MINUTES OF THE PROCEEDINGS

OF THE

METEOROLOGICAL COUNCIL,

1885—1886.

LONDON:
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1886.

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1885—1886.

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MINUTES OF THE PROCEEDINGS

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METEOROLOGICAL COUNCIL.

1885—86.

116, *Victoria Street, April* 15, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (March 25) were read and confirmed.

Mr. Scott reported that on February 9 he had written to the Chief Signal Officer for explanations of certain Atlantic telegrams received (P.C. 279) (Minutes, 1884, p. 94), and had received the following reply:—

(M.O. 551.) Signal Office, War Department, Washington,
February 25, 1885.

SIR,

YOUR letters of the 6th and 7th instant were duly received, and were referred to the agent of this service in New York city, who is directly charged with the duty of collecting information and telegraphing the messages to the Meteorological Office.

I have the honour to enclose extract of his remarks relative to the subject of your letters, and to request that you will please send to this office at as early date as practicable full and explicit instructions for the guidance of my agents in collecting information from shipmasters and telegraphing messages to the London Meteorological Office.

Your, &c.
(Signed) W. B. HAZEN,
Chief Signal Officer, U.S.A.

Mr. Robert H. Scott, Secretary,
Meteorological Office, London.

The following reply had been sent (P.C. 710):—

REVISED MEMORANDUM explanatory of the METHOD of FORWARDING TELEGRAPHIC REPORTS of ATLANTIC WEATHER, proposed by the METEOROLOGICAL OFFICE, LONDON.

The principal object is to obtain telegraphic reports of gales or strong winds experienced over the western part of the Atlantic, the atmospheric disturbance causing which may subsequently pass over western Europe, and influence the weather over the British Islands. The occurrence of ice or derelict ships is also a fact the telegraphic report of which is desirable.

To give effect to this, the commanders of steamers of the principal passenger lines running to New York or Boston have been requested to fill up on forms (copy annexed), which will be supplied by the Meteorological Office, the indicated particulars of wind, &c. that may be observed on the outward voyage, and to hand or transmit the forms to the Officer of the United States Signal Service at the port at which they arrive, immediately on their arrival, adopting the means most likely to ensure speedy delivery, as the value of the information depends wholly on its early transmission to England.

The telegraphic reports will be compiled from the data supplied by these forms, and should contain the following information:—

1. The name of the ship supplying the report.
2. The date and hour of the lowest barometer accompanying the storm.
3. The longitude in which the lowest barometer was observed.
4. The direction of change of wind observed about the time of lowest barometer.
5. The lowest barometer reading, as above.
6. The greatest force of wind.

x 17159. 25.—5/85. Wt. 557.

No storm should be reported telegraphically which occurs to the *eastward* of long. 45° W., or the force of which does not *exceed* 7 on the Beaufort scale.

If two gales, accompanied by distinct barometric disturbances, be observed on the same voyage, within the specified limits of longitude, they should both be reported.

If two ships arrive on any one day, their reports should be sent in one telegram, the name of the second ship dividing the reports.

It is to be understood that when there is no marked change of wind direction or of barometric pressure near the time of greatest wind force, for the report of *change of direction* should be substituted the direction of the strongest wind force observed; and the lowest barometer should be reported as nearly as practicable.

The report of latitude is not necessary.

The telegraphic address will be "*Met. London.*"

The change of direction of wind will be in words; thus—"South-west, north-west," meaning that the wind veered from S.W. to N.W.

The lowest barometer reading will be reported in figures to the nearest tenth; thus—"296," meaning 29·6 inches.

The force of wind will be indicated according to Beaufort's scale, simply, thus—"Nine," the words "gale," "storm," &c. not being used.

The form of telegram may consequently be as follows:—

(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 wind, 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 should relate to ice or derelicts seen on any part of the passage, and should be 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 need not be inserted, unless the report of the storm and that of the derelict (or ice) be from different ships.

SPECIMEN OF FORM (supplied to COMMANDERS of STEAM VESSELS referred to).

ATLANTIC WEATHER REPORT.

(Gales experienced to the westward of Long. 45° W., and Ice and Derelict Ships seen during the whole voyage.)

Ship's Name..... Captain.....

Date† of lowest Barometer.		Lat. N.	Long. W.	Gales.				Ice.	Derelict Ships.
Day of Month.	Hour.			Change of Wind about time of lowest Barometer.	Greatest Force and its Direction.‡ F.	Greatest Force and its Direction.‡ D.	Lowest Bar. recorded.		
		° ′	° ′						

* Derelict can be substituted for icebergs when necessary.

† "Ship's time," not Greenwich time. 0=Midnight, when day begins; 23=11 o'clock on following night, or 1 hour before midnight.

‡ Wind direction should be *true*, not magnetic; force is by Beaufort's scale 0—12.

N.B.—When done with in the United States please send this form, by post, to The Secretary, Meteorological Office, 116, Victoria Street, London, England.

Read the following letter:—

(M.O. 777.)

SIR, Calcutta, March 13, 1885.

I HAVE the honour to submit herewith two copies of a meteorological chart of the Bay of Bengal, and should be obliged by your favouring me with any remarks or suggestions which in your opinion would improve the usefulness or the simplicity of the publication.

I have, &c.

(Signed) HENRY F. BLANFORD,
Meteorological Reporter to the Government of India.

The Secretary to the Meteorological Office,
116, Victoria Street, London.

Submitted also—Remarks on the chart by Captain Toynbee. The subject was referred to the Hydrographer.

Read Letter 801 from Falmouth, stating that the cost of the proposed connexion between the anemograph and the ground (Minutes, 1884, p. 112) would be 12*l.* 17*s.* —Authorised.

Submitted the first draft of the Report of the Office for the past year.

SIR, Meteorological Office, March 31, 1885.

I HAVE the honour to report, for the information of the Council, on the work which has been done for the quarter ending 31st March 1885.

Useful additions have been made to the pressure charts from the Remark Books kept by the officers on board H.M. ships; 470 of these books having been examined during the past quarter.

Mean pressures have also been obtained over the Mediterranean Sea, and isobars have been drawn for the months of February and November. In the month of May pressure in this sea is very uniform, and consequently no isobars have been drawn.

I have also been occupied in obtaining barometrical ranges over the Atlantic, Pacific, and Indian Oceans, and a chart of the world on a small scale has been drawn showing the areas of equal barometrical range in the month of November.

I have the honour to submit this chart to the Council.

I am, &c.

(Signed) C. W. BAILLIE,
Navg. Lieut., R.N.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE,
Marine Superintendent.

Read—A memorandum from Captain Toynbee reporting that since the last meeting 4 logs had been received, 3 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. E. J. Blake -	"Tilkhurst" -	Nov. 9, 1883—March 22, 1885.	Algoa Bay, Newcastle, N.S.W., San Francisco, and home.	1883, p. 54.
Capt. J. Lowe -	"Agnes Muir" -	Dec. 18, 1883—April 5, 1885.	Cardiff, Japan, China, Manila, and home.	——
Capt. E. J. Molony	"British Merchant"	June 11, 1883—March 1, 1885.	Liverpool, Melbourne, Queensland, San Francisco.	1883, p. 13.

Mr. Scott was instructed to present the charts (O. 27) to Captain Lowe and to convey the best thanks of the Council to the other observers.

Submitted—The following statements of work for March 1885:—

MARINE ROOM.

April 11, 1885.

Examined 20 new logs and two lighthouse registers.

North Atlantic Weather Charts.

The tracings for April 1883 completed, and those for May well advanced.

The first drawing of isobars for March and April nearly completed.

The first drawing of air and sea isotherms for April completed.

Copying of European isotherms and American isobars, isotherms, and winds for May completed, and progress made with June and July.

The outline of working chart reduced to one-third the scale (for further reduction by photography to one-fourth the original).

Testing and examining eidographs with the view to perfecting the same for the work required of them.

The female clerks proceeding with the plotting of observations for June and July; also giving assistance in the copying of European and American isobars and isotherms.

General.

Indexing data in ocean 10-degree squares.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE,
Marine Superintendent.

April, 1885.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

(To 31st March 1885.)

Monthly Weather Report:—

1884. *December.*—Completed and published.
1885. *January.*—In revise,
„ *February.*—In proof.
„ *March.*—In hand—fairly up to date.

Checking of Daily Forecasts.—Up to date.

Weekly Weather Report:—

1884, Appendix II.—Tables III. and IV. sent to printers. Table V. complete. Table VI. in hand, now half done.

Two sheets (8 pp. each) of proof of above have been revised and sent back for press; the other will be revised as soon as the MS. of Table VI.* is completed.

1885.—All the numbers have appeared promptly.

Issue of Daily Weather Reports by hand from the Meteorological Office.—This has been carried out during the whole month, and the system works well.

Checking storm warnings for 1884.—In hand. Work is done up to end of June.

American (U.S.) Warning Message.—Plan for reporting has been revised.

Preparation of Rainfall Reports for Mr. Symons's values—1884, monthly and annual—for each station in the Daily and Weekly Weather Reports, carefully prepared and checked.

