., 1884. 2 vols., with plates, 8°. London, s.a.

Franklin Institute, Philadelphia.—The journal of the Franklin Institute, devoted to science and the mechanic arts. Vols. cxvii.-cxviii. Third series, vols. lxxxvii.-lxxxviii., 1884. 2 vols., with plates, 8°. Philadelphia, 1884.

Geological and Natural History Survey of Canada.—Report of progress for 1880-81-82. 1 vol., with plates and maps, la. 8°. Montreal, 1883.

(Government Observatory, Bombay.)—Report on the condition and proceedings of the Government Observatory, Colába, for the year which ended with the 30th June, 1884. 9 pp. sm. f°. s.l.e.a.

Hansa.—Zeitschrift für Seewesen. (Redigirt und herausgegeben von W. von Freeden.) xxi. Jahrg., 1884. sm. f°. Hamburg, s.a.

Hinrichs, G.—Bulletin of the Iowa Weather Service, 1881. Nos. 91-102. 58 pp. la. 8°. Iowa, 1881.

Hong-Kong Observatory.—Annual report for 1884. 8 pp. sm. f°. Dated Hong-Kong, 17th January, 1885.

(Hydrographic Office, Washington.)—Annual report of the Hydrographer to the Bureau of Navigation for the fiscal year ending June 30, 1884. 14 pp. la. 8°. Washington, 1884.

Hydrographisches Amt der Admiralität, Berlin.—Annalen der Hydrographie und maritimen Meteorologie. Organ des hydrographischen Amtes und der deutschen Seewarte. Zwölfter Jahrg., 1884. With plates, la. 8°. Berlin, s.a.

Kais. Königl. geographische Gesellschaft in Wien.—Mittheilungen. 1883. xxvi. Band (der neuen Folge xvi.). With plates, la. 8°. Wien, 1883.

K. K. hydrographisches Amt, Pola.—Mittheilungen aus dem Gebiete des Seewesens. Jahrg. 1884. xii. Bd. With plates, la. 8°. Pola, 1884.

Contains also some unnumbered pages of meteorological observations recorded at Pola during 1883-84.

Kaiserliche leopoldino-carolinische deutsche Akademie der Naturforscher.—Leopoldina. Herausgegeben von C. H. Knoblauch. Heft. xviii.-xix., 1882-83. 2 vols. la. 4°. Halle, 1882-83.

* **Kettler, J. I.**—Zeitschrift für wissenschaftliche Geographie. Band iv. With plates, la. 8°. Wien, 1883.

|| **Kew Observatory.**—Report of the Kew Committee for the years ending October 31, 1883 and 1884, with appendices containing results of magnetical, meteorological, and solar observations made at the Observatory. 2 vols. 8°. London, 1883-84. (*Proc. Roy. Soc.*; 1883 and 1884.)

Knowledge.—An illustrated magazine of science plainly worded, exactly described. Conducted by R. A. Proctor. Vols. v.-vi., 1884. 2 vols., 4°. London, 1884.

Kongelige danske videnskabernes Selskab.—Oversigt over det . . . Forhandlinger og dets Medlemmers Arbejder i Aaret 1883. With plates, la. 8°. Kjøbenhavn, 1883-84.

Königl. sächsisches meteorologisches Institut.—Jahrbuch, 1883. 299 + 64 + iv. + 36 pp., 8 plates, la. 4°. Chemnitz, 1884.

Koninklijk nederlandsch meteorologisch Instituut.—Nederlandsch meteorologisch Jaarboek voor 1877. Zes en twintigste Jaargang. Tweede Deel. vii. + 292 pp., oblong 8°. Utrecht, 1884.

Laboratoire de Chimie du Caire.—Bulletin. Année 1881-82. Décembre, 1882. 53 pp. 8°. Caire, s.a.

Leicester Literary and Philosophical Society.—Report of the Council . . . presented to the annual general meeting, assembled June 23rd, 1884. 35 pp. 8°. Leicester, [1884].

—Transactions. Forty-ninth session, 1883-84. pp. 61-91, 8°. s.l.e.a.

Literary and Philosophical Society, Manchester.—Mémoires. Third series. Vols. vii. and ix. 2 vols., 1 plate, 8°. London, 1882-83.

Vol. ix. has a separate title page—"A centenary of science in Manchester (in a series of notes) by R. Angus Smith."

—Proceedings. Vols. xx.-xxii. Sessions 1880-83. 3 vols., 8°. Manchester, 1881-83.

* **London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science.** Conducted by Sir R. Kane, Sir W. Thomson, and W. Francis. Fifth series. Vols. xvii.-xviii., 1884. 2 vols., with plates, 8°. London, s.a.

London Institution.—Journal. Nos. 37-39, 1882-84. 8°. s.l.e.a.

(Melbourne Observatory.)—Nineteenth report of the Board of Visitors to the Observatory; together with the annual report of the Government Astronomer. (1883-84.) 12 pp. sm. f°. Melbourne, s.a.

Meteorological Commission, Cape of Good Hope.—Report . . . for the year 1883. vi. + 70 pp. sm. f°. Cape Town, 1884.

Meteorological Council, London.—Report of the Meteorological Council to the Royal Society, for the years ending the 31st of March 1883 and 1884. 2 vols., with plates, la. 8°. London, 1884-5.

———.—The monthly weather report of the Meteorological Office for the year 1884. iii. + 130 pp., 25 plates, la. 4°. London, 1885.

———.—The quarterly weather report of the Meteorological Office for the year 1876. New series. (Preface by R. H. Scott.) With plates, la. 4°. London, 1884.

———.—The quarterly weather report, 1878. Appendices and Plates. 32 pp., 73 plates, la. 4°. London, 1884.

[Meteorological Office, India.]—Report on the administration of the meteorological department of the Government of India in 1883-84. 110 pp. f°. s.l.e.a.

(Meteorological Office, Madras.)—Administration report of the meteorological reporter to the Government of Madras, for the year 1883-84. (By E. I. Pogson.) 19 pp. la. 8°. Madras, 1884.

Meteorological Service, Dominion of Canada.—Monthly weather review, 1884, Jan.—Dec. With plates, la. 4°. s.l.e.a.

———.—Report . . . by C. Carpmæl. For the year ending December 31, 1882. xix. + 137 pp., 1 plate, la. 8°. Ottawa, 1884.

Ministère de la Marine et des Colonies, Paris.—Revue maritime et coloniale. Tomes lxxxii.-lxxxiv. 4 vols., with plates, la. 8°. Paris, 1884-85.

Ministerio de Fomento. Observatorio meteorológico central, México.—Revista mensual climatológica. Resumen de los datos físicos y estadísticos colectados en el observatorio de México. Tomo i., Nos. 1 to 17. 572 pp., 6 tabular forms, sm. f°. (México, 1881-82.)

* **Nature.**—A weekly illustrated journal of science. Vols. xxix.-xxx. 1883-84. 2 vols., with portrait, la. 8°. London and New York, 1884.

* **Nature, La.**—Revue des sciences et de leurs applications aux arts et à l'industrie. Journal hebdomadaire illustré. Rédacteur en chef G. Tissandier. Douzième année, 1884. 1^{re} et 2^e semestres. 2 vols. sm. f°. Paris, s.a.

* **Nautical Magazine for 1884.** A journal of papers on subjects connected with maritime affairs. New series. Vol. liii. 8°. London, s.a.

Observatoire Royal de Bruxelles.—Annuaire. 1880-82, 1884-85. Années 17-49, 51-52. 5 vols., with plates, 18°. Bruxelles, 1879-84.

Oesterreichische Gesellschaft für Meteorologie.—Zeitschrift. Redigirt von J. Hann. xix. Band. With plates, la. 8°. Wien, 1884.

[Office of the Chief Signal Officer, Washington.]—Annual report of the Chief Signal Officer, United States Army, to the Secretary of War, for the fiscal years ending June 30, 1881 and 1882. (1882 in two parts.) 3 vols., with plates, la. 8°. Washington, 1881 and 1883.

Petermann's (Dr. A.) Mittheilungen aus Justus Perthes' geographischer Anstalt. Herausgegeben von E. Behm. Letztes Quartal von A. Supan. 30 Band, 1884. With plates, 4°. Gotha, s.a.

———.—Ergänzungsband xv., 1883-1884. Nos. 71-75. With plates, 4°. Gotha, 1884.

Physikalischer Verein zu Frankfurt am Main.—Jahresbericht . . . für das Rechnungsjahr 1882-83. 75 pp., 6 sheets of met. obsns. for 1883, 2 diagrams, 8°. Frankfurt a/M., 1884.

Pontificia Università Gregoriana, continuazione del bullettino meteorologico dell' osservatorio del Collegio Romano, con corrispondenza e bibliografia per l'avanzamento della fisica terrestre, fondato dal P. Angelo Secchi. Vol. xx. anno xx., 1881. sm. f°. Roma, 1881.

Principal Civil Medical Officer, Singapore.—Annual medical report on the Civil Hospitals in the Straits Settlements for the year 1883. 38 pp. f°. s.l.e.a.
Contains some abstracts of met. obsns.

(Royal Alfred Observatory, Mauritius.)—Annual report of the Director of the Royal Observatory for the year 1882. 37 pp. sm. 4°. s.l.c.a.

Royal Cornwall Polytechnic Society.—The fifty-first annual report, 1883. xii. + 148 + 28 + 12 pp., 4 plates, 8°. Falmouth, s.a.

Royal Dublin Society.—The scientific proceedings. New series. Vol. iii. With plates, 8°. Dublin, 1883.

— — —The scientific transactions. Vol. i., series ii. 2 vols., with plates. 4°. Dublin, 1877–1883.

Royal Geographical Society, London.—Proceedings . . . and monthly record of geography. New monthly series. Vol. vi., 1884. With plates, la. 8°. London, 1884.

Royal Institution of Great Britain.—Notices of the proceedings at the Meetings of the Members . . . with abstracts of the discourses delivered at the evening Meetings. Vol. x., 1882–1884. With plates, 8°. London, 1884.

Royal Meteorological Society, London.—Quarterly journal. Vol. x., 1884. With plates, la. 8°. London, 1884.

Royal Society of Edinburgh.—Proceedings. Vol. xi. Nov. 1880 to July 1882. With plates, 8°. Edinburgh, 1882.

Royal Society of London.—Proceedings. Nov. 15, 1883, to Dec. 1, 1884. Vols. xxxvi.–xxxvii. 2 vols., with plates, 8°. London, 1884.

Royal Society of New South Wales.—Journal and Proceedings . . . 1882–84. Vols. xvi.–xvii. Edited by A. Liversidge. 2 vols., with plates, 8°. Sydney, 1882–84.

Royal Society of Tasmania.—Papers and Proceedings [and Report] . . . for 1882. 1 vol., with plates, 8°. Hobart, 1884.

Royal United Service Institution, London.—Journal. Vol. xxvii. With plates, 8°. London, 1884.

Rugby School Natural History Society.—Report . . . for the year 1883. (Preface by C. H. Hodges and G. C. Richards, Editors.) xvi. + 60 pp., 5 plates, 8°. Rugby, 1884.

Schweizerische meteorologische Central-Anstalt.—Annalen. 1883. Der "Schweizerischen meteorologischen Beobachtungen" zwanzigster Jahrg. With plates, 8°. Zurich, s.a.

Scientific Department of the Naval Technical Committee, St. Petersburg.—Naval Reportory. 1884, Nos. 2–12; 1885, Nos. 1–2. Vols. cc.–ccvi., with plates, la. 8°. St. Petersburg, 1884–85.

In the Russian language.

Severn Fishery Board.—Eighteenth annual report of the Board of Conservators of the Severn Fishery District, with . . . resolutions passed at a meeting of the Board, held at the Guildhall, Worcester, on the 8th January, 1885. 71 pp., 3 plates, 8°. Worcester, 1885.

Shipwrecked Mariner, The.—Quarterly maritime magazine. Edited by W. R. Buck. Vols. xxix.–xxxi., 1882–1884. 3 vols., with plates, 8°. 1882–1884.

Smithsonian Institution, Washington.—Annual report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures and condition of the Institution for the year 1882. xx. + 855 pp., 8°. Washington, 1884.

Société de Géographie de Genève.—Le Globe. Journal géographique. Tome xliii. Quatrième série, Tome iii., 8°. Genève, 1884.

Société des sciences naturelles de Neuchâtel.—Bulletin. Tomes xlii.–xiv., 1882–84. 2 vols., with plates, 8°. Neuchâtel, 1883–84.

Société météorologique de France.—Annuaire. Tome xxxi., 1883. With plates, la. 8°. Paris, s.a.

Society of Arts, London.—Index to vols. i.–xxx. of Journal. 3 vols., la. 8°. London, 1863, 1873, 1884.

— — —Journal. Vol. xxxii. Nov. 23, 1883, to Nov. 14, 1884. With plates, la. 8°. London, 1884.