Instructions in taking Cirrus Observations.—Carefully revised for reprinting.

Tables showing the possible Duration of Bright Sunshine for each degree of latitude from 49° to 58° N.:—

Monthly values (with reciprocals).—Done in duplicate and published.

Weekly „ „ „ Done.

Curves showing possible Duration of Bright Sunshine for each day in the year, for each degree of latitude from Lat. 49° to Lat. 58° N.—Done.

R. H. Scott, Esq. (Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

April 1, 1885.

Quarterly Weather Report, Part III., 1877.—Isobars drawn on Plates XIII. and XIV.

Observatory Returns.—The Hourly Readings for March 1883 completed and sent to printer; proof up to about one half of February has been examined and signed for press. The calculation of hourly vapour tension values, and of the pressure and temperature means, &c. for April 1883 nearly completed.

Harmonic Analyser.—The analysis of the temperature curves for 1882 completed, and also that of the Valencia barograms for 1871.

Miscellaneous.—Special tabulations, &c. of sunshine cards have been made. Nearly the whole of my own time, and a great portion of Mr. Thompson's, has been spent upon work connected with the "Krakatoa Air Wave."

(Signed) R. H. CURTIS.

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

* This is now done, and the Tables are all in the printer's hands.—15th April 1885.

Submitted—The following report on the forecasts for March 1885 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

MARCH.

3.30 P.M.

DISTRICTS.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
SCOTLAND, N.	a	50	56	53	83
,,	b	31	28	30	
,,	c	15	12	13	
,,	d	4	4	4	
SCOTLAND, E.	a	38	64	51	79
,,	b	35	20	28	
,,	c	15	12	13	
,,	d	12	4	8	
ENGLAND, N.E.	a	42	69	56	85
,,	b	35	23	29	
,,	c	15	4	9	
,,	d	8	4	6	
ENGLAND, E.	a	46	65	56	88
,,	b	42	23	32	
,,	c	0	0	0	
,,	d	12	12	12	
MIDLAND COS.	a	38	54	46	89
,,	b	50	35	43	
,,	c	4	7	5	
,,	d	8	4	6	
ENGLAND, S.	a	54	46	50	87
,,	b	35	38	37	
,,	c	4	8	6	
,,	d	7	8	7	
SCOTLAND, W.	a	31	60	46	73
,,	b	31	24	27	
,,	c	19	4	12	
,,	d	19	12	15	
ENGLAND, N.W.	a	36	64	50	76
,,	b	28	24	26	
,,	c	20	8	14	
,,	d	16	4	10	
ENGLAND, S.W.	a	44	48	46	80
,,	b	32	36	34	
,,	c	20	12	16	
,,	d	4	4	4	
IRELAND, N.	a	29	60	45	69
,,	b	29	20	24	
,,	c	29	4	17	
,,	d	13	16	14	
IRELAND, S.	a	42	56	49	68
,,	b	17	20	19	
,,	c	33	16	24	
,,	d	8	8	8	

8.30 P.M.

DISTRICTS.		Percentages. Wind.	Weather.	Average Forecasts.	Percentage of Success a + b.
SCOTLAND, N.	a	52	61	57	86
,,	b	29	29	29	
,,	c	16	10	13	
,,	d	3	0	1	
SCOTLAND, E.	a	52	68	60	89
,,	b	32	26	29	
,,	c	13	6	10	
,,	d	3	0	1	
ENGLAND, N.E.	a	58	61	60	84
,,	b	29	20	24	
,,	c	10	16	13	
,,	d	3	3	3	
ENGLAND, E.	a	45	58	52	91
,,	b	39	39	39	
,,	c	6	3	4	
,,	d	10	0	5 ·	
MIDLAND COS.	a	49	65	57	90
,,	b	39	26	33	
,,	c	6	6	6	
,,	d	6	3	4	
ENGLAND, S.	a	58	61	60	92
,,	b	32	32	32	
,,	c	0	0	0	
,,	d	10	7	8	
SCOTLAND, W.	a	39	65	52	81
,,	b	32	26	29	
,,	c	13	3	8	
,,	d	16	6	11	
ENGLAND, N.W.	a	32	62	47	81
,,	b	36	32	34	
,,	c	19	3	11	
,,	d	13	3	8	
ENGLAND, S.W.	a	55	61	58	89
,,	b	29	32	31	
,,	c	13	0	6	
,,	d	3	7	5	
IRELAND, N.	a	30	65	48	82
,,	b	43	26	34	
,,	c	20	6	13	
,,	d	7	3	5	
IRELAND, S.	a	17	49	33	74
,,	b	50	32	41	
,,	c	23	13	18	
,,	d	10	6	8	

SUMMARY.

BRITISH ISLES	a	41	58	50	80
,,	b	33	27	30	
,,	c	16	8	12	
,,	d	10	7	8	
BRITISH ISLES	a	44	62	53	85
,,	b	35	29	32	
,,	c	13	6	10	
,,	d	8	3	5	

Reported—That the following cheques had been drawn during the month of March :—

1885.			£ s. d.	£ s. d.
March 7th	For weekly salaries		- -	28 5 6
„ 14th	„ „		- -	28 5 6
„ „	L. P. Casella, barometer (commission account)		-	10 0 0
„ „	Negretti & Zambra, Richard's barographs		-	22 13 6
„ 21st	B. Edgington, signal "cones"		- -	7 7 0
„ „	Anglo-American Telegraph Co., telegrams		- -	5 13 6
„ „	Postmaster General „		- -	215 13 0
„ „	For weekly salaries		- -	28 10 6
„ „	E. Green, care of Bermuda anemometer		- -	4 15 0
„ 28th	For weekly salaries		- -	28 13 0
„ „	Pall Mall Coal Co., coals		- -	5 5 0
„ „	Postmaster General, private wire		- -	31 5 0
„ „	J. H. Woodstock, packing cases		- -	2 12 6
„ 31	Lieut.-General R. Strachey	Council Fees.	291 18 10	
„ „	Warren de la Rue		103 19 0	
„ „	Sir Frederick Evans		42 8 6	
„ „	F. Galton		151 15 8	
„ „	G. G. Stokes		139 11 10	
„ „	E. J. Stone		157 17 6	
„ „	G. H. Darwin		23 9 1	
„ „	Capt. W. J. L. Wharton		60 12 2	
				971 12 7
„ „	A. J. Hodges, Council income tax		- -	25 0 0
„ „	R. H. Scott, salary		- -	66 13 4
„ „	J. S. Harding, jun., salary		27 15 6	
„ „	T. D. Bell „		14 8 10	
				42 4 4
„ „	J. E. Cullum (Valencia)		- -	16 13 4
„ „	R. H. Curtis	Discussion, &c. of observations.	22 4 5	
„ „	J. A. Curtis		16 13 4	
„ „	T. E. Allen		15 11 1	
„ „	C. H. Thompson		11 13 4	
„ „	S. Call		10 16 8	
„ „	E. G. Aldridge		7 16 8	
				84 15 6
„ „	F. Gaster	Preparation, &c. of Weather Reports.	30 12 8	
„ „	F. J. Brodie		21 9 2	
„ „	G. G. Francis		19 18 8	
„ „	A. J. Rigby		16 5 0	
„ „	R. Sargeant		13 11 3	
				101 16 9
„ „	Capt. H. Toynbee	Discussion, &c. of observations.	33 6 8	
„ „	Lieut. C. W. Baillie		20 16 8	
„ „	R. Strachan		27 15 6	
„ „	C. Harding		22 4 5	
„ „	H. Harries		14 3 4	
„ „	W. Allingham		14 3 4	
„ „	W. G. James		10 8 8	
				142 18 7
„ „	G. J. Mayhew, rent		- -	158 15 0
„ „	General Life and Fire Assurance Co., fire insurance		1 6 0	
„ „	„ „		1 2 0	
				2 8 0
„ 31st	J. S. Harding, senior, pension (Minutes, 1882, p. 43)		- -	10 14 1
„ „	W. Thomas, care of Scilly anemometer		1 13 1	
„ „	„ meteorological reports		4 19 0	
				6 12 1
	Carried forward		-	£2,049 2 7

		£ s. d.	£ s. d.
1885.	Brought forward -	- -	2,049 2 7
March 31st	H. Williams, care of bridled anemometer	2 11 1	
„ „	„ care of Robinson's anemometer - -	2 11 0	
			5 2 1
„ „	Scottish Meteorological Society, Ben Nevis Observations, 1884–5 (Minutes, 1884, p. 72) - - - - -	- -	100 0 0
„ „	C. Niven, Aberdeen observatory - -	68 14 0	
„ „	J. L. E. Dreyer, Armagh „ - -	12 10 0	
„ „	W. L. Fox, Falmouth „ - -	62 19 0	
„ „	Kew Committee, allowance - -	100 0 0	
„ „	Royal Meteorological Society, observations - - - - - -	25 0 0	
„ „	C. M. Clouston, Orkney - - -	2 12 9	
„ „	G. H. Aird, Seaham - - -	2 10 0	
„ „	S. J. Perry, Stonyhurst - - -	14 11 4	
„ „	J. E. Cullum, Valencia - - -	56 15 4	
			345 12 5
„ „	G. T. Watson, care of Yarmouth anemometer - - -	3 19 0	
„ „	„ meteorological reports -	4 12 0	
			8 11 0
„ „	H. Todd, Cambridge - - -	4 11 0	
„ „	H. Mohn, Christiania - - -	5 10 0	
„ „	W. Brand, Dunrossness - - -	3 18 8	
„ „	P. Curnow, Dungeness - - -	4 13 3	
„ „	W. Foster, Hawes Junction - -	1 19 2	
„ „	C. Durham, Holyhead - - -	3 18 2	
„ „	G. G. Appleton, Hurst Castle - -	3 18 6	
„ „	J. Fisher, Jersey - - -	4 5 6	
„ „	F. Gaster, London - - -	3 18 0	
„ „	W. Berridge, Loughborough - -	3 5 5	
„ „	Lloyd's, for Malin Head - -	3 5 0	
„ „	K. Kerr, Mullaghmore - - -	5 5 3	
„ „	W. D. Penny, Nairn - - -	4 4 6	
„ „	W. Wickham, Oxford - - -	3 12 6	
„ „	B. Budds, Parsonstown - - -	3 7 6	
„ „	J. John, Prawle Point - - -	3 5 0	
„ „	G. Baker, St. Ann's Head - -	3 7 10	
„ „	J. B. Smith, Spurn Head - -	3 5 5	
„ „	D. Macdonald, Stornoway - -	5 11 9	
„ „	J. Sinclair, Wick - - -	3 5 0	
„ „	A. Guy, York - - - -	3 18 0	
			82 5 5
„ „	A Buchan, salary - - -	37 10 0	
„ „	W. C. Ley „ - - -	37 10 0	
			75 0 0
„ „	J. R. Jones, Aberdeen agent - -	6 7 9	
„ „	J. Fowler, Cardiff agent - - -	4 0 6	
„ „	L. Allen, Dundee „ - - -	9 16 9	
„ „	D. McGregor & Co., Glasgow agent -	1 0 10	
„ „	Z. Scaping, Hull agent - - -	2 7 6	
„ „	J. Gill, Liverpool „ - - -	14 9 0	
„ „	C. H. Permain, Southampton agent -	0 17 3	
			38 19 7
„ „	J. S. Harding, junr., petty cash - -	- -	50 0 0
			£2,754 13 1

116, *Victoria Street, April* 29, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. GALTON.	MR. STONE.
PROFESSOR STOKES.	THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (April 15) were read and confirmed.

The Hydrographer submitted his opinion on the subject of the specimen charts of the Bay of Bengal (Minutes, p. 3). The Secretary was instructed to submit a draft reply to Mr. Blanford at next meeting.

Submitted—The following memorandum which had been prepared by instruction of the Chairman :—

SIR, April 29, 1885.

I BEG to submit the following memorandum on the work done with the Harmonic Analyser.

The whole of the thermograms (dry-bulb traces only) for the 12 years 1871–1882, have been passed through the instrument, and the calculation of the coefficients from the results is now in hand and will soon be completed.

As yet, however, no special examination of the work has been made for ensuring its accuracy, and I shall therefore be glad of instructions as to what amount of checking is deemed necessary for that purpose.

It may, perhaps, be useful to mention the different stages of the work :—

(1.) The following of the traces by the pointer, as the curves are passed through the instrument ;

(2.) The reading of the cylinders, Nos. 1, 2, and 7, being read at the close of each 24 hours' trace, and Nos. 3, 4, 5, and 6 at the end of each five days' traces ;

(3.) Ascertaining the daily, five-daily, and monthly increments of the cylinder readings ;

(4.) The application of the factors to the cylinder increments ; and

(5.) The calculation of the Bessel's coefficients from the results.

As regards Nos. (1) and (2) the only check now possible, short of passing the curves through the instrument a second time, would be to examine the readings *inter se*. To a small extent this has already been done during the progress of the work, but it would probably be well to have a systematic comparison made, and cases of unusually large differences in the readings looked into.

As regards Nos. (3) and (4), the results obtained from cylinder 7 (the mean) have been informally compared with the monthly means obtained from the hourly readings, and published in the Quarterly Weather Reports ; but this is the only check which has as yet been applied to this part of the work, and I would therefore suggest that at least the monthly increments, and the application of the factors, should be re-worked throughout ; and also that the results of the comparison of the arithmetical and instrumental means should be got out in a form which could be kept for reference.

The last portion of the work, No. (5), is wholly unchecked, and I beg therefore to suggest that, following the practice of the Office, it should be independently re-worked by a second person.

R. H. CURTIS.

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

The Chairman and Professor Stokes undertook to give instructions on the subject.

Mr. Scott reported that he had learnt from Mr. Baillie that the Remark books at the Admiralty for the last ten years had been examined by him with the object of completing the pressure charts (Minutes, 1884, p. 82), and that it did not appear that a protracted further search would be remunerative.

The Hydrographer was requested to examine into the subject.

It was resolved—That charts containing a statement of the amount of information for the ocean existing in the Office, in continuation of those in the last Report of the Meteorological Committee, be published in the Report now in process of preparation.

Submitted—The following statement of accounts for the year ending 31st March 1885 :—

Income	£ s. d.	£ s. d.
Balance from year 1883–84		820 10 11
Vote for year		15,300 0 0
Repayment of expenses charged under—		
(1.) Incidental expenses	10 5 8	
(2.) Special researches	8 11 7	
(3.) Observatories and stations	8 7 10	
		27 5 1
Supply of Weather Information :		
D.W. Charts and Forecasts	229 3 2	
6 p.m. Charts	25 0 0	
Information for Press Agencies, &c.	86 13 6	
Telegrams	255 9 2	
Miscellaneous data	13 8 10	
		609 14 8
Sale of Instruments, &c. :		
Royal Navy account	20 18 4	
Mercantile Marine account	39 16 8	
		60 15 0
Commission charged on work done for Colonies, &c.		26 9 8
		£16,844 15 4

Expenditure.	£ s. d.	£ s. d.
Administration :		
Payment of Council	1,000 0 0	
Secretary	800 0 0	
Salaries and wages	758 16 0	
Rent, fuel, and lighting	716 8 2	
Furniture and fittings	39 18 1	
Incidental and contingent expenses	421 3 0	
Pensions	42 16 4	
		3,779 1 7
Special Researches :—		
Harmonic analysis	117 0 0	
Synchronous Atlantic work	309 12 6	
Sunshine records	23 12 6	
Anemometers: Scilly, Holyhead, and Electrical	27 10 1	
Genl. Strachey's Developing Instrument	27 13 0	
Extra charges on sea temperature charts	145 5 10	
Copying observations for Hamburg	19 0 11	
Expenses at Health Exhibition	21 18 0	
Principles of Weather Forecasting	114 10 0	
Fog experiments	50 0 0	
Atlantic Weather Reports	25 9 2	
Ben Nevis observations	100 0 0	
Arctic, balloon and cloud observations	16 7 9	
		997 19 9
Land Meteorology :		
Observatories and stations	1,759 16 2	
Discussion and reduction of observations	1,299 13 5	
		3,059 9 7
Weather Information and Forecasts :		
Telegraphic reports and storm warnings	3,151 6 3	
Preparation and issue of reports and forecasts	1,524 15 3	
		4,676 1 6
Inspections :		
Salaries and travelling expenses		560 12 1
Ocean Meteorology :		
Discussion and reduction of observations	1,804 1 0	
Expenses incidental to the supply of instruments :		
Proportion for care and issue of instruments	200 0 0	
Royal Navy	175 14 1	
Mercantile Marine	305 1 9	
Distant island and coast stations	21 4 4	
		2,506 1 2
Balance		1,265 9 8
		£16,844 15 4

Liabilities.	£ s. d.	Assets.	£ s. d.
To sundry creditors	700 12 3	By cash at Bank	1,613 4 9
„ balance	1,265 9 8	„ „ at Office	80 0 1
		„ „ at Valencia	50 0 0
		„ sundry debtors	222 17 1
	£1,966 1 11		£1,966 1 11

N.B.—Some expenses in connection with Falmouth Observatory not yet brought to account.