Symons's monthly meteorological magazine. Vol. xix., 1884. With plates, 8°. London, s.a.

(Royal Alfred Observatory, Mauritius.)—Annual report of the Director of the Royal Observatory for the year 1882. 37 pp. sm. 4°. s.l.e.a.

Royal Cornwall Polytechnic Society.—The fifty-first annual report, 1883. xii. + 148 + 28 + 12 pp., 4 plates, 8°. Falmouth, s.a.

Royal Dublin Society.—The scientific proceedings. New series. Vol. iii. With plates, 8°. Dublin, 1883.

———The scientific transactions. Vol. i., series ii. 2 vols., with plates, 4°. Dublin, 1877–1883.

Royal Geographical Society, London.—Proceedings . . . and monthly record of geography. New monthly series. Vol. vi., 1884. With plates, la. 8°. London, 1884.

Royal Institution of Great Britain.—Notices of the proceedings at the Meetings of the Members . . . with abstracts of the discourses delivered at the evening Meetings. Vol. x., 1882–1884. With plates, 8°. London, 1884.

Royal Meteorological Society, London.—Quarterly journal. Vol. x., 1884. With plates, la. 8°. London, 1884.

Royal Society of Edinburgh.—Proceedings. Vol. xi. Nov. 1880 to July 1882. With plates, 8°. Edinburgh, 1882.

Royal Society of London.—Proceedings. Nov. 15, 1883, to Dec. 1, 1884. Vols. xxxvi.–xxxvii. 2 vols., with plates, 8°. London, 1884.

Royal Society of New South Wales.—Journal and Proceedings . . . 1882–3. Vols. xvi.–xvii. Edited by A. Liversidge. 2 vols., with plates, 8°. Sydney, 1883–84.

Royal Society of Tasmania.—Papers and Proceedings [and Report] . . . for 1883. 1 vol., with plates, 8°. Hobart, 1884.

Royal United Service Institution, London.—Journal. Vol. xxvii. With plates, 8°. London, 1884.

Rugby School Natural History Society.—Report . . . for the year 1883. (Preface by C. H. Hodges and G. C. Richards, Editors.) xvi. + 60 pp., 5 plates, 8°. Rugby, 1884.

Schweizerische meteorologische Central-Anstalt.—Annalen. 1883. Der “Schweizerischen meteorologischen Beobachtungen” zwanzigster Jahrg. With plates, 4°. Zurich, s.a.

Scientific Department of the Naval Technical Committee, St. Petersburg.—Naval Repertory. 1884, Nos. 2–12; 1885, Nos. 1–2. Vols. cc.–ccvi., with plates, la. 8°. St. Petersburg, 1884–85.

In the Russian language.

Severn Fishery Board.—Eighteenth annual report of the Board of Conservators of the Severn Fishery District, with . . . resolutions passed at a meeting of the Board, held at the Guildhall, Worcester, on the 8th January, 1885. 71 pp., 3 plates, 8°. Worcester, 1885.

Shipwrecked Mariner, The.—Quarterly maritime magazine. Edited by W. R. Buck. Vols. xxix.–xxxi., 1882–1884. 3 vols., with plates, 8°. 1882–1884.

Smithsonian Institution, Washington.—Annual report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures and condition of the Institution for the year 1882. xx. + 855 pp. 8°. Washington, 1884.

Société de Géographie de Genève.—Le Globe. Journal géographique. Tome xxiii. Quatrième série, Tome iii., 8°. Genève, 1884.

Société des sciences naturelles de Neuchâtel.—Bulletin. Tomes xiii.–xiv., 1882–84. 2 vols., with plates, 8°. Neuchâtel, 1883–84.

Société météorologique de France.—Annuaire. Tome xxxi., 1883. With plates, la. 8°. Paris, s.a.

Society of Arts, London.—Index to vols. i.–xxx. of Journal. 3 vols., la. 8°. London, 1863, 1873, 1884.

———Journal. Vol. xxxii. Nov. 23, 1883, to Nov. 14, 1884. With plates, la. 8°. London, 1884.

Symons's monthly meteorological magazine. Vol. xix., 1884. With plates, 8°. London, s.a.

Ufficio centrale di Meteorologia italiana.—Annali. Serie II. Vol. iv., Parts i.–iii., 1882. 3 vols., with plates, sm. f°. Roma, 1884.

Yorkshire Philosophical Society.—Annual report of the Council . . . for MDCCLXXXIII. Presented to the annual meeting, February 5th, 1884. 35 pp. la. 8°. York, 1884.

U—RAINFALL.

(Adelaide Observatory).—Rainfall. 1883, Jan.–Dec. 4°. Sheets.

|| **Becquerel, [A. C.] et E.**—Mémoire sur les quantités d'eau tombées près et loin des bois. Lu dans la séance du 3 avril 1869. 14 pp. 4°. [*Mém. Acad. Sc. Paris*, xxxvi., 1870, p. 741.]

|| **Blanford, H. F.**—On the connexion of the Himalaya snowfall with dry winds and seasons of drought in India. 22 pp. 8°. (*Proc. R. Soc.*, 1884, No. 232.)

———.—Rainfall chart of India, showing the average annual distribution of the rainfall according to locality and season. 2 sheets, la. f°. Calcutta, 1883.

|| ———.—The theory of the winter rains of Northern India. 16 pp., 1 plate, 8°. Calcutta, 1884. (*Journ. Asiatic Soc. Bengal*, liii., Part ii., No. 1, June, 1884.)

|| ———.—The theory of the winter rains of Northern India. 4 pp. 8°. (*Proc. Asiatic Soc. Bengal*, 1884, March.)

Bryan, W. B.—Rainfall at . . . stations in the Counties of Lancaster and York. 1876–1883. Oblong la. 8°. Sheet.

Colonial Secretary's Office, Hongkong.—On the mean monthly and annual rainfall at Hongkong. (By W. Doberck.) sm. f°. Sheet.

|| **Eliot, J.**—The rainfall of Cherrapunji. 17 pp., 1 plate, la. 8°. (*Quart. Journ. Meteor. Soc.*, viii., 1882, p. 41.)

Harvey, C. W.—Rainfall in Herts. For the months of January 1881 to November 1883. Oblong sm. 8°. Sheets.

Hellmann, G.—Grösste Niederschlagsmengen in Deutschland, mit besonderer Berücksichtigung Norddeutschlands. 11 pp. sm. f°. Berlin, 1884. (*Zeitschr. k. preuss. statist. Bureau*, 1884, p. 251.)

|| **Köppen, W.**—Zur Charakteristik der Regen in N.W. Europa und Nordamerika. 15 pp. sm. f°. (*Meteor. Zeitschr. deutsche meteor. Gesellsch.* 1885, Jan., p. 10.)

Manchester, Sheffield, and Lincolnshire Railway.—Monthly statement of rain fallen in the year ending 31st December, 1882. sm. f°. Sheet.

[**Meteorological Commission, Cape of Good Hope.**]—[Rainfall diagrams, illustrating monthly averages of rainfall at selected places in Cape Colony, being graphical representations of a portion of the Tables published as Appendix F. in the Report of the Meteorological Commission for 1883.] 7 diagrams, sm. f°. [Rep. Met. Comm. 1884, App. E.]

(**Meteorological Office, Bengal.**)—Statement of rainfall in Bengal for the weeks ending the 6th of April to the 1st of June, 1883. f°. Sheets.

For continuation of this see "Meteorological Report of the Province of Bengal." (P. B. 1.)

Moore, J. W.—Rainfall in 1884, at 40, Fitzwilliam Square, West, Dublin. 8°. Sheet.

[**Observatorium te Batavia.**]—Regenwaarnemingen in Nederlandsch-Indië. Vijftde Jaargang, 1883. (Inleiding van J. J. Poortman.) xii. + 360 pp. f°. Batavia, 1884.

Title page and Preface in the English language also.

|| **Bagona, D.**—Pioggia a differenti altezze. 12 pp. sm. f°. Roma, 1883. (*Annali della meteorologia*, 1882, Parte i., p. 35.)

Russell, H. C.—Results of rain and river observations made in New South Wales during 1883. 27 pp., 3 plates, la. 8°. Sydney, 1884.

|| **Scott, R. H.**—On the diurnal range of rainfall at the seven Observatories in connexion with the Meteorological Office: 1871–80. 22 pp., 5 plates, la. 4°. (*Quart. Weather Rep.*, 1877, App. iii., p. [13].)

Service météorologique du Gouvernement général de l'Algérie.—Saison pluvieuse 1879–82 (commencée le 1^{er} Septembre 1879). Quantités de pluie (en millimètres) tombées mensuellement dans les stations. Sept. 1879—Aug. 1882. f°. Sheets.

———.—Tableau récapitulatif des quantités de pluie (en millimètres) tombées quotidiennement pendant le mois dans les stations météorologiques du réseau africain 1882. Jan.—Sept. f°. Sheets.

Surveyor General's Office, Colombo.—The Hon. the Surveyor-General's Return of rainfall in Ceylon during the year 1883, and means during different periods. 1a. f°. Sheet. Colombo, 1884. (*Suppl. to the Ceylon Gov. Gazette*, Aug. 15, 1884.)

Symons, G. J.—British rainfall, 1883. On the distribution of rain over the British Isles, during the year 1883, as observed at more than 2,000 stations in Great Britain and Ireland, with articles upon various branches of rainfall work. 55 + 194 pp., 4 plates, 8°. London, 1884.

W[alcott], R. B.—Rainfall observations [in Barbados] for the months of Jan.—Dec. 1882. sm. f°. Sheets.

———Rainfall in Barbados, for the year 1883. 6 pp. 1a. 8°. (*Suppl. to Planter's Journ.*, May 1st, 1884.)

W—TEMPERATURE.

Augustin, F.—De la relation des taches solaires à la température. 16 pp. 1a. 8°. Prague, 1884. (*Compt. rend. géométr. Prague*.)
In the Polish language.

* **Becquerel, [A. C.] et E.**—Mémoire sur la température de l'air sous bois et hors de bois. Lu dans la séance du 5 avril 1869. 46 pp. 4°. (*Mém. Acad. Sc. Paris*, xxxvi., 1870, p. 695.)

Bezold, W. von.—Beurkundungen zu der Abhandlung des Herrn Dr. van Bebbber über "die gestrengen Herren." 6 pp. 1a. 8°. (*Zeitschr. österr. Gesellsch. Meteor.*, Wien, 1883, p. 418.)

———Die Kälterückfälle im Mai. Abhandl. der k. kais. Akad. der Wissensch. II. Cl., xiv. Bd., ii. Abth. München, 1883, 7 pp. 1a. 8°. (*Zeitschr. österr. Gesellsch. Meteor.*, Wien, 1883, p. 268.)

Denza, F.—Sulla variazione della temperatura secondo l'altezza. 20 pp. 1a. 8°. Torino, 1883. (*Atti. R. Accad. Sc. Torino*, xviii., 1883.)

Doering, O.—La variabilidad interdiurna de la temperatura en algunos puntos de la República Argentina y de América del sur en general. I. Variabilidad de la temperatura de Buenos Aires. II. Variabilidad de la temperatura de Bahía Blanca. 266 pp. 1a. 8°. Buenos Aires, 1883. (*Bolet. acad. inter. Chile*, v. gvi.)

Engelmann, G.—The mean and extreme daily temperatures in St. Louis for forty-seven years, as calculated from daily observations. 13 pp., 1 plate, 8°. (*Trans. St. Louis Acad. Sc.*, iv., No. 3, p. 196.)

* **Fleming, J.**—The temperature of the seasons, and its influence on inorganic objects, and on plants and animals. xii. + 209 pp. sm. 8°. London and Edinburgh, 1851.

Gamble, J. G.—Summer and winter temperature in South Africa. Read, March 30, 1881. 6 pp. 8°. (*Trans. South Africa. Philos. Soc.*, II., part iii., p. 104.)

* **Glaisher, J.**—On the reduction of the thermometrical observations made at the Apartments of the Royal Society, from the years 1774 to 1781, and from the years 1787 to 1843. 12 pp. 4°. London, 1849. (*Phil. Trans.*, 1849, part ii., p. 307.)

Hann, J.—Die Temperaturverhältnisse der österreichischen Alpenländer. I-II. Theil. 2 parts. 1a. 8°. (*Sitzb. k. Akad. Wissensch.*, Wien, Bd. xc., ii. Abth., 1884, p. 585; xcii., ii. Abth., 1885, p. 493.)

———Die Temperatur von Wien und Umgebung nach einer Studie über den Nachweis von Lössbeeinflussung auf die Temperaturmittel. 4 pp. 1a. 8°. [*Sitzb. k. Akad. Wissensch.*, Wien.]

Hazen, H. A.—Thermometer exposure. Read before the Phil. Soc., Washington, Oct. 13, 1883. 14 pp. 8°. (*Amer. Journ. Sci.*, xxxiii., May, 1884, p. 365.)