Read—A memorandum from Captain Toynbee reporting that since the last meeting 8 logs had been received, 7 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last Mention on Minutes.
Capt. George Burton	S.S. "British Queen."	Sept. 11, 1884—April 11, 1885.	Liverpool and Philadelphia, 5 voyages.	1884, p. 48.
Capt. Arch. Campbell	S.S. "Circassia"	Oct. 25, 1884—April 1, 1885.	Moville to New York, 4 voyages.	1884, p. 104.
Capt. W. L. Rosseter.	Barque "St. Kilda."	Jan. 23—April 28, 1885.	Liverpool, Demerara, and home.	1884, p. 82.
Capt. Benjamin Flinton.	Barque "Dartmouth."	May 8, 1884—March 4, 1885.	London, Hong Kong, and home.	—
Capt. G. A. Freeman.	Barque "Hannah and Mary."	Nov. 11, 1884—April 17, 1885.	Grangemouth, Demerara, Doboy, and home.	—
Capt. W. Hird -	"Marlborough"	July 25, 1884—April 10, 1885.	New Zealand and home	—
Capt. W. Sangster -	S.S. "Dracona"	July 15, 1884—Jan. 20, 1885.	Newport (Mon.), Montreal, Malaga, Montreal, Cardiff, Ceylon.	—

Mr. Scott was instructed to present the Charts (O. 27) to Captain Freeman, (O. 32) to Captains Hird and Sangster, and (O. 43) to Captain Flinton, and to convey the best thanks of the Council to the other observers.

Mr. Scott reported that Mr. T. E. Allen had been suffering from rheumatic fever since March 19th, and submitted a medical certificate (No. 914), stating that, though convalescent, Mr. Allen would not be fit to return to work for about six weeks. He was authorized to grant Mr. Allen special sick leave for that period, Mr. Allen to undertake any work that was within his power.

116, *Victoria Street, May* 6, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

The Secretary was in attendance.

The Minutes of the last meeting (April 29) were read and confirmed.

The draft reply to Mr. Blanford (Minutes, p. 6) was adopted, and the Secretary was instructed to forward it. (P.C. 944.)

Read—A memorandum from Captain Toynbee reporting that since the last meeting two logs had been received, both of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. A. Becket -	"Amana" -	May 30, 1884—April 28, 1885.	Glasgow, Portland (Oregon), and home.	1884, p. 3.
Capt. C. H. Renaut	"Pleione" -	July 11, 1884—April 26, 1885.	London, Wellington, N.Z., and home.	1884, p. 8.

Mr. Scott was instructed to convey the best thanks of the Council to the two observers.

Submitted—The following statements of work for April 1885 :—

MARINE ROOM.

May 6, 1885.

Examined 10 new logs and 2 lighthouse registers.

North Atlantic Weather Charts.

Weather areas and generalised winds for November 1882, prepared, and December commenced.
First drawing of isobars for March and April 1883 completed, and those for May well advanced.
Tracings of all data for May completed, and the drawing of air and sea isotherms advanced.
Copying of European isotherms, and American isobars, isotherms, and winds for June completed, and progress made with July and August.
The female clerks advancing the plotting of observations for June, July, and August, and giving assistance in the copying of European and American isobars and isotherms. One of the staff practising the working of the eidograph.

General.

Indexing data in ocean 10° squares.
Observations in rough book copied into log 6,107.

(Signed) CHAS. HARDING.

The Marine Superintendent.
Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE,
Marine Superintendent.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

(To 30th April, 1885.)

Monthly Weather Report, 1885.—*January*, printed and published.
February, in printer's hands, for revise.
March, copy nearly completed for printer.

Checking of Daily Forecasts.—Nearly up to date.

Weekly Weather Report 1884, *Appendix II.*:—All the Tables completed and in printer's hands.
1885. All numbers have been published promptly.

Checking Storm Warnings.—Done up to end of October.

Table showing possible Amount of Bright Sunshine for each degree of latitude, from 58° N. to 49° N., in each of the following groups of weeks, viz. :—

First to fourth weeks in the year.		Twenty-seventh to thirtieth weeks in year.	
Fifth to eight	do.	Thirty-first to thirty-fourth	do.
Ninth to thirteenth	do.	Thirty-fifth to thirty-ninth	do.
Fourteenth to seventeenth	do.	Fortieth to forty-third	do.
Eighteenth to twenty-first	do.	Forty-fourth to forty-seventh	do.
Twenty-second to twenty-sixth	do.	Forty-eighth to fifty-second	do.

All completed.

Drawing Curves on 12 *Maps, showing Prevalence of Bright Sunshine* over the British Isles in each month of the year.—Done.

Instructions to Mr. Kerr (of Mullaghmore), for carrying out inspection of station at Belmullet.—Prepared and forwarded.

The occurrence of the Easter holidays during this month, and sickness of some of the clerks, has caused some delay in work.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

May 1, 1885.

Quarterly Weather Report, Part III., 1877.—The chart plates completed and sent to printer, and proof of letterpress and plates revised.

Observatory Returns.—The Hourly Readings for April 1883 sent to printer; proof has been checked up to about the middle of March. The calculation of vapour tension and of mean value, &c., and the copying of the Hourly Readings, has been finished for three stations for the month of May 1883.

Harmonic Analyser.—The calculation of the Bessel's coefficients from the analyser readings has been made for the years 1870–77, but this work is now stopped in order to apply a correction for non-periodicity. Specimen plates of curves have been drawn with General Strachey's curve instrument.

Krakatoa Air Wave.—Most of the barograms have been pantagraphed on a copper plate, and work has been done on the tabulations and diagrams.

(Signed) R. H. CURTIS.

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

SUBMITTED—The following STATEMENT respecting the RECORDS for May 1883, received from the SELF-RECORDING OBSERVATORIES (see Minutes, 21st December 1868 and 20th November 1876).

—	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	2 hrs.	3 hrs.	0	0	0	0	0	0
„ „ other causes	0	0	0	0	0	0	0	†2 hrs.	0	0	‡2 hrs.	‡2 hrs.	0	0
Orientation verified	26th	—	31st	—	17th	—	26th	—	9th	—	23rd	—	4th	—
No. of errors discovered by subsidiaries	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ irregular differences	1	0	0	1	0	1	4	2	1	0	0	2	7	3
Result of 40 *Remeasurements* :—														
Greatest difference	0·0	1·0	1·0	1·0	0·0	2·0	1·0	1·0	1·0	1·0	0·0	2·0	1·0	1·0
Mean difference irrespective of sign	0·0	0·2	0·0	0·3	0·0	0·2	0·0	0·4	0·0	0·1	0·0	0·3	0·0	0·4
Residual difference (—Meteorological Office)	0·0	−0·1	0·0	+0·1	0·0	−0·1	0·0	−0·1	0·0	+0·1	0·0	−0·1	0·0	−0·3
RAIN GAUGE :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient, due to stoppage of clock	0		0		27 hrs.		0		0		0		0	
„ „ other causes	0		*24		0		0		0		0		0	
Errors in tabulation	0		4		0		2		0		0		1	

BAROGRAPH —							
Action	Good.	Good.	Good.	Good.	Good.	Good	Good.
Photography	Do.	Bad.	Do.	Do.	Do.	Do.	Indifferent.
Records deficient, due to stoppage of clock	0	0	0	0	‖10 hrs.	0	0
,, ,, failure of light	0	0	0	0	0	‖12 hrs.	0
,, ,, other causes	0	0	Q	0	0	0	0
No. of errors discovered—							
In entry of standard	0	0	1	1	6	3	0
,, calculating residual correction	0	1	0	0	0	1	1
,, applying residual correction	0	1	0	7	1	1	1
,, subtraction in subsidiary tables	0	0	0	3	3	2	0
,, tabulation by subsidiaries	0	0	0	0	0	0	0
,, ,, irregular differences	0	1	0	1	3	0	19
Result of 40 *Remeasurements* :—							
Greatest difference	·005	·005	·005	·005	·007	·005	·005
Mean difference irrespective of sign	·002	·002	·002	·002	·002	·002	·003
Residual difference (—Meteorological Office)	+·001	—·001	·000	·000	·000	·000	—·001
Mean monthly difference between simultaneous Barograph and Barometer readings	·002	·002	·001	·002	·002	·001	·001

THERMOGRAPH :—																		
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.		Good.			
Photography	Do.		Do.		Do.		Indifferent.		Do.		Indifferent.		Indifferent.					
	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.				
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
,, ,, failure of light	0	0	0	0	0	0	0	0	0	0	0	‖3 hrs.	0	0				
,, ,, imperfectly moistened bulbs	—	0	—	0	—	0	—	§2 hrs.	—	¶3 hrs.	—	¶9 hrs.	—	0				
,, ,, partially frozen bulbs	—	0	—	0	—	0	—	0	—	0	—	0	—	0				
,, ,, other causes	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
No. of errors discovered in entry of Standard	0	0	0	1	1	0	0	0	0	0	0	0	0	1				
,, ,, by subsidiary measurements	0	0	0	0	0	0	0	1	0	0	0	1	0	0				
,, ,, of subtraction in do. tables	0	0	1	1	2	0	5	2	3	3	2	1	3	1				
,, ,, detected under glass scale	0	0	0	0	2	0	0	0	0	4	0	**231	0	0				
Result of 40 *Remeasurements* :—																		
Greatest difference	0·3	0·2	0·4	0·2	0·1	0·2	0·3	0·3	0·2	0·2	0·2	1·1	0·4	0·3				
Mean difference irrespective of sign	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·2	0·1				
Residual difference (—Meteorological Office)	+0·1	0·0	0·0	0·0	0·0	+0·1	0·0	0·0	—0·1	0·0	0·0	0·0	+0·2	0·0				
Mean monthly difference between simultaneous Thermograph and Thermometer readings	0·1	0·2	0·2	0·2	0·1	0·1	0·2	0·3	0·2	0·2	0·1	0·2	0·2	0·2				
No. of errors in maxima and minima	0	—	4	—	4	—	0	—	1	—	6	—	5	—				

* Funnel choked. † Improper starting of curve. ‡ Instrument under repair. § One standard given. ‖ No standard given.
¶ Two standards given. ** From 11 a.m. of the 22nd to Mid. of the 31st, the dry-bulb value was apparently used.

Submitted—The following report on the forecasts for April 1885 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

APRIL.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	44	72	58	96
,,	b	52	24	38	
,,	c	4	4	4	
,,	d	0	0	0	
Scotland, E.	a	36	68	52	94
,,	b	56	28	42	
,,	c	4	0	2	
,,	d	4	4	4	
England, N.E.	a	56	68	62	94
,,	b	36	28	32	
,,	c	8	0	4	
,,	d	0	4	2	
England, E.	a	40	56	48	80
,,	b	40	24	32	
,,	c	16	8	12	
,,	d	4	12	8	
Midland Cos.	a	32	60	46	86
,,	b	56	24	40	
,,	c	12	12	12	
,,	d	0	4	2	
England, S.	a	44	56	50	86
,,	b	36	36	36	
,,	c	16	4	10	
,,	d	4	4	4	
Scotland, W.	a	40	60	50	84
,,	b	40	28	34	
,,	c	12	8	10	
,,	d	8	4	6	
England, N.W.	a	40	64	52	90
,,	b	44	32	38	
,,	c	4	0	2	
,,	d	12	4	8	
England, S.W.	a	42	50	46	77
,,	b	29	33	31	
,,	c	17	4	11	
,,	d	12	13	12	
Ireland, N.	a	40	56	48	80
,,	b	36	28	32	
,,	c	12	4	8	
,,	d	12	12	12	
Ireland, S.	a	36	52	44	70
,,	b	20	32	26	
,,	c	28	8	18	
,,	d	16	8	12	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	64	63	64	90
,,	b	33	20	26	
,,	c	3	10	7	
,,	d	0	7	3	
Scotland, E.	a	37	60	49	96
,,	b	57	37	47	
,,	c	6	0	3	
,,	d	0	3	1	
England, N.E.	a	60	53	57	94
,,	b	30	37	33	
,,	c	10	10	10	
,,	d	0	0	0	
England, E.	a	54	23	39	80
,,	b	38	50	41	
,,	c	7	17	12	
,,	d	6	10	8	
Midland Cos.	a	37	43	40	79
,,	b	37	40	39	
,,	c	16	10	13	
,,	d	10	7	8	
England, S.	a	53	43	48	88
,,	b	30	50	40	
,,	c	10	0	5	
,,	d	7	7	7	
Scotland, W.	a	44	60	52	82
,,	b	33	27	30	
,,	c	10	3	7	
,,	d	13	10	11	
England, N.W.	a	44	60	52	87
,,	b	43	27	35	
,,	c	7	10	9	
,,	d	6	3	4	
England, S.W.	a	54	37	46	84
,,	b	40	37	38	
,,	c	3	20	12	
,,	d	3	6	4	
Ireland, N.	a	44	60	52	87
,,	b	43	27	35	
,,	c	7	7	7	
,,	d	6	6	6	
Ireland, S.	a	30	50	40	80
,,	b	43	37	40	
,,	c	10	10	10	
,,	d	17	3	10	

SUMMARY.

British Isles	a	41	60	51	85
,,	b	40	29	34	
,,	c	12	5	9	
,,	d	7	6	6	
British Isles	a	48	50	49	86
,,	b	38	35	37	
,,	c	8	9	8	
,,	d	6	6	6	

Reported—That the following cheques had been drawn during the month of April:—

1885.			£	s.	d.
April	4th	For weekly salaries	20	7	8
,,	11th	,, ,,	16	1	0
,,	18th	,, ,,	16	1	0
,,	25th	,, ,,	16	1	0
,,	,,	Pall Mall Coal Co., coals	5	10	0
,,	,,	T. De la Rue & Co., sunshine cards	8	15	0
,,	,,	Postmaster-General, telegrams	193	6	7
,,	,,	Wightman & Co., wrappers	7	0	0
,,	,,	P. Adie, instruments	21	13	6
,,	,,	Kew Committee, verifications	11	16	0
,,	,,	J. Green, care of Bermuda Anemometer	4	10	0
,,	,,	Chance Brothers, sunshine balls	7	10	0
,,	,,	R. Strachan, aneroids bought on commission	23	15	0
,,	,,	Pickford & Co., carriage of parcels	2	1	10
,,	,,	Williams & Norgate, books	4	2	0
,,	,,	Gas Light and Coke Co., gas	10	12	9
,,	,,	G. A. Gillett, wood, &c.	1	7	3
,,	,,	Anglo-American Telegraph Company, telegrams	5	4	0
,,	,,	W. C. Ley, "cirrus" cards	2	18	0
,,	,,	F. Dangerfield, delivery of charts	9	16	6
,,	,,	P. Comins, wall at Mullaghmore	3	4	0
,,	,,	Bank of England, sale of Stationery Office forms	9	0	7
,,	,,	Negretti & Zambra, instruments	63	4	4
,,	30th	R. H. Scott — "Office" salaries.	66	13	4
,,	,,	J. S. Harding, jun. — "Office" salaries.	27	15	6
,,	,,	T. D. Bell — "Office" salaries.	15	0	0
,,	,,	J. E. Cullum, Valencia Observatory	16	13	4
,,	,,	J. Sheerman, Harmonic Analysis	10	0	0
,,	,,	R. H. Curtis — Discussion, &c. of observations.	22	10	0
,,	,,	J. A. Curtis — Discussion, &c. of observations.	17	10	0
,,	,,	T. E. Allen — Discussion, &c. of observations.	16	5	0
,,	,,	C. H. Thompson — Discussion, &c. of observations.	11	13	4
,,	,,	S. Call — Discussion, &c. of observations.	10	16	8
,,	,,	E. G. Aldridge — Discussion, &c. of observations.	8	15	0
,,	,,	R. J. Canham — Discussion, &c. of observations.	6	13	4
,,	,,	A. H. Bell — Discussion, &c. of observations.	6	13	4
,,	,,	F. Gaster — Preparation, &c. of Weather Reports.	32	0	7
,,	,,	F. J. Brodie — Preparation, &c. of Weather Reports.	20	18	10
,,	,,	G. G. Francis — Preparation, &c. of Weather Reports.	21	7	11
,,	,,	A. J. Rigby — Preparation, &c. of Weather Reports.	16	8	1
,,	,,	R. Sargeant — Preparation, &c. of Weather Reports.	13	11	0
,,	,,	A. R. Simpkins — Preparation, &c. of Weather Reports.	9	7	6
,,	,,	H. J. Stevens — Preparation, &c. of Weather Reports.	8	6	8
,,	,,	Capt. H. Toynbee — Discussion, &c. of observations.	33	6	8
,,	,,	Navg. Lt. C. W. Baillie, R.N. — Discussion, &c. of observations.	20	16	8
,,	,,	R. Strachan — Discussion, &c. of observations.	27	15	6
,,	,,	C. Harding — Discussion, &c. of observations.	22	10	0
,,	,,	H. Harries — Discussion, &c. of observations.	14	3	4
,,	,,	W. Allingham — Discussion, &c. of observations.	14	3	4
,,	,,	W. G. James — Discussion, &c. of observations.	10	8	8
,,	,,	F. T. Bullen — Discussion, &c. of observations.	8	15	0
,,	,,	R. F. Wallace — Discussion, &c. of observations.	7	18	4
,,	,,	J. S. Harding, junr., petty cash	50	0	0
,,	,,	H. Harries, observations for Dr. Kunze	3	15	0
			£1,036	9	11

116, *Victoria Street, May* 20, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (May 6) were read and confirmed.

Reported—That Mr. Whipple had returned from Falmouth, having satisfactorily completed the transference of the instruments to the new observatory (Minutes, 1884, p. 117), and had forwarded the following report :—

FALMOUTH.—April 28th to May 9th.

I visited the observatory for the purpose of removing the instruments to the new building recently erected by the Royal Cornwall Polytechnic Society on the Western Terrace Road, Falmouth.

The new observatory is freely exposed on all sides, having no buildings immediately adjacent to the inclosure in which it stands, and an open valley between it and the sea to the south-west. The crest of the hill on which the old building stands is distant about three-eighths of a mile east, the present level of the anemometer cups being 26 feet lower than the old.