Hill, S. A.—On the temperature of North-Western India. 15 plates, 5 plates, f°. (*Indian Met. Mem. vol. 3*, No. 4, p. 103.)

Karsten, G.—1. Periodische Erscheinungen des Thier- und Pflanzenreiches in Schleswig-Holstein (1878-1883). 2. Ueber die Beziehungen zwischen der Erndtezeit und den klimatischen Verhältnissen. 3. Milde Winter. Anomalien und Störungen des Klimas. 20 pp., 1 plate, 2 tables. 1a. 8°. Kiel, 1884. (*Schrift. naturw. Ver. Schleswig-Holst.*, v., 1884, p. 69.)

* **Köppen, W.**—Die Wärmezonen der Erde, nach der Dauer der heissen, gemässigten und kalten Zeit und nach der Wirkung der Wärme auf die organische Welt

Surveyor General's Office, Colombo.—The Hon. the Surveyor-General's Return of rainfall in Ceylon during the year 1883, and means during different periods. 1a. f^o. Sheet. Colombo, 1884. (*Suppl. to the Ceylon Gov. Gazette*, Aug. 15, 1884.)

Symons, G. J.—British rainfall, 1883. On the distribution of rain over the British Isles, during the year 1883, as observed at more than 2,000 stations in Great Britain and Ireland, with articles upon various branches of rainfall work. 55 + 194 pp., 4 plates, 8°. London, 1884.

W[alcott], R. B.—Rainfall observations [in Barbados] for the months of Jan.—Dec. 1882. sm. f^o. Sheets.

—Rainfall in Barbados, for the year 1883. 6 pp. 1a. 8°. (*Suppl. to Planters' Journ.*, May 1st, 1884.)

W—TEMPERATURE.

|| **Augustin, F.**—De la relation des taches solaires à la température. 16 pp. 1a. 8°. Prague, 1884. (*Compt. rend. gymn.-réel Prague*).
In the Polish language.

* || **Becquerel, [A. C.] et E.**—Mémoire sur la température de l'air sous bois et hors de bois. Lu dans la séance du 5 avril 1869. 46 pp. 4°. [*Mém. Acad. Sc. Paris*, xxxvi., 1870, p. 695.]

|| **Bezold, W. von.**—Bemerkungen zu der Abhandlung des Herrn Dr. van Bebbler über "die gestrengen Herren." 6 pp. 1a. 8°. (*Zeitschr. oesterr. Gesellsch. Meteor.*, Wien, 1883, p. 418.)

|| ————Die Kälterückfälle im Mai. Abhandl. der k. bair. Akad. der Wissenschaft. II. Cl., xiv. Bd., ii. Abth. München, 1883, 7 pp. 1a. 8°. (*Zeitschr. oesterr. Gesellsch. Meteor.*, Wien, 1883, p. 268.)

|| **Denza, F.**—Sulla variazione della temperatura secondo l'altezza. 20 pp. 1a. 8°. Torino, 1883. (*Atti. R. Accad. Sc. Torino*, xviii., 1883.)

|| **Doering, O.**—La variabilidad interdiurna de la temperatura en algunos puntos de la República Argentina y de América del sur en general. I. Variabilidad de la temperatura de Buenos Aires. II. Variabilidad de la temperatura de Bahía Blanca. 266 pp. 1a. 8°. Buenos Aires, 1883. (*Bolet. acad. nac. cienc.*, v. y vi.)

|| **Engelmann, G.**—The mean and extreme daily temperatures in St. Louis for forty-seven years, as calculated from daily observations. 13 pp., 1 plate, 8°. (*Trans. St. Louis Acad. Sc.*, iv., No. 3, p. 496.)

* **Fleming, J.**—The temperature of the seasons, and its influence on inorganic objects, and on plants and animals. xii. + 209 pp. sm. 8°. London and Edinburgh, 1851.

|| **Gamble, J. G.**—Summer and winter temperature in South Africa. Read, March 30, 1881. 6 pp. 8°. (*Trans. South Afric. Philos. Soc.*, II., part iii., p. 104.)

* || **Glaisher, J.**—On the reduction of the thermometrical observations made at the Apartments of the Royal Society, from the years 1774 to 1781, and from the years 1787 to 1843. 12 pp. 4°. London, 1849. (*Phil. Trans.*, 1849, part ii., p. 307.)

|| **Hann, J.**—Die Temperaturverhältnisse der österreichischen Alpenländer. I.—II. Theil. 2 parts, 1a. 8°. (*Sitzb. k. Akad. Wissensch.*, Wien, Bd. xc., ii. Abth., 1884, p. 585; xci., ii. Abth., 1885, p. 403.)

———Die Temperatur von Wien und Umgebung nebst einer Studie über den Nachweis von Localeinflüssen auf die Temperaturmittel. 4 pp. 1a. 8°. [*Sitzb. k. Akad. Wissensch.*, Wien.]

|| **Hazen, H. A.**—Thermometer exposure. Read before the Phil. Soc., Washington, Oct. 13, 1883. 14 pp. 8°. (*Amer. Journ. Sc.*, xxvii., May, 1884, p. 365.)

|| **Hill, S. A.**—On the temperature of North-Western India. 45 plates, 5 plates, f^o. (*Indian Met. Mem.*, vol. ii., No. 4, p. 103.)

|| **Karsten, G.**—1. Periodische Erscheinungen des Thier- und Pflanzenreiches in Schleswig-Holstein (1878–1883). 2. Ueber die Beziehungen zwischen der Erndtezeit und den klimatischen Verhältnissen. 3. Milde Winter. Anomalien und Störungen des Klimas. 20 pp., 1 plate, 2 tables, 1a. 8°. Kiel, 1884. (*Schrift. naturw. Ver. Schleswig-Holst.*, v., 1884, p. 69.)

|| **Köppen, W.**—Die Wärmezonen der Erde, nach der Dauer der heissen, gemäßigten und kalten Zeit und nach der Wirkung der Wärme auf die organische Welt

betrachtet. 12 pp., 1 plate, la. 8°. (*Meteor. Zeitschr. deutsche meteor. Gesellsch.*, I. Jahrg., 1884, p. 215.)

* || **Lucas, —**.—On changes of mean temperature in long periods. Translated [from "*Zeitschr. oesterr. Gesellsch. Meteor., Wien*"] by **W. T. Lynn**. 3 pp. 8°. (*Proc. Meteor. Soc.*, 1868, Jan., p. 72.)

Meteorological Council, London.—Charts showing the surface temperature of the Atlantic, Indian, and Pacific Oceans. (Introductory remarks by **R. H. Scott**.) 1 p., 13 charts, la. f°. London, 1884.

Meteorological Office, India.—Abstract of the results of the thermometric observations taken at the Meteorological Office, Chowringhee, in the months of January to December, 1884. sm. f°. Sheets.

No observations were taken during the month of August.

—Results of the thermometrical observations taken at the Meteorological Office, Chowringhee, from 30th December, 1883, to 3rd January, 1885. sm. f°. Sheets.

No observations were taken from 27th July to 31st August, 1884.

Prince, C. L.—Observations upon the heat and drought of the past summer [1884]. sm. f°. Sheet.

* || **Schlagintweit, H. De.**—Numerical elements of Indian meteorology. First Series.—Temperatures of the atmosphere, and isothermal lines of India. 18 pp. la. 4°. [*Phil. Trans.*, 1863, p. 525.]

|| **Scott, R. H.**—Cumulative temperature. 14 pp. 8°. [*Meteorology in relation to health. Int. Health Exhib., London, 1884, p. 61.*]

|| **Shaw, W. N.**—On the measurement of temperature by water-vapour pressure. Read Nov. 26, 1883. 15 pp., 1 plate, 4°. (*Cambridge Phil. Trans.*, xiv., part 1.)

|| **Weihrauch, K.**—Studien zur Mittelbildung bei der relativen Feuchtigkeit. 47 pp. 8°.

|| **Whipple, G. M.**—Preliminary inquiry into the causes of the variations in the readings of black-bulb thermometers in vacuo. 8 pp. la. 8°. (*Quart. Journ. R. Meteor. Soc.*, x., 1884, p. 45.)

Woeikoff, A.—Bemerkungen über die Temperatur des östasiatischen Inselreihe, Sachalin, Yezo und Nippon. 3 pp. la. 8°. (*Zeitschr. oesterr. Gesellsch. Meteor., Wien*, xx., 1885, p. 1.)

X—WEATHER TELEGRAPHY AND PREDICTION.

* **Börnstein, R.**—Die locale Wetterprognose. 48 pp. sm. 8°. Berlin, 1884.

* **Clouston, C.**—An explanation of the popular weather prognostics of Scotland on scientific principles. 53 pp. 8°. Edinburgh, 1867.

Colonial Secretary's Office, Hong-Kong.—[Notice relating to the proposed meteorological signals in connection with the Hong-Kong Observatory.] sm. f°. Sheet. Dated, Hong-Kong, 25th May, 1884.

—[Notice issued by the Hong-Kong Observatory respecting the hoisting of meteorological signals and issue of storm warnings.] sm. f°. Sheet. Dated, August 11th, 1884.

* **Cory, F. W.**—How to foretell the weather with the pocket spectroscope. 86 pp. sm. 8°. London, 1884.

|| **Knipping, E.**—Die Wettertelegraphie in Japan. 19 pp., 1 plate, 8°. Yokohama, 1884. (*Mittheil. deutsch. Gesellsch. Nat.-u. Völkerk. Ostasien*, Band iv., Seite 11.)

Meteorological Council, London.—Principles of forecasting by means of weather charts. By the Hon. **R. Abercromby**. viii. + 123 pp. la. 8°. London, 1885.

|| **Montigny, C.**—De l'influence de l'état de l'atmosphère sur l'apparition des couleurs dans la scintillation des étoiles, au point de vue de la prévision du temps. 10 pp. 8°. Bruxelles, 1884. (*Bull. acad. roy. de Belgique. 3^{me} série, tome vii., No. 4, 1884.*)

Office of the Chief Signal Officer, Washington. Instructions to display-men on the sea coasts of the United States. 11 pp. sm. 8°. Washington, 1882.

[Office of the Chief Signal Officer, Washington.]—Memorandum of correspondence relative to weather telegrams from New York City and Boston to the Meteorological Council of Great Britain. 10 pp. la. 8°. Washington, 1884.

(Office of the Chief Signal Officer, Washington.)—Official danger, distress, and storm-signal codes for signal service, sea-coast stations and mariners. 91 pp. la. 8°. Washington, 1883.

Office of the Chief Signal Officer, Washington.—Weather proverbs, Signal Service Notes, No. ix. Prepared under the direction of W. B. Hazen by H. H. C. Dunwoody. 148 pp., 1 map, la. 8°. Washington, 1883.

Y—WINDS, STORMS, AND CYCLONES.

Birt, W. R.—*Tabule anemologicæ*, or tables of the wind; exhibiting a new method of registering the direction of the wind, by which the daily, weekly, and monthly variations of the upper and lower currents of the atmosphere, at several stations, are shewn at one view. No. 2. 4 pp. 4°. London, s.a.

Colonial Secretary's Office, Hong-Kong.—On the mean direction and force of the wind at Victoria Peak. (By W. Doberck.) 5 pp. sm. 8°. [Hong-Kong, 1884.]

Davis, W. M.—Whirlwinds, cyclones and tornadoes. 90 pp., 2 plates, 18°. Boston, 1884.

Dechevrens, M.—Les typhons de 1882. Première partie. Les typhons des mois de Juillet et Août. 55 pp., 6 plates, la. 4°. Zi-ka-wei, 1884.

———.—The typhoons of 1882. Part II. Typhoons in September and October 22 pp., 1 plate, la. 4°. Zi-ka-wei, 1884.

Eliot, J.—Account of the south-west monsoon storms of the 26th June to 4th July, and of 10th to 15th November 1883. 134 pp., 9 plates, 8°. Calcutta, 1884. (*Journ. Asiatic Soc. Bengal*, LIII., Part II., No. 2, August 1884.)

Faye, —.—Controverses au XVIII^e siècle, au sujet des trombes à propos d'une note de M. J. Luvain. 6 pp. la. 8°. (Turin, s.a.) (*Compt. rend. acad. sc. Paris, Séance du 18 Fév.* 1884, p. 400.)

Harding, C.—On the storm which crossed the British Islands between September 1st and 3rd, 1883, and its track over the North Atlantic. 17 pp. 16 pp., 8 la. 8°. (*Quart. Jour. R. Meteor. Soc.*, x., 1884, p. 7.)

Haughton, [S.]—Observations on the winds made in the years 1848–49, in Leopold Barlow, North Somerset, on board Her Majesty's Ship "Investigator." Read Nov. 10, 1862. 16 pp., 1 plate, 8°. (*Proc. R. Irish Acad.*, 1862, p. 454.)