The anemometer, having been returned from Mr. Munro after undergoing repair, was unpacked and set up on the iron column erected for its support upon the roof, and the registering apparatus fixed in the room below. This is somewhat inconveniently placed, but a ready means of improving matters did not suggest itself. Alterations had to be made to the shafts, and also to the pencils, the latter not having been altered by Munro to fit the standard blank anemograph curves. A small irregularity, however, shows in the velocity trace at the point where the old pencil edge was rounded off. I had not appliances to remove this totally. The directions of the cardinal points were exactly determined by observation of the sun at local noon, as observed by the chronometer after comparison with the Greenwich time signal received at the post office, and also by a local optician's transit. Distant objects serving as mires for orientation were selected and noted.

The thermograph and barograph were removed without injury to either tubes or thermometers, and set up together in the new instrument room, the bulbs of the thermometers now being but 4 feet above the ground, which is turfed both under and in the immediate vicinity of the screen. The latter is freely exposed on the east and north sides, but on the west there is a slightly projecting low outhouse 15 feet distant.

In front of the screen on the north side the turfed bank of the observatory garden runs along obliquely, its nearest approach to the screen at the level of the bulbs being 14 feet. The stems of the thermometers were carefully blackened, and new slits scraped, in order to reduce the thickness of the light dots. Alterations were also made in the duration of the light cut-off, in order to assist in the clear marking of the time lines on the photographic paper. The maximum and minimum thermometers were re-fixed in the screen, but at a lower level than they occupied before in order to bring them nearer the thermograph bulb level. The minimum was examined for evaporated spirit, and readjusted. Ice could not be obtained for examining the new readings, and I had no standard with me.

The Standard barometer had its cistern emptied, and the mercury and glass cleaned when it was dismounted. When set up in its new position the height of the cistern was referred to an adjacent Bench Mark, and found to be about 183 feet above mean sea level.

The sunshine recorder was transferred to its new position on a cloudy afternoon, so that no record was lost. It was firmly cemented into a tray fixed on the stair head on the roof, owing to inability to remove the glass sphere from its support to which it is attached by Canada balsam. The bowl appears to be now subject to a slight error of level. Time did not permit of my rectifying this.

The Beckley rain gauge was removed from Mrs. Philp's garden to a position selected in the centre of the garden enclosure, perfectly open on all sides, and where it will not be screened by the new magnetic observing house when built. It stands 110 feet north-west of the observatory, and 40 feet distant from the nearest point of the walls of the ground, the height above sea level being 169 feet.

The spare M.O. copper 8-inch gauge was placed in a levelled slate slab adjusted with the rim to the same level 2 feet 2 inches east.

Mr. Kitto and his assistant were instructed in the photographic operations necessary for the manipulation of the A. G. B. paper, and successful trial curves obtained.

In conclusion, I have to record my thanks to Messrs. Olver & Sons, builders, Falmouth, for the assistance I received from the intelligent workmen they placed at my disposal.

May, 1885. (Signed) G. M. WHIPPLE.

Read—A memorandum from Captain Toynbee reporting that since the last meeting 14 logs had been received, 9 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. F. B. Bouchette	S.S. "Montreal"	Nov. 28, 1884—May 6, 1885	Liverpool and Portland viâ Halifax.	1884, p. 48.
Capt. Jas. Campbell	Barque "Florence."	Dec. 4, 1883—April 22, 1885.	Newport, Buenos Ayres, West Coast of South America, and home.	1883, p. 54.
Capt. T. W. Freeman.	S.S. "Bellerophon."	Jan. 12—May 9, 1885.	Liverpool, China, and home.	1884, p. 82.
Capt. W. N. Lailey -	S.S. "Boyne" -	Nov. 16, 1884—May 3, 1885.	Penarth, Port Saïd, India, and home.	1884, p. 49.
Capt. W. U. Moore Lieut. C. W. de la Poer-Beresford.	H.M.S. "Dart" -	March 27—Nov. 5, 1884.	Surveying on Australian Station.	1884, p. 20. 1881, p. 138.
Capt. Moses Parry -	S.S. "Prydain"	Sept. 20, 1884—April 7, 1885.	Cardiff, Odessa, Hamburg, New York, Genoa, New York, &c.	1883, p. 75.
Capt. S. Trott Mr. R. Ladd.	S.S. "Minia" -	Jan. 3—May 5, 1885.	Halifax, Falmouth, Brest (cable laying).	1884, p. 104.
Capt. N. C. Carr -	"Superb" -	July 29, 1884—May 4, 1885.	London, Melbourne, and home.	——
Capt. J. M'Millan -	"Canterbury" -	Aug. 6, 1884—April 29, 1885.	New Zealand and home -	——

Mr. Scott was instructed to present the charts (O. 27) to Captains Carr and M'Millan, and to convey the best thanks of the Council to the other observers.

116, *Victoria Street, June* 3, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

The Secretary was in attendance.

Read—The following letter:—

(M.O. 101172.) Kew Observatory, Richmond, Surrey,
June 2, 1885.

DEAR MR. SCOTT,

IN accordance with instructions received at the meeting of the Kew Committee on Friday last, I beg to hand you herewith a copy of the report I submitted to them on the working of the photo-nephoscope since my report dated June 27th, 1884.

I also beg to submit the estimates of the cost of a permanent installation of the apparatus, and of its working, for one year.

Yours, &c.
(Signed) G. M. WHIPPLE.

REPORT to the KEW COMMITTEE on the WORKING of the PHOTO NEPHOSCOPE at the KEW OBSERVATORY.

IN accordance with the suggestions contained in my report submitted to the Kew Committee on June 27th, 1884, a grant of 40*l.* was applied for, and obtained from the Meteorological Council in July last.

This amount has been expended in the purchase of telegraph cable and switches; the construction of carriage, reel for winding, signal flags, experimental photographic plates, preliminary calculations, &c., of which a detailed account is submitted herewith.

Twenty good pairs of negatives have been secured on plates kindly prepared by Captain Abney. They all show cumulus or cirro-cumulus clouds, for I regret to say that the numerous attempts made to photograph the thin cirrus and cirro-stratus clouds have proved failures, with one single exception.

We have also not yet obtained any estimates of the rate of cloud motion; this is owing to our limited supply of plates and plate-holders.

Thirty-six good height, distance and bearing determinations have been made, and a copy of the results is appended hereto, together with a number of specimen prints, and a specimen form of reduction.

Models of the cameras, stands, &c., have been constructed on a scale of one-sixth and placed in the Inventions Exhibition, and a frame of selected cloud prints will shortly be shown above them, as will a stereoscope with one or two transparencies.

Of the grant of 40*l.* made in July 1884 by the Meteorological Council, the following sums have been expended:—

	£	*s.*	*d.*
On apparatus	26	2	7
Chemicals	1	13	1
Sundries	0	14	7
Extra time of assistants	6	15	4
	35	5	7

The cost of models, prints, and stereoscope at Exhibition is estimated at 12*l.*

The result of the above experiments is to show that the cost now of a set of three pairs of negatives, giving nine cloud positions, may be assumed to be for—

	£	*s.*	*d.*
Assistant's time, photographic operations	0	3	0
„ „ computing	0	7	6
Materials, including positives	0	2	6
	0	13	0

(Signed) G. M. WHIPPLE,
Superintendent.

May 29, 1885.

Rough Estimate of the Cost of the Permanent Installation of the Photo-Nephograph at the Kew Observatory.

	£	s.	d.
To construction of two water-tight stands and lockers for cameras, switches, telephones, flags, and terminals -	8	0	0
Burying cable and fixing terminals - - -	2	0	0
Six additional plate holders and satchel - - -	4	0	0
Plate boxes for storage (one year) - - - -	4	0	0
Compensation for disturbing grass - - - -	1	0	0
Sundries - - - - - - -	1	0	0
	20	0	0

The cost of working, per annum, is estimated to be as follows, presuming that two cloud motion determinations, necessitating the employment of eight plates, are made on 150 days per annum :—

	£	s.	d.
Nine gross photographic plates at 27*s.*, as per Morgan and Kidd's estimate - - - - - -	12	3	0
Development of same at 4*d.* per plate - - -	20	0	0
Assistants time (two) at 1 hour per day - - -	15	0	0
Computors time (four positions daily) 2 hours at 1*s.* 6*d.* -	22	10	0
Annual rental, as per Fuller's agreement - - -	3	0	0
Maintenance of batteries - - - - -	1	10	0
	74	3	0
Paper positives from pictures, 100 dozen at 3*s.* 6*d.* - -	17	10	0
Contingencies - - - - - -	5	0	0
	96	13	0

(Signed) G. M. Whipple,
Superintendent.

June 2, 1885.

Mr. Scott was instructed to reply (P.C. 1111) that the determination of velocity of the clouds was the chief point to be investigated, and that the future observations should be specially directed to this. Sufficient plates are to be procured and observations carried on, on the scale of expense proposed in Mr. Whipple's letter, until October 1.

Read—Letters 1134 and 1149 from the two partners of the firm of M'Gregor and Co., of Glasgow, who are dissolving partnership, each requesting the appointment of agent to the Office, which had been held by the original firm.

The Council resolved, in accordance with a recommendation from Captain Toynbee, to appoint Mr. D. M'Gregor. (P.C. 1108).