Hildebrandsson, H. H.—Tromben vid Nöttja den 9 Juni 1883. 8 pp., 4 plates, 8°. (*Öfversigt K. Vetensk.-Akad. Föreläsning*, 1884, No. 2, Stockholm.)

Knipping, E.—Notes on the storms of August 10th to 14th, and 24th to 26th, 1884. Newspaper cutting. (*The Japan Mail*, 1884, Sept. 26.)

———.—Notes on the storms [in Japan] of September 15th, 17th, and 18th, 1884. Newspaper cutting. (*Japan Daily Mail*, 1884, Oct. 24.)

Koninklijk nederlandsch meteorologisch Instituut.—Maandelijksche windkaarten van den Atlantischen Oceaan. 3^e Serie. Bevattende windprocenten van 8° N. Breedte tot 14° Z. Breedte. (Voorede van P. F. van Heerdt.) 1 p., 12 charts, la. 8°. Utrecht, 1879.

———.—Maandelijksche windkaarten van den Zuid-Atlantischen Oceaan. 4^e Serie. (Voorede van P. F. van Heerdt.) 1 p., 11 charts, la. 8°. Utrecht, 1884.

Koppen, W.—Notiz über die Rückführung der Anemometerangaben der Stationen der Seewarte auf absolutes Maass und über das Verhältniss von Beaufort's Scala zur Windgeschwindigkeit. 7 pp. la. 8°. [*Zeitschr. österr. Gesellsch. Meteor. Wiss.*, xiv., 1879, p. 302.]

Macnab, J.—Catechism of the law of storms for the use of sea officers. With instructions for answering papers on the subject in the Board of Trade Examinations, and diagrams illustrating both the circular and incircling theories. 39 pp., 4 plates, sm. 8°. London, 1881.

Marriott, W.—The great storm of January 26th, 1884. 9 pp. la. 8°. (*Quart. Journ. R. Met. Soc.*, x., 1884, p. 111.)

[Office of the Chief Signal Officer, Washington.]—Memorandum of correspondence relative to weather telegrams from New York City and Boston to the Meteorological Council of Great Britain. 10 pp. la. 8°. Washington, 1884.

(Office of the Chief Signal Officer, Washington.)—Official danger, distress, and storm-signal codes for signal service, sea-coast stations and mariners. 91 pp. la. 8°. Washington, 1883.

Office of the Chief Signal Officer, Washington.—Weather proverbs. Signal Service Notes, No. ix. Prepared under the direction of W. B. Hazen by H. H. C. Dunwoody. 148 pp., 1 map, la. 8°. Washington, 1883.

Y—WINDS, STORMS, AND CYCLONES.

Birt, W. R.—Tabulæ anemologicæ, or tables of the wind; exhibiting a new method of registering the direction of the wind, by which the daily, weekly, and monthly variations of the upper and lower currents of the atmosphere, at several stations, are shewn at one view. No. 2. 4 pp. 4°. London, s.a.

Colonial Secretary's Office, Hong-Kong.—On the mean direction and force of the wind at Victoria Peak. (By W. Doberck.) 5 pp. sm. 8°. [Hong-Kong, 1884.]

Davis, W. M.—Whirlwinds, cyclones and tornadoes. 90 pp., 2 plates, 18°. Boston, 1884.

Dechevrens, M.—Les typhons de 1882. Première partie. Les typhons des mois de Juillet et Août. 55 pp., 6 plates, la. 4°. Zi-ka-wei, 1884.

———The typhoons of 1882. Part ii. Typhoons in September and October. 32 pp., 1 plate, la. 4°. Zi-ka-wei, 1884.

|| Eliot, J.—Account of the south-west monsoon storms of the 26th June to 4th July, and of 10th to 15th November 1883. 134 pp., 9 plates, 8°. Calcutta, 1884. (*Journ. Asiat. Soc. Bengal*, LIII., Part ii., No. 2, August 1884.)

|| Faye, —.—Controverses, au XVIII^e siècle, au sujet des trombes à propos d'une note de M. J. Luvini. 6 pp. la. 8°. (Turin, s.a.) (*Compt. rend. acad. sc. Paris, Séance du 18 Fév. 1884*, p. 400.)

|| Harding, C.—On the storm which crossed the British Islands between September 1st and 3rd, 1883, and its track over the North Atlantic. 17 pp., 9 plates, la. 8°. (*Quart. Journ. R. Meteor. Soc.*, x., 1884, p. 7.)

* Haughton, [S.]—Observations on the wind, made in the years 1848–49, in Leopold Harbour, North Somerset, on board Her Majesty's Ship "Investigator." Read Nov. 10, 1862. 16 pp., 4 plates, 8°. (*Proc. R. Irish. Acad.*, 1862, p. 454.)

|| Hildebrandsson, H. H.—Tromben vid Nöttja den 9 Juni 1883. 8 pp., 4 plates, 8°. (*Öfversigt K. Vetensk.-Akad. Förhandl.*, 1884, No. 2, Stockholm.)

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———Notes on the storms [in Japan] of September 15th, 17th, and 18th, 1884. Newspaper cutting. (*Japan Daily Mail*, 1884, Oct. 24.)

Koninklijk nederlandsch meteorologisch Instituut.—Maandelijksche windkaarten van den atlantischen Oceaan. 3^e Serie. Bevattende windprocenten van 8° N. Breedte tot 14° Z. Breedte. (Voorrede von P. F. van Heerdt.) 1 p., 13 charts, la. 8°. Utrecht, 1879.

———Maandelijksche windkaarten van den Zuid-Atlantischen Oceaan. 4^e Serie. (Voorrede von P. F. van Heerdt.) 1 p., 14 charts, la. 8°. Utrecht, 1884.

|| Köppen, W.—Notiz über die Rückführung der Anemometerangaben der Stationen der Seewarte auf absolutes Maass und über das Verhältniss von Beaufort's Scala zur Windgeschwindigkeit. 7 pp. la. 8°. [*Zeitschr. österr. Gesellsch. Meteor. Wien*, xiv., 1879, p. 302.]

* Macnab, J.—Catechism of the law of storms for the use of sea officers. With instructions for answering papers on the subject in the Board of Trade Examinations, and diagrams illustrating both the circular and incurving theories. 39 pp., 4 plates, sm. 8°. London, 1884.

|| Marriott, W.—The great storm of January 26th, 1884. 9 pp. la. 8°. (*Quart. Journ. R. Met. Soc.*, x., 1884, p. 114.)

Office of the Chief Signal Officer, Washington.—Charts of relative storm frequency for a portion of the northern hemisphere. Prepared under the direction of **W. B. Hazen** by **J. P. Finley**. Professional Papers of the Signal Service. No. xiv. 9 pp., 13 charts, la. 4°. Washington, 1884.

—Report on wind velocities at the Lake Crib and at Chicago. Signal Service Notes, No. vi. Prepared under the direction of **W. B. Hazen** by **H. A. Hazen**. 21 pp. la. 8°. Washington, 1883.

—The special characteristics of tornadoes, with practical directions for the protection of life and property. Signal Service Notes, No. xii. Prepared under the direction of **W. B. Hazen** by **J. P. Finley**. 19 pp. la. 8°. Washington, 1884.

§ **Pernter, J. M.**—Beitrag zu den Windverhältnissen in höheren Luftschichten. 15 pp. la. 8°. (*Sitzb. d. Akad. Wissensch., Wien, Bd. xc., ii. Abth.*, 1884.)

§ **Rankine, J.**—Results of observations made with Whewell's anemometer. Read 24th Dec. 1838. 11 pp., 1 plate, 4°. (*Phil. Trans.*, xiv., Part ii., p. 359.)

§ (**Redfield, W. C.**)—On three several hurricanes of the American seas, and their relations to the Northers, so called, of the Gulf of Mexico and the Bay of Honduras. 68 pp., 5 plates, la. 8°. [*Silliman, Journ.*, 1., 1846, pp. 1, 153, and 333.]

Rosser, W. H.—The seaman's guide to the law of storms; the circular theory of storms, and its modification as due to the incurvature of the winds; together with a summary of the results of recent investigation; and the questions for Masters and Mates. 1 + 28 pp. 8°. London, 1885 [1884].

Schück, A.—Beiträge und Bemerkungen zu unserer Kenntnis der Wirbelstürme oder Cyclonen. 4 pp. sm. 8°. (*Hansa*, 21 Jahrg., 1884, p. 75.)

§ **Scott, R. H.**—The equinoctial gales: do they occur in the British Isles? 5 pp., 2 plates, la. 8°. (*Quart. Journ. R. Meteor. Soc.*, x., 1884, p. 236.)

* **Sherman, O. T.**—Observations on the height of land and sea breezes, taken at Coney Island. 3 pp. 8°. [*Amer. Journ. Sc.*, 3rd series, xix., 1880, p. 300.]

Storm Warnings.—Return to an Order of the House of Lords, dated 26th May 1884, of the storms which have visited the British Islands between 1st January 1874 and 31st December 1883, and of which no warning has been issued from the Meteorological Office: with a notice of the quarter from which each unwarned storm has reached the coast. 15 pp. sm. 8°. (London, 1884.)

Thorpe, J.—On the Bowen cyclone of 30th January 1884. 5 pp., 1 plate, 8°. (*Proc. R. Soc. Qld.*, vol. i., part 1, p. 35.)

Z—MISCELLANEOUS.

* **Admiralty, London.**—Admiralty catalogue of charts, plans, and sailing directions. 214 pp. la. 8°. London, 1884.

Aitken, J.—On the formation of small clear spaces in dusty air. 9 pp. 8°. (*Proc. R. Soc. Edinb.*, xii., session 1883-84, p. 440.)

Arcimis, A.—Señales náuticas en tiempo de niebla. Newspaper cutting. (*El Globo*, Aug. 29, 1884.)

Board of Trade, London.—Abstracts of the returns made to the Board of Trade of sea casualties which occurred on and near the coasts of the United Kingdom, from the 1st July 1882 to the 30th June, 1883; . . . x. + 167 pp., 6 charts, sm. 8°. London, 1884.

Clouston, C.—Guide to the Orkney Islands, including their scenery, climate, agriculture, trade, fisheries, history, natural history, etc. with a map, views, notices of Inns and Ferries, etc. iv. + 76 pp., 1 map, sm. 8°. Edinburgh, 1862.

Commission zur wissenschaftlichen Untersuchung der deutschen Meere, in Kiel.—Vierter Bericht . . . für die Jahre 1877 bis 1881. Im Auftrage des Kgl. Preuss. Ministeriums für Landwirtschaft, Domänen und Forsten herausgegeben von **H. A. Meyer**, **K. Möbius**, **G. Karsten**, **V. Hensen**, **A. Engler**. vii. bis xi. Jahrg., iii. Abh. (Jahrg. (Schluss)). 70 pp., 7 plates, 8°. Berlin, 1884.

(**Cunningham, J. T.**)—Marine station for scientific research. Granton, Edinburgh. 18 pp. 8°. (Edinburgh, 1884.)

Office of the Chief Signal Officer, Washington.—Charts of relative storm frequency for a portion of the northern hemisphere. Prepared under the direction of **W. B. Hazen** by **J. P. Finley**. Professional Papers of the Signal Service. No. xiv. 9 pp., 13 charts, la. 4°. Washington, 1884.

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(**Cunningham, J. T.**)—Marine station for scientific research, Granton, Edinburgh. 18 pp. 8°. (Edinburgh, 1884.)

[**Editorial Committee of the Norwegian North Atlantic Expedition.**]
—Den Norske Nordhavs-Expedition, 1876-1878. xi. Zoologi. Asteroidea, ved **D. C. Danielssen og J. Koran.** 119 pp., 16 plates, 8°. Christiania, 1884.

In the English language also.

———Den Norske Nordhavs-Expedition, 1876-1878. xii. Zoologi. Pennatulida, ved **D. C. Danielssen og J. Koran.** 84 pp., 12 plates, 1 map, 8°. Christiania, 1884.

In the English language also.

———Den Norske Nordhavs-Expedition, 1876-1878. xiii. Zoologi. Spongiæ ved **G. A. Hansen.** 25 pp., 7 plates, 1 map, 8°. Christiania, 1885.

In the English language also.

[**Evans, J.**—Address of John Evans, D.C.L., LL.D., the Treasurer, delivered at the anniversary meeting of the Royal Society, on Monday, December 1, 1884. 22 pp., 8°. London, 1884. [*Proc. R. Soc.*, xxxvii., 1884, p. 428.]

———Physiography. Being one of the series of lectures delivered at the Institution of Civil Engineers, Session 1884-85. 24 pp., 1 plate, 8°. London, 1885.

Findlay, A. G.—A directory for the navigation of the South Pacific Ocean: with descriptions of its coasts, islands, etc., from the Strait of Magalhães to Panama, and those of New Zealand, Australia, etc.; its winds, currents, and passages. Fifth edition. lvi. + 1252 pp., 10 plates, 1a. 8°. London, 1884.