Read—A memorandum from Captain Toynbee reporting that since the last meeting 4 logs had been received, 3 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. A. Simpson (No. 90,667).	S.S. "Australasian."	Dec. 9, 1884—May 26, 1885.	Plymouth, Adelaide, viâ the Cape of Good Hope, home by Suez.	1884, p. 78.
Capt. John W. Sheldrake.	"Iron Cross" -	June 23, 1884—May 21, 1885.	Liverpool, Calcutta, New York, and home.	—
Capt. John Wilson -	S.S. "Ethiopia"	Aug. 10, 1884—Apr. 6, 1885.	Glasgow and New York (five voyages).	—

Mr. Scott was instructed to present the Charts (O. 27) to Captain Sheldrake, the Charts (O. 32) to Captain Wilson, and to convey the best thanks of the Council to Captain Simpson.

Submitted—The following report on the forecasts for May 1885 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

MAY.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	58	73	66	83
"	b	23	12	17	
"	c	15	8	12	
"	d	4	7	5	
Scotland, E.	a	35	62	49	89
"	b	54	27	40	
"	c	7	4	6	
"	d	4	7	5	
England, N.E.	a	35	62	49	91
"	b	54	31	42	
"	c	11	0	6	
"	d	0	7	3	
England, E.	a	50	77	64	87
"	b	38	8	23	
"	c	8	4	6	
"	d	4	11	7	
Midland Cos.	a	62	77	70	85
"	b	15	15	15	
"	c	15	8	11	
"	d	8	0	4	
England, S.	a	65	77	71	92
"	b	27	15	21	
"	c	4	4	4	
"	d	4	4	4	
Scotland, W.	a	35	54	45	75
"	b	42	19	30	
"	c	15	8	12	
"	d	8	19	13	
England, N.W.	a	42	66	54	79
"	b	35	15	25	
"	c	19	19	19	
"	d	4	0	2	
England, S.W.	a	73	65	69	92
"	b	19	27	23	
"	c	8	4	6	
"	d	0	4	2	
Ireland, N.	a	46	77	62	85
"	b	31	15	23	
"	c	19	4	11	
"	d	4	4	4	
Ireland, S.	a	58	65	62	89
"	b	31	23	27	
"	c	11	8	9	
"	d	0	4	2	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	50	68	59	89
"	b	30	29	30	
"	c	17	0	8	
"	d	3	3	3	
Scotland, E.	a	42	68	55	89
"	b	45	23	34	
"	c	10	0	5	
"	d	3	9	6	
England, N.E.	a	45	68	57	88
"	b	36	26	31	
"	c	16	6	11	
"	d	3	0	1	
England, E.	a	61	65	63	89
"	b	29	23	26	
"	c	10	6	8	
"	d	0	6	3	
Midland Cos.	a	62	58	60	88
"	b	32	23	28	
"	c	3	16	9	
"	d	3	3	3	
England, S.	a	78	65	72	94
"	b	16	29	22	
"	c	6	3	5	
"	d	0	3	1	
Scotland, W.	a	49	58	54	85
"	b	39	23	31	
"	c	6	3	4	
"	d	6	16	11	
England, N.W.	a	42	55	49	86
"	b	42	32	37	
"	c	13	7	10	
"	d	3	6	4	
England, S.W.	a	58	55	57	91
"	b	29	39	34	
"	c	10	3	6	
"	d	3	3	3	
Ireland, N.	a	36	71	54	81
"	b	35	20	27	
"	c	23	3	13	
"	d	6	6	6	
Ireland, S.	a	52	68	60	88
"	b	32	23	28	
"	c	16	9	12	
"	d	0	0	0	

SUMMARY.

British Isles	a	51	69	60	86
"	b	33	19	26	
"	c	12	6	9	
	d	4	6	5	

British Isles	a	52	64	58	88
"	b	33	26	30	
"	c	12	5	8	
"	d	3	5	4	

Submitted—The following statements of work for May 1885:—

MARINE ROOM.

June 3, 1885.

Examined 19 new logs.

North Atlantic Weather Charts.

Making additions to isobars for November and December 1882.
Preparing weather areas and generalized winds for December 1882, and for part of January 1883.
Drawing of air and sea isotherms for May completed.
Making "tracings" of all data for June also drawing air and sea isotherms.
Testing glass pens for use with eidographs.
Various work in connexion with land isobars, isotherms, and winds.
The female clerks steaming June charts, plotting the observations for July and August, assisting in the copying of land isobars, isotherms, and winds, and preparing "tracings" of data. Three members of the staff practising the working of the eidographs.

General.

Indexing data in ocean 10-degree squares, and obtaining amount and distribution of data in the Office to the end of 1884.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE,
Marine Superintendent.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

Monthly Weather Reports.—1885, *February.*—Expected from printer daily (complete). 1885, *March.*—In printer's hands. 1885. *April.*—Half done. There has been some little delay with these just lately on account of holidays, and sickness of various clerks.

Checking Daily Forecasts.—Complete up to date.

Checking Storm Warnings, 1884.—Completed.

Weekly Weather Report.

1884, Appendix II.—Sheets 3 and 4 of proof have been received, corrected, and returned for press, and the printer has been requested to deliver remainder of proof at once.

1885.—All numbers have appeared promptly.

Comparing the Records of Mr. Galton's ("trigger") Anemometer, with Estimations of Wind Force on board the Newarp Light Vessel.—Computations all finished. Inquiry is now being made as to method of observing, &c., as the results appear somewhat peculiar.

(Signed) FREDC. GASTER.
3/6/85.

PANTAGRAPH ROOM.

June 1, 1885.

Quarterly Weather Report, Part IV., 1877.—Chart plate XVI. partly drawn.

Observatory Returns.—The Hourly Readings for May 1883 sent to printer. Proof read and revised to end of March, and Part I. signed for press.

The calculation of vapour tension values, and of daily, five-daily, and monthly means for May completed.

Harmonic Analyser.—A correction for non-periodicity has been applied to the coefficients for the 12 years 1871–1882. The examination of the readings of the machine (Minutes, April 29, 1885) is now in hand. Several plates of curves have been drawn with General Strachey's instrument.

Krakatoa Air Waves.—My own time has been chiefly occupied in discussing, under the Chairman's instructions, the observations relating to these phenomena; Mr. Thompson has also been partly engaged on diagrams for the work.

Miscellaneous.—Bunhill Row sunshine cards for the first three months of the year tabulated for the Royal Meteorological Society.

Some assistance has been given to the Examination Room by myself and others during the month.

R. H. Scott, Esq., F.R.S. (Signed) R. H. CURTIS.

Reported—That the cash accounts for the six months ended the 31st March 1885 had been audited this day by the Chairman and Professor Darwin, and would be sent forthwith to the Treasury for the Audit Office. The receipts for the six months, exclusive of a balance of 1,123*l.* 2*s.* 11*d.* on the 1st October 1884, amounted to 9,199*l.* 12*s.* 6*d.* The payments amounted to 8,579*l.* 10*s.* 7*d.*, leaving a balance of 1,743*l.* 4*s.* 10*d.* in hand and at the Bank on 1st April 1885.

Reported—That the following cheques had been drawn during the month of May:—

1885.				£	s.	d.
May	2nd	For weekly salaries		16	1	0
,,	,,	Johnson, Matthey, & Co., chemicals		2	11	2
,,	6th	Scottish Meteorological Society, observations		22	10	0
,,	,,	R. J. Lecky, sunshine recorder frames		5	15	0
,,	,,	Postmaster General, telegrams		258	19	9
,,	9th	For weekly salaries		16	1	0
,,	16th	,, ,,		16	1	0
,,	,,	G. W. Wheatley, conveyance of parcels		1	16	6
,,	,,	Anglo-American Telegraph Co., telegrams		3	7	6
,,	,,	R. W. Munro, repairing Falmouth anemometer, &c.		35	0	6
,,	,,	J. H. Woodstock, packing cases		4	5	0
,,	23rd	For weekly salaries		16	1	0
,,	30th	,, ,,		16	1	0
,,	,,	R. H. Scott	"Office" salaries	66	13	4
,,	,,	J. S. Harding, jun.	"Office" salaries	27	15	6
,,	,,	T. D. Bell	"Office" salaries	15	0	0
,,	,,	J. E. Cullum, Valencia observatory		16	13	4
,,	,,	G. Sheerman, harmonic analysis		10	0	0
,,	,,	R. H. Curtis	Discussion, &c. of observations	22	10	0
,,	,,	J. A. Curtis	Discussion, &c. of observations	17	10	0
,,	,,	T. E. Allen	Discussion, &c. of observations	16	5	0
,,	,,	C. H. Thompson	Discussion, &c. of observations	11	13	4
,,	,,	S. Call	Discussion, &c. of observations	10	16	8
,,	,,	E. G. Aldridge	Discussion, &c. of observations	8	15	0
,,	,,	R. G. Canham	Discussion, &c. of observations	6	13	4
,,	,,	A. H. Bell	Discussion, &c. of observations	6	13	4
,,	,,	F. Gaster	Preparation, &c. of Weather Reports	32	4	11
,,	,,	F. J. Brodie	Preparation, &c. of Weather Reports	20	18	10
,,	,,	G. G. Francis	Preparation, &c. of Weather Reports	21	10	10
,,	,,	A. J. Rigby	Preparation, &c. of Weather Reports	16	8	1
,,	,,	R. Sargeant	Preparation, &c. of Weather Reports	13	11	0
,,	,,	A. R. Simpkins	Preparation, &c. of Weather Reports	9	7	6
,,	,,	H. J. Stevens	Preparation, &c. of Weather Reports	8	6	8
,,	,,	Captain H. Toynbee	Discussion &c. of observations.	33	6	8
,,	,,	Nav. Lieut. C. W. Baillie, R.N.	Discussion &c. of observations.	20	16	8
,,	,,	R. Strachan	Discussion &c. of observations.	27	15	6
,,	,,	C. Harding	Discussion &c. of observations.	22	10	0
,,	,,	H. Harries	Discussion &c. of observations.	14	3	4
,,	,,	W. Allingham	Discussion &c. of observations.	14	3	4
,,	,,	W. G. James	Discussion &c. of observations.	10	8	8
,,	,,	F. T. Bullen	Discussion &c. of observations.	8	15	0
,,	,,	R. F. Wallace	Discussion &c. of observations.	7	18	0
,,	,,	J. S. Harding, jun., petty cash		50	0	0
				£983	14	7