Gasca, J.—El goniógrafo. Opúsculo sobre la resolución del problema de dividir en partes iguales, así un ángulo plano como la circunferencia entera. 7 pp., 1 plate. 8°. Guanajuato, 1884.

* **Herndon, W. L., and Gibbon, L.**—Exploration of the valley of the Amazon, made under direction of the Navy Department. Part I. by Lieut. Herndon; Part II. by Lieut. Gibbon. 2 vols., with plates, and 2 vols. of maps, 8°. Washington, 1853-54.

[**Huxley, T. H.**—Address of T. H. Huxley, LL.D., the President, delivered at the anniversary meeting of the Royal Society, on Friday, November 30, 1883. 18 pp., 8°. London, 1883. [*Proc. R. Soc.*, xxxvi., 1883-84, p. 60.]

* **Hydrographic Department, Admiralty.**—The Admiralty list of Lights in the British Islands, 1884. Corrected to 31st December, 1883. 75 pp., 1a. 8°. London, 1884.

Hydrographic Office, Admiralty, London.—The Mediterranean Pilot, Vol. II. Comprising coast of France, and of Italy to the Adriatic; African coast from Jerbah to El Arish; coasts of Karamania and Syria. Together with the Tuscan Archipelago, and Islands of Corsica, Cyprus, Rhodes, Scarpanto, and Casso. ix. + 259 pp., 1 plate, 1a. 8°. London, 1877.

(**Kennedy, H. G.**)—Report from H.B.M. Consul at Batavia, inclosing extract relating to the volcanic outbursts in the Sunda Strait, from the log book of the steam-ship "Governor-General London." Communicated by **R. H. Scott.** 7 pp., 8°. [*Proc. R. Soc.*, xxxvi., 1883, p. 192.]

* (**Leslie, A.**)—The Arctic voyages of Adolf Erik Norden-skiöld. 1858-1879. xiv. + 447 pp., 4 maps, 8°. London, 1879.

* **Markham, A. H.**—The great frozen sea. A personal narrative of the voyage of the "Alert" during the Arctic expedition of 1875-6. xx. + 440 pp., 10 plates, 8°. London, 1878.

Mocenigo, A. G.—Le difficoltà della aeronautica. 16 pp., 8°. (Vicenza, 1884.)

* **Nourse, J. E.**—American explorations in the ice-zones. The expeditions of De Haven, Kane, Rodgers, Hayes, Hall, Schwatka, and De Long; the relief voyages for the Jeannette by the U.S. steamers Corwin, Rodgers, and Alliance; the cruises of Captains Long and Baynor of the Merchant Service; with a brief notice of the Antarctic cruise under Lieut. Wilkes, 1840, and of the locations and objects of the U. S. Signal Service Arctic Observers. 578 pp., 1 map, 2 plates, 6 portraits, 4°. Boston, s.a.

Office of the Chief Signal Officer, Washington.—Report on Lady Franklin Bay Expedition of 1883. Prepared under the direction of **W. B. Hazen** by **E. A. Garlington.** Signal Service Notes, No. x. 52 pp., 1 map, 1a. 8°. Washington, 1883.

———The elements of the heliograph. Prepared under the direction of **W. B. Hazen** by **F. K. Ward.** Signal Service Notes, No. xi. 12 pp., 1a. 8°. Washington, 1883.

———Work of the Signal Service in the Arctic regions. Prepared under the direction of **W. B. Hazen.** Signal Service Notes, No. x. 40 pp., 1 chart, 1a. 8°. Washington, 1883.

(Schück, A.)—Die Entwicklung unseres Bekanntwerdens mit den astronomischen, geographischen und nautischen Kenntnissen der Karolineninsulaner, nebst Erklärung der Medo's oder Segelkarten der Marshallinsulaner, im westlichen grossen Nord-Ocean. 26 pp., 2 plates, 8°. (*Tijdschr. nederl. Aardr. Genootsch. Amsterdam. Tweede serie, Deel i., p. 226.*)

|| Spottiswoode, W.—Address of W. Spottiswoode, the President, delivered at the anniversary meeting of the Royal Society, on Thursday, November 30, 1882. 30 pp. 8°. London, 1882. [*Proc. R. Soc.*, xxxiv., 1882-83, p. 302.]

* Supan, A.—Grundzüge der physischen Erdkunde. xii. + 492 pp., 20 plates, la. 8°. Leipzig, 1884.

* "The Times" register of events in 1884. clxxiv. + 215 pp. 8°. London, 1885.

Tôkiô University.—Measurement of the force of gravity at Naha (Okinawa) and Kagoshima. By S. Sakai and E. Yamaguchi. Appendix to the Memoir No. 5 of Tôkiô Daigaku (Tôkiô University). 22 pp. la. 8°. Tôkiô, 2544 (1884).

APPENDIX XVIII.

METEOROLOGICAL OFFICE : ACCOUNT OF RECEIPTS AND PAYMENTS for the year ending 31st March 1885.

RECEIPTS.				PAYMENTS.			
	£	s.	d.		£	s.	d.
Balance from year 1883-84 -	1,447	17	7	ADMINISTRATION :			
Parliamentary Vote -	15,300	0	0	Payment of Council -	1,000	0	0
Repayment of expenses charged under—				Secretary -	800	0	0
(1.) Incidental expenses -	23	10	8	Salaries and wages -	758	16	0
(2.) Special researches -	39	13	1	Rent, fuel, and lighting -	712	13	8
			63	Incidental and contingent expenses :—			
			3	Attendance, cleaning, &c. -	440	16	3
			9	Furniture and fittings -	39	18	1
				Pensions -	42	16	4
						3,795	0
SUPPLY OF INFORMATION :—						0	4
D.W. Charts and Forecasts -	249	15	5	SPECIAL RESEARCHES -		1,050	7
6 p.m. Charts -	25	0	0			9	
Information for Press Agencies, &c. -	83	7	10	LAND METEOROLOGY :			
Telegrams -	151	3	2	Observatories and stations -	1,822	16	11
Miscellaneous data -	11	17	7	Discussion and reduction of observations -	1,299	13	5
			527			3,122	10
			4			0	4
			0	WEATHER INFORMATION AND FORECASTS :			
SALE OF INSTRUMENTS, &c. :				Telegraphic reports and storm warnings -	3,135	10	8
Royal Navy (A) -	39	1	6	Preparation and issue of reports and forecasts -	1,524	15	3
Mercantile Marine account (B) -	73	7	4			4,660	5
			112			11	
			8	INSPECTIONS :			
			10	Salaries and travelling expenses -		560	12
Commissions executed for Colonial and Foreign Institutions, &c. (C) -			272			1	
Commission charged on work done for Colonies, &c. -			26	OCEAN METEOROLOGY :			
			6	Discussion and reduction of observations -	1,804	1	0
			4	Expenses incidental to the supply of instruments :—			
				Proportion for care and issue of instruments -	200	0	0
				Royal Navy -	174	5	5
				Mercantile Marine -	355	13	3
				Distant island and coast stations -	20	9	0
						2,554	8
						8	
				Commissions executed for Colonial and Foreign Institutions, &c. -		262	14
						2	
						16,005	19
						3	
				BALANCE :			
				Cash at Bank -	1,613	4	9
				„ at Office -	80	0	1
				Advance to Valencia Observatory -	50	0	0
						1,743	4
						10	
						£17,749	4
						1	

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APPENDIX XIX.

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

OFFICIAL.

- No. 1. Report for 1867. Presented to Parliament. 1s.
2. Instructions for Meteorological Telegraphy. New Edition. (1875.) 6d.
3. Fishery Barometer Manual. 6d.
4. Charts of Surface Temperature, South Atlantic Ocean. 2s. 6d.
5. Report for 1868. Presented to Parliament. 5d.
6. Report for 1869. Presented to Parliament. 10d.
7. Quarterly Weather Report for 1869.—Parts I. to IV. 5s. each.
8. The Barometer Manual (out of print, see Nos. 24, 40, 60, and 61).
9. Quarterly Weather Report for 1870.—Parts I. to IV. 5s. each.
10. Report for 1870. Presented to Parliament. 10d.
11. Contributions to our Knowledge of the Meteorology of Cape Horn and the West Coast of South America. 2s. 6d.
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. 2s. 6d.
13. A Discussion of the Meteorology of the Part of the Atlantic lying North of 30° N., for the Eleven Days ending 8th February 1870. Price, with Book of Charts, 5s.
14. Quarterly Weather Report for 1871.—Parts I. to IV. 5s. each.
15. Report for 1871. Presented to Parliament. 10d.
16. Quarterly Weather Report for 1872.—Parts I. to IV. 5s. each.
17. Report for 1872. Presented to Parliament. 1s.
18. Contributions to our Knowledge of the Meteorology of the Antarctic Regions. 2s.
19. Quarterly Weather Report, 1873.—Parts I. to IV. 5s. 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. 20s.
21. Report of the Proceedings of the Meteorological Congress at Vienna. 1s.
22. Report for 1873. Presented to Parliament. 4d.

LIST OF PUBLICATIONS, &c.—continued.

- No. 23. Report of the Proceedings of the Conference on Maritime Meteorology held in London, 1874. 2s.
24. Instructions in the Use of Meteorological Instruments. [Reprinted 1885. 6s.]
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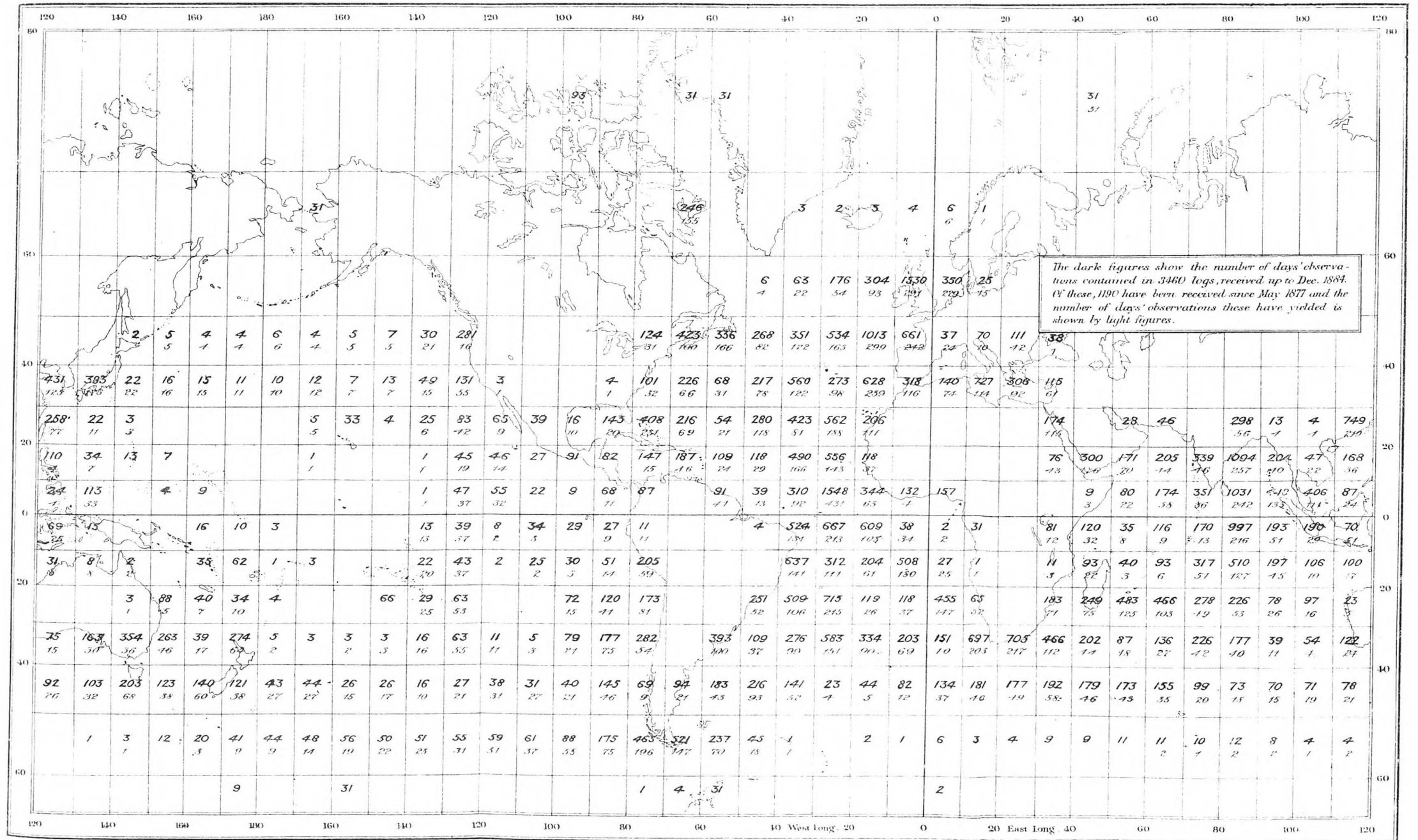
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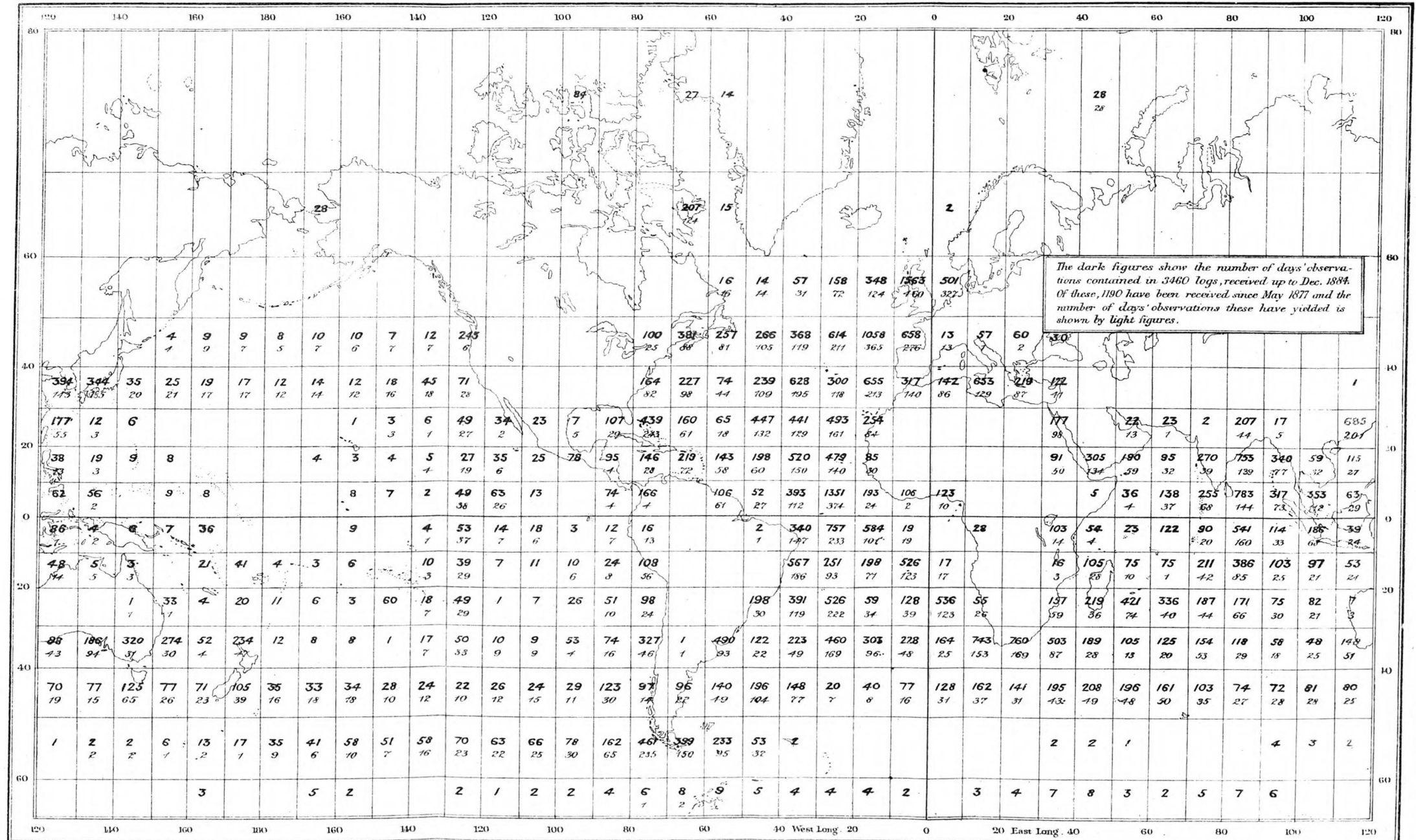
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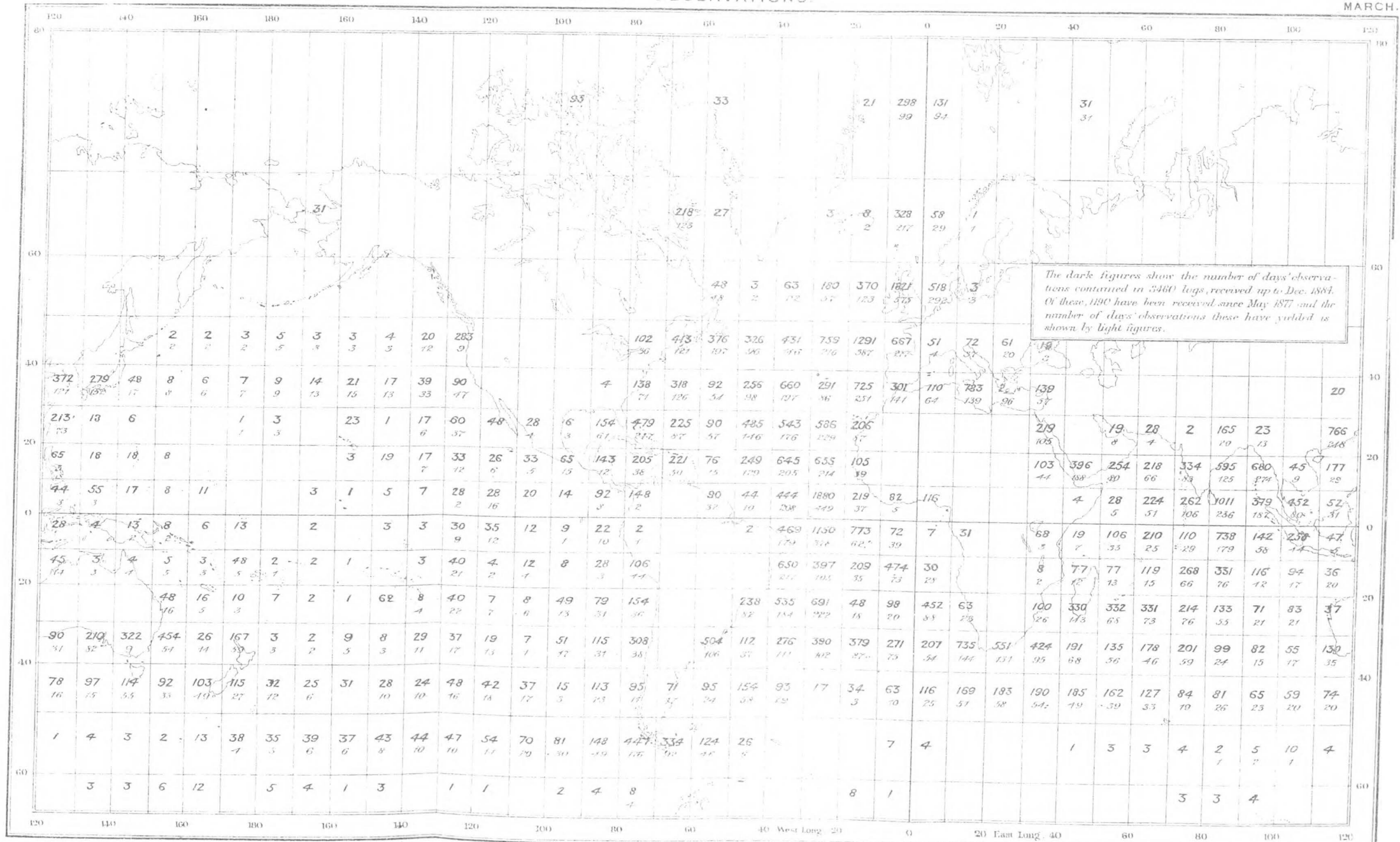
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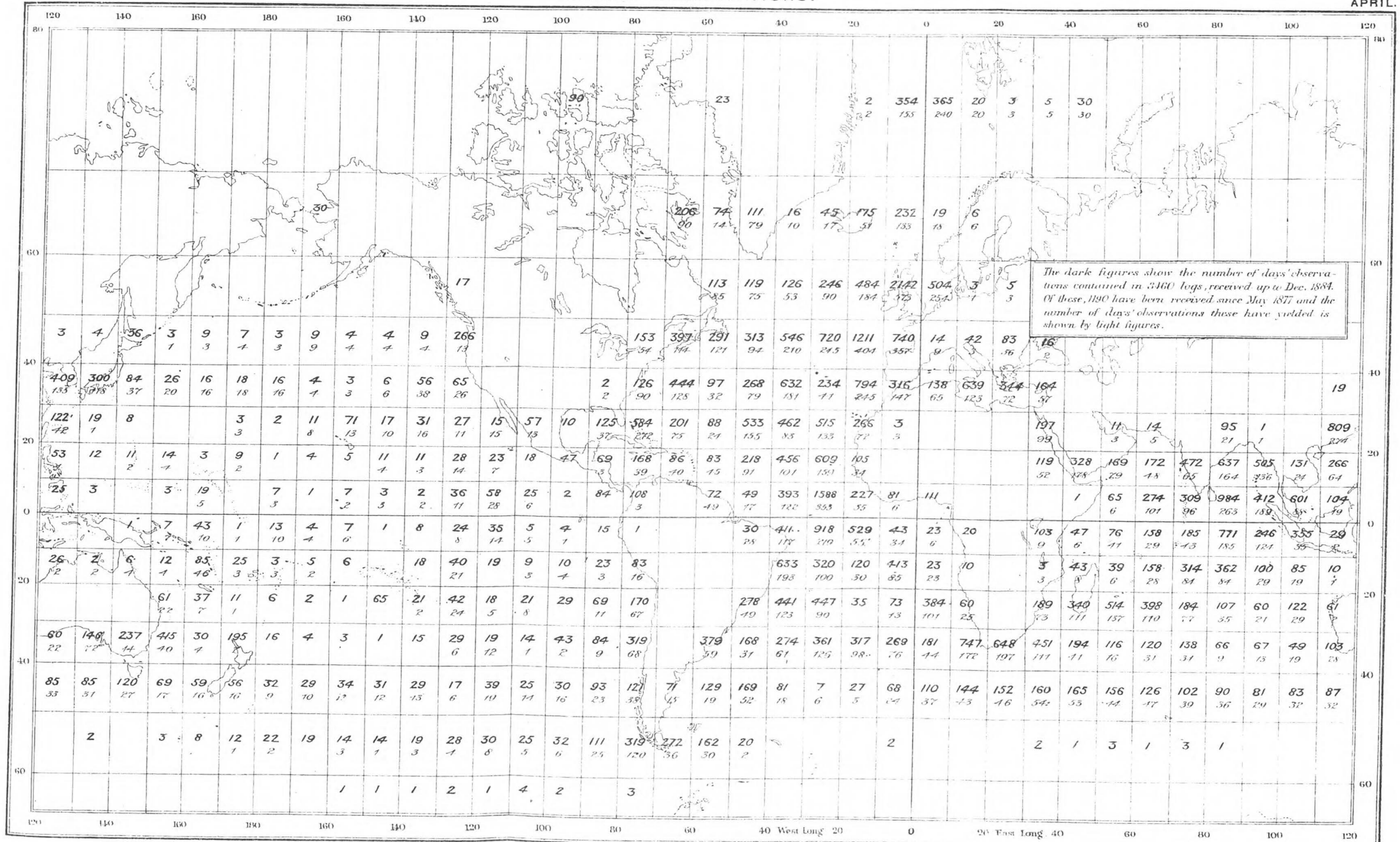
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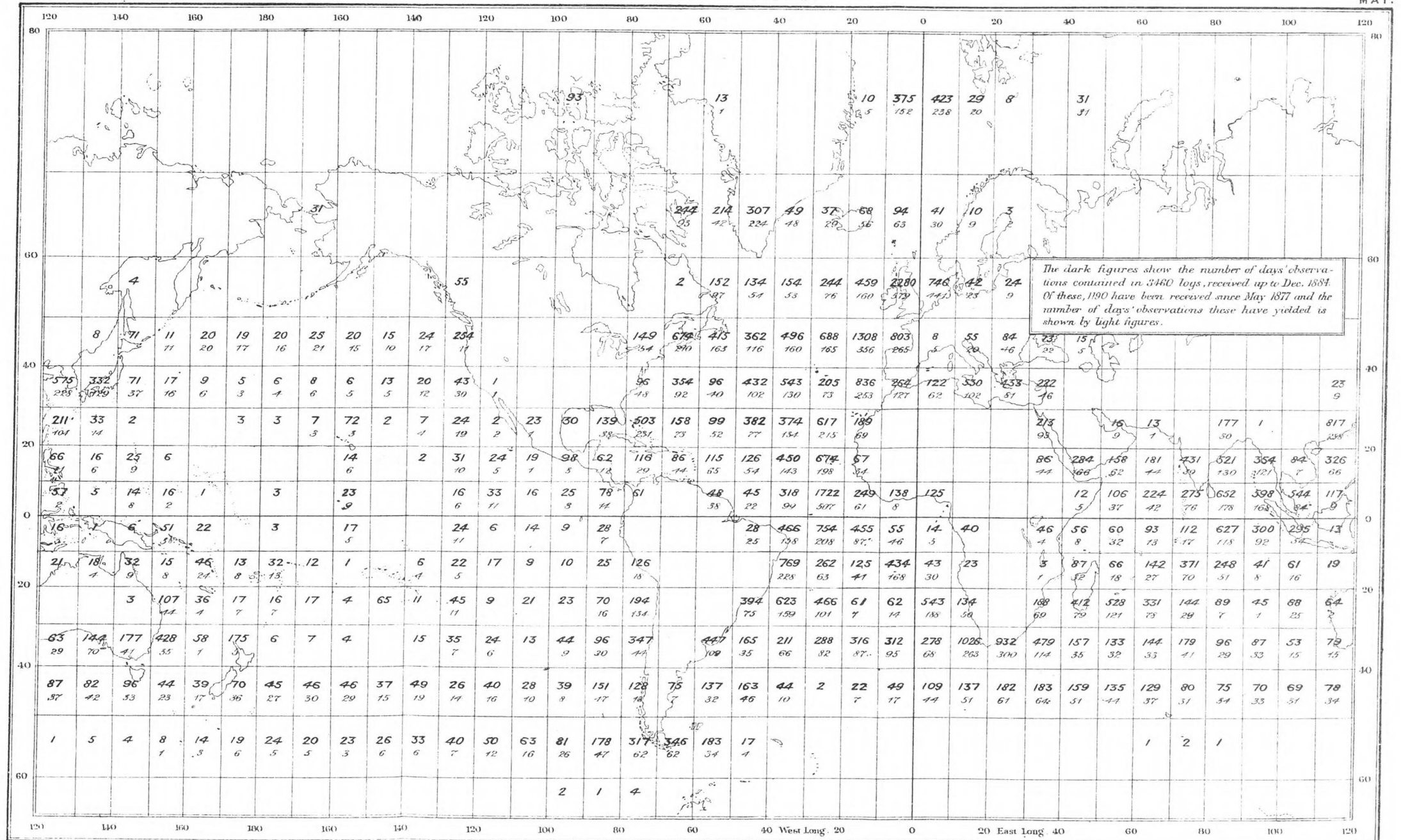
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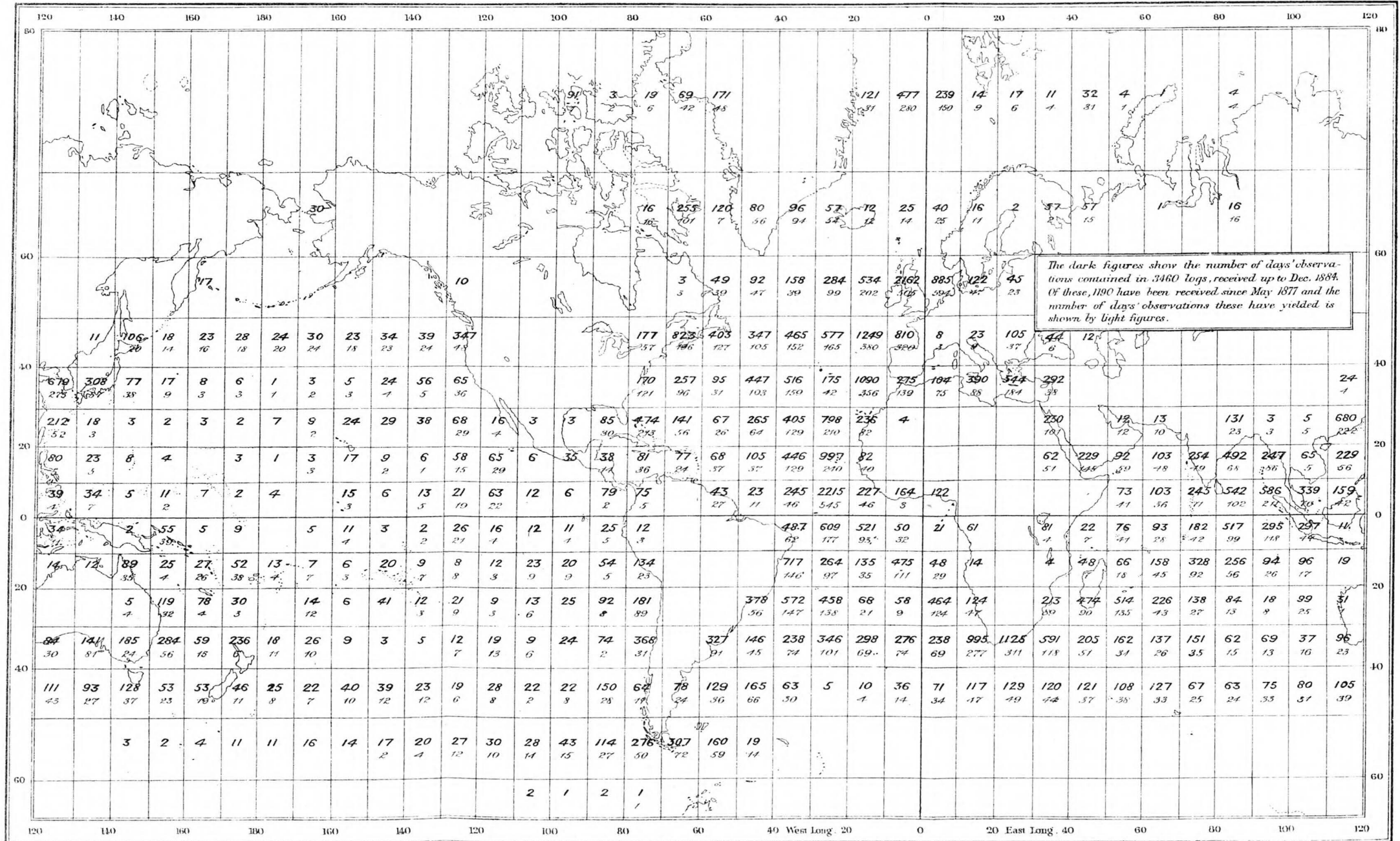
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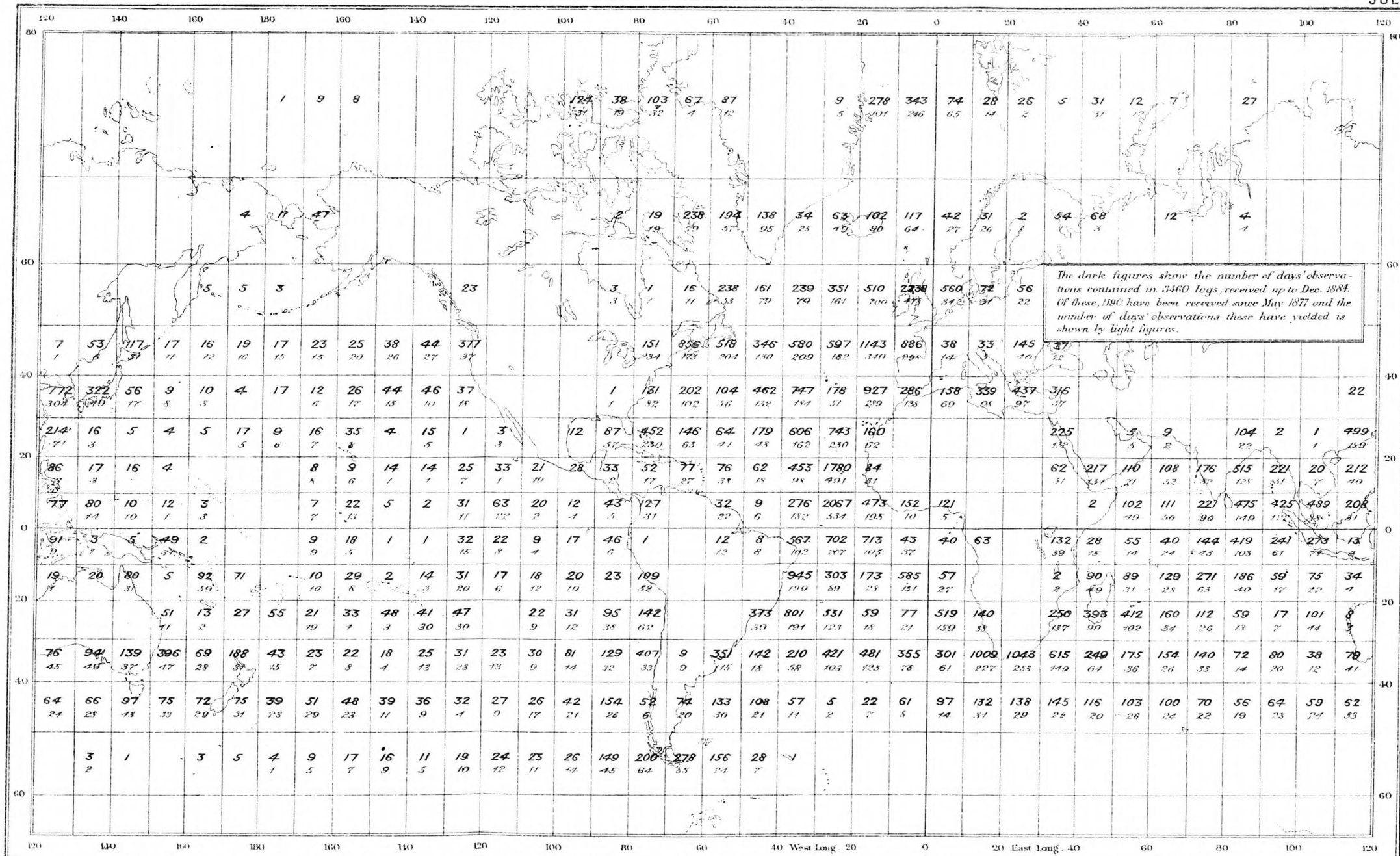
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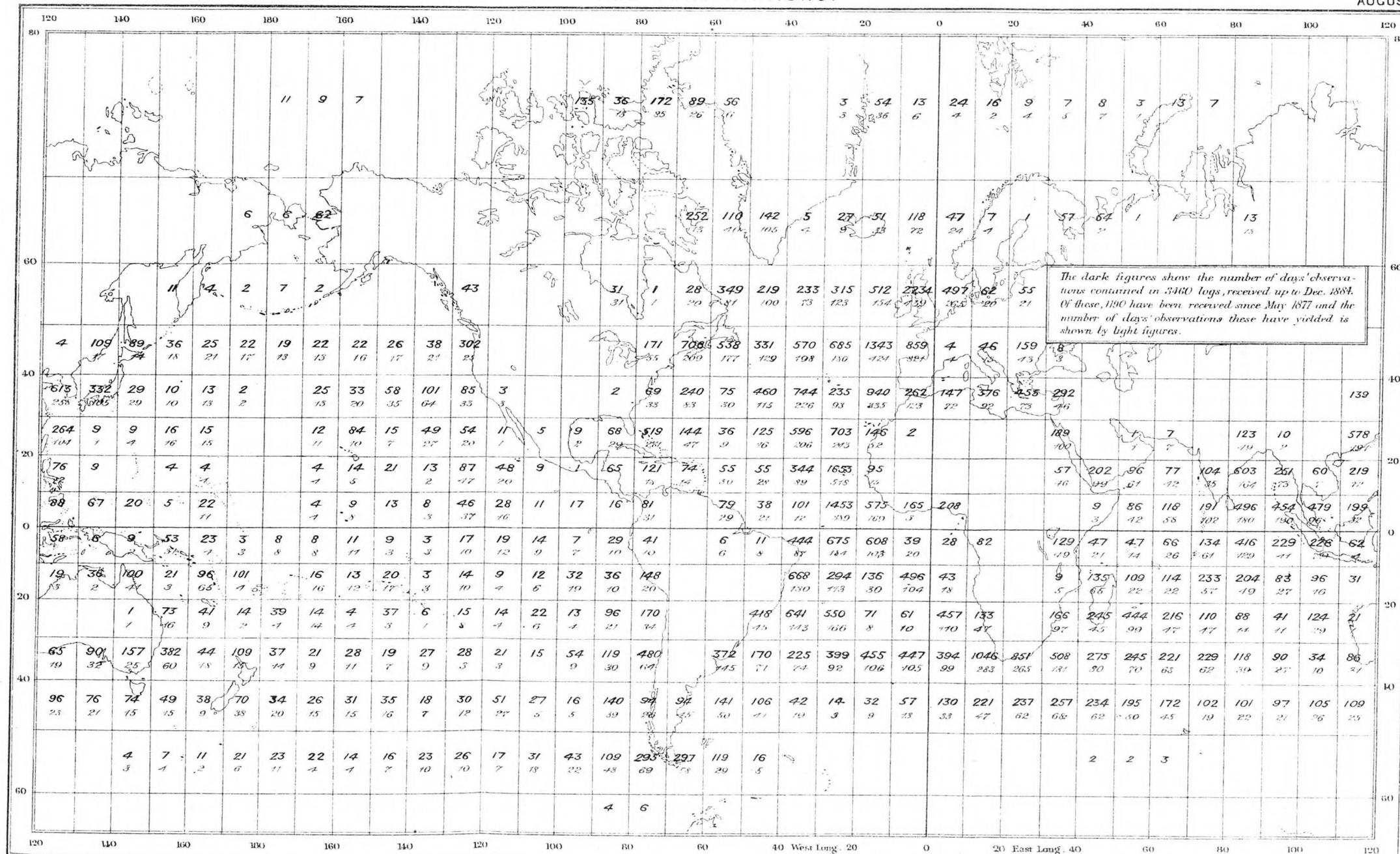
JULY.



The dark figures show the number of days' observations contained in 3460 logs, received up to Dec. 1884. Of these, 1190 have been received since May 1877 and the number of days' observations these have yielded is shown by light figures.

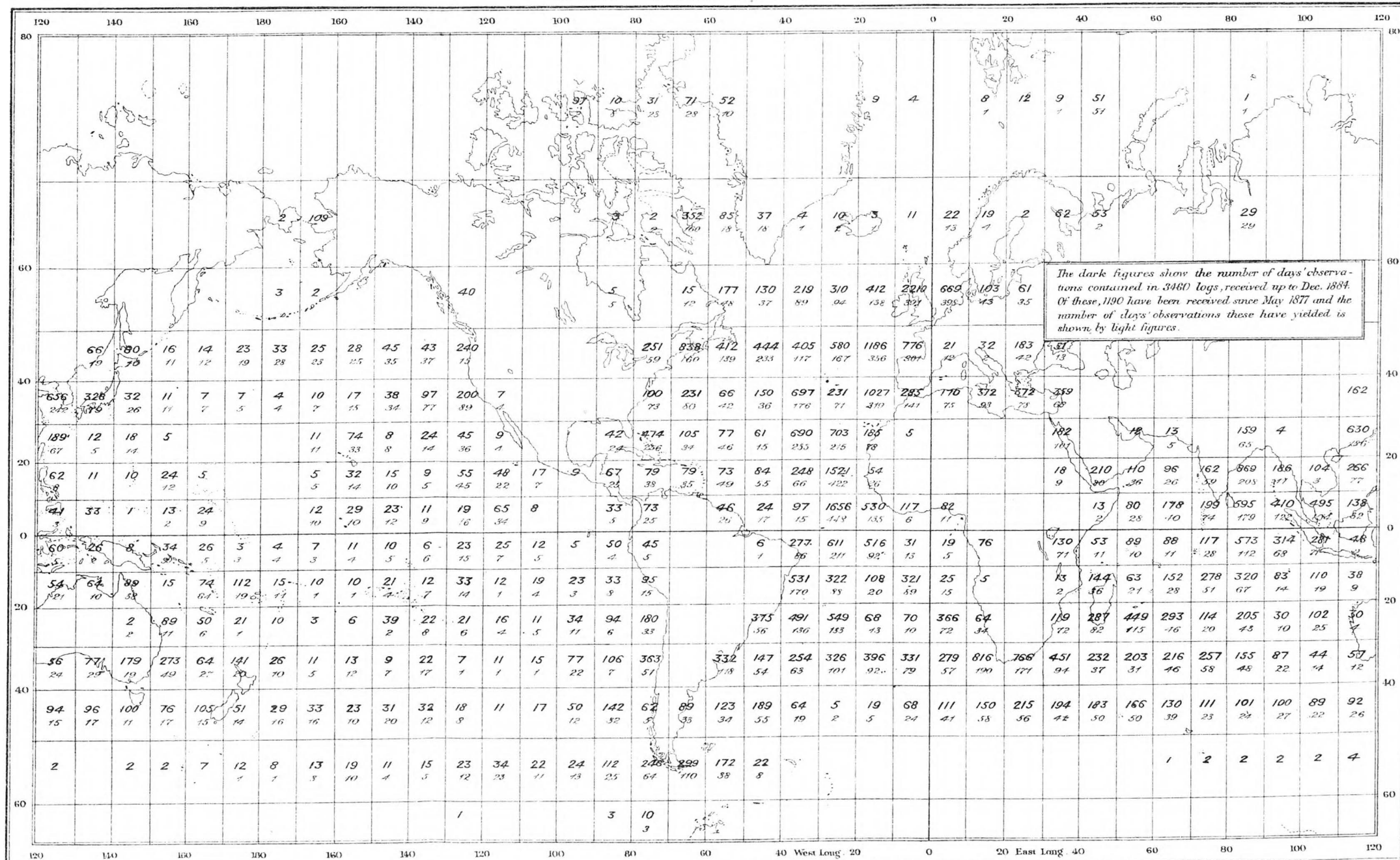
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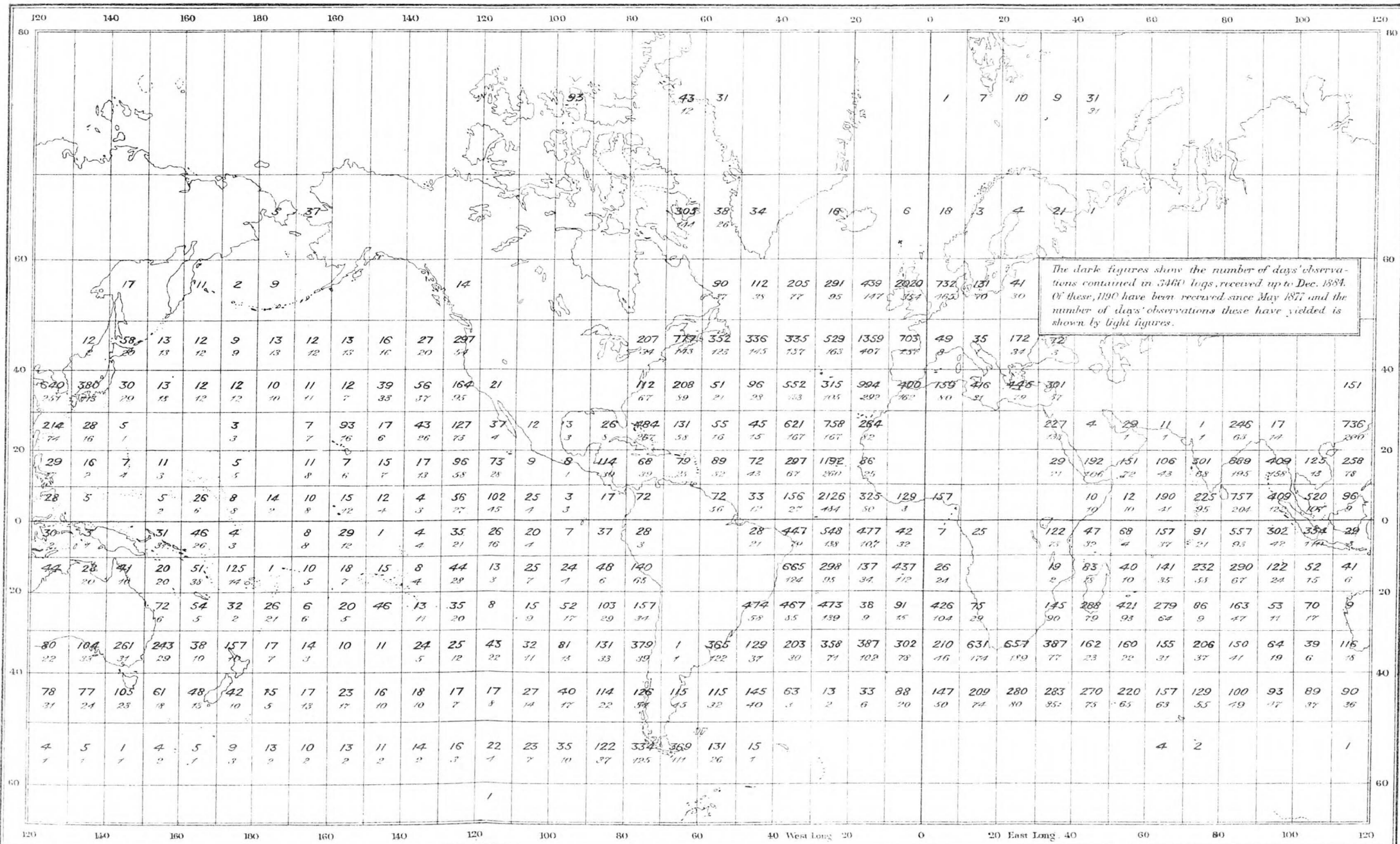
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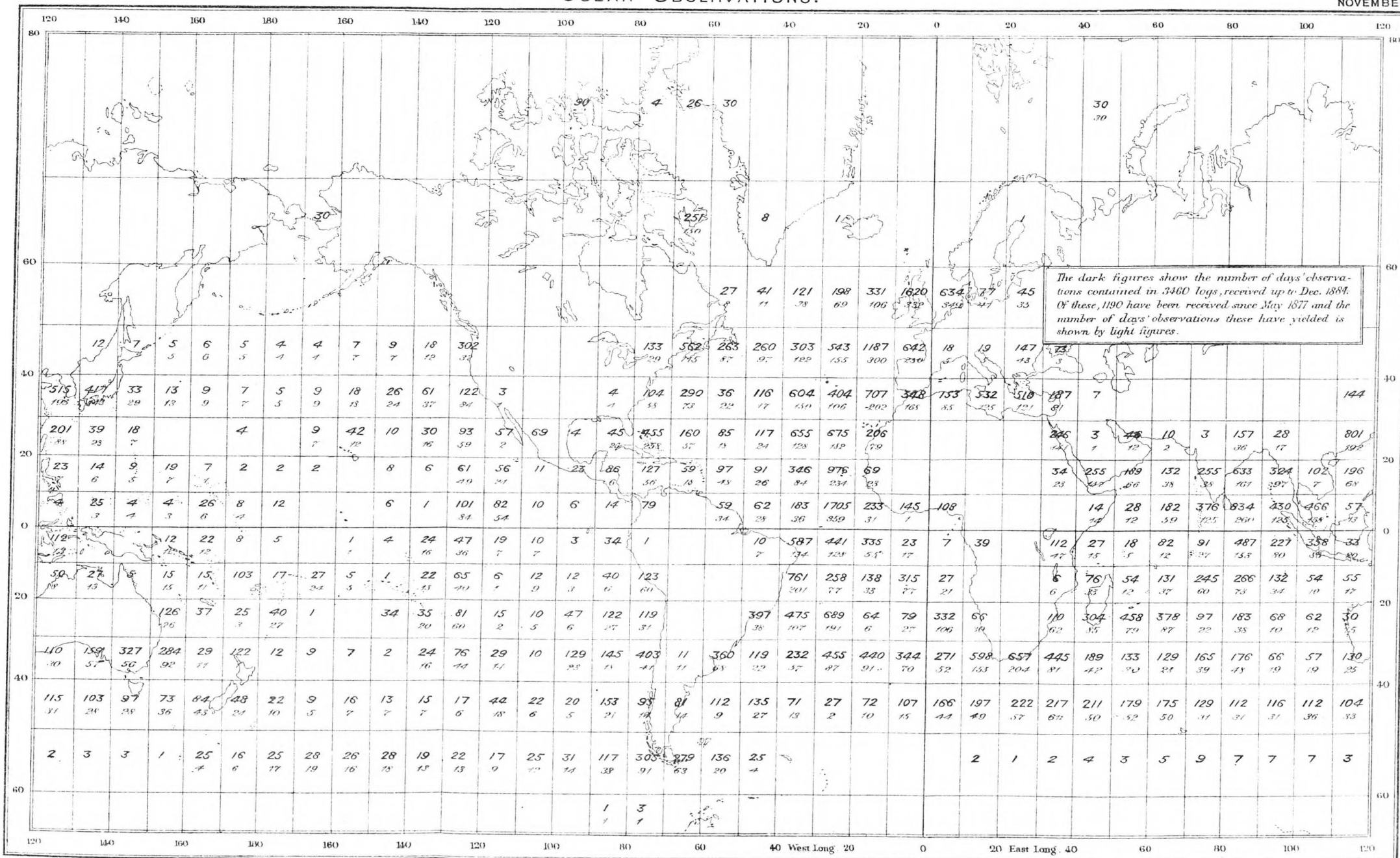
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DECEMBER.