116, *Victoria Street, June* 17, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. DARWIN.	PROFESSOR STOKES.
MR. GALTON.	THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (June 3) were read and confirmed.

Read—The following letter :—

(M.O. 1233.)

SIR, Treasury Chambers, June 9, 1885.

I AM directed by the Lords Commissioners of Her Majesty's Treasury to transmit herewith, in original, a letter and its enclosures from the Irish Office, respecting certain weather reports furnished to the Registrar-General, Ireland, by Dr. J. W. Moore; and I am to request that my Lords may be informed (1) whether Dr. Moore already receives any remuneration from the grant for meteorological observations; and (2) whether the Council agree to the payment now recommended by the Irish Secretary.

My Lords consider that the payment, if any, that may be allowed, should be borne on the grant administered by the Council.

I have, &c.

The Secretary, Meteorological Council, (Signed) C. G. BARRINGTON.
116, Victoria Street, S.W.

(M.O. 1233.) Chief Secretary's Office, Dublin Castle,

SIR, June 1, 1885.

I AM directed by the Lord Lieutenant to acquaint you, for the information of the Lords Commissioners of Her Majesty's Treasury, that the Registrar General for Ireland has brought under His Excellency's attention the service rendered to him in connection with his annual report on the agricultural statistics of Ireland, by Dr. J. W. Moore, of Fitzwilliam Square, Dublin.

The facts appear to be as follows :—

Dr. Moore is the observer at Dublin for the Meteorological Office, London, and in his capacity as a distinguished meteorologist he prepared for the statistics of 1879, at the request of the then Lord Lieutenant, conveyed to him through the Registrar General, a report on the weather of 1879, which was duly published in the volume of agricultural statistics for that year, and presented to Parliament.

At the time much public attention was directed to the question of the weather, owing to the bad harvests—the failure of the potato crop—and the impending distress—the circumstances of which are still fresh in their Lordships' recollection.

Dr. Moore has since continued to furnish Her Majesty's Government and Parliament with similar information annually in the volume published by the Registrar General, and he has heretofore given his services and time gratuitously.

He now, however, states that his professional engagements are so numerous as to keep him fully occupied, and that the compilation of the meteorological abstracts and tables must be done in the intervals of rest from his professional avocations; and he states that, in justice to himself, he must decline to continue to supply the information, unless he is fairly remunerated for his labours, and for the time they consume.

The Registrar General in submitting the matter, states that the weather report is an extremely valuable addition to the statistics, especially for agricultural purposes, and that he should be extremely sorry if it had to be discontinued.

He points out that it is not merely the records of meteorological observations that are furnished by Dr. Moore, but also his own remarks thereon, and he observes that while the mere record of observations could be obtained through the Meteorological Office, the remarks cannot be so obtained.

Dr. Grimshaw adds that although he himself could compile remarks of the kind, they would not possess anything like the same value or carry the same weight as those furnished by an eminent meteorologist such as Dr. Moore.

Dr. Moore, it appears, also forwards to the Registrar General each week, gratuitously, his own remarks on the weather, and the Registrar General publishes them in the weekly returns issued by his department.

Dr. Grimshaw considers that a fee of 5*l.* 5*s.* for the report for each year would be the lowest sum that could be offered to Dr. Moore for his services; and in the circumstances His Excellency recommends their Lordships to sanction payment of that sum for the current year, and for the future, out of the vote for the General Register Office (Ireland), together with a sum of 10*l.* 10*s.* in recognition of past services.

I enclose herewith, for their Lordships' information, the pages from the last published volume of agricultural statistics, that for 1883—containing Dr. Moore's observations, which appear to His Excellency to be very interesting and useful.

I am, &c.

The Secretary, Treasury. (Signed) W. S. B. KAYE.

The Chairman was requested to prepare a reply.

Read—The following letter:—

(mo 1259)

Signal Office, War Department,
Washington City, May 27, 1885.

SIR,

IN the matter of the reduction of the barometer to sea-level, I beg to submit the following considerations, and to ask your kindly criticism and remarks.

It would seem that the combination of observations on land with those on vessels, as long ago as 1857, rendered it necessary to give up the isabnormal lines (the isobarometric of Kämtz), and reduce all pressures to sea-level and draw isobars which extended without serious error over low-lying portions of Europe and the adjoining ocean.

The signal service in 1870 for the first time had to confront the problem of drawing isobars on tri-daily maps (morning, afternoon, and midnight), not only over oceans and low-lands, but inwards over high plateaus.

In 1870 and 1871 this service endeavoured to reduce each barometric observation to sea-level by considering only the temperature and pressure prevailing at the station at the moment of observation and by assuming the average temperature of the column of air imagined below the station to be represented by the formula $t_0 = t_1 + \frac{h}{2c}$, where t_1 is the observed temperature and $\frac{h}{2c}$ the variation due to altitude. In any formula of this kind it is evident that by using t_1, there is a diurnal period introduced into the reduced barometer, which for high stations is very large and misleading. So troublesome was this, that already in January 1872 this method was discontinued for the very highest stations (see Annual Report, Chief Signal Officer 1873, p. 373), and an annual constant was used for these, in order at least to be able to follow the local tri-daily changes in pressure. But for stations from 2,000 to 5,000 feet high the original method still gave the same trouble, which was aggravated by a serious mistake in the use of a certain formula.

In 1881 this office began using for all stations a system of monthly constant reductions to sea-level, based on the monthly normal pressures and temperatures (see Annual Report, 1882, pp. 826–846). This method was adopted as a temporary device, and especially for certain financial reasons; it has features confessedly quite as objectionable as either of the above-mentioned methods.

The arguments against any reduction of high stations to sea-level and in favour of adopting a high plane, say 5,000 feet, to which both low and high stations should be reduced, are fully appreciated. They were in fact, urged upon the attention of General Myer as early as 1872. This idea has been exemplified in the work of several European meteorologists, but as the reduction to sea-level still continues the most popular, improvements in its details have been constantly kept in view.

An important modification is now proposed, which while considered to have decided advantages, yet introduces so great a departure from existing customs, that before adopting it, I desire a free expression of your own views as to its merits and defects, as I should prefer to make changes only in the direction of some method that would be generally acceptable to all meteorologists who have to prepare daily weather maps from telegraphic observations.

It is proposed to utilize the fact demonstrated by several, noteably Rühlmann, that the regular periodic diurnal change of temperature of the *mass of air* above or below any station is so small as to be negligible in comparison with the periodic change at the station itself, and especially in comparison with the non-periodic changes that accompany the vertical and horizontal movements of large portions of the atmosphere. It follows from this, that the reduction to sea-level should be but little affected by diurnal temperature changes at the stations, but should depend principally upon the mean temperature of the air, whether the latter be a quiescent layer or a current flowing rapidly past the station. It is, therefore, necessary to devise such a combination of the local observations as will follow closely the large non-periodic changes of temperature while at the same time eliminating the greater part of the periodic diurnal fluctuations shown by the station thermometers and which are generally very local phenomena. It is not clear that we should attempt wholly to eliminate the diurnal fluctuations, as there must be a small period in the daily temperature of the mass of air, but, for the present, we may neglect this refinement.

The special method by which the observer at any station may most easily obtain the mean temperature to be used in reducing the barometric observation, which he is then about to telegraph to the central station, must be left to the discretion of the respective national weather bureaus. It is sufficient to recognize the principle that he must use a temperature from which the diurnal periodicity has been largely eliminated.

The following examples are suggested:

For the tri-daily observations and reports of the United States, use the mean of the temperatures observed at the given hour and the two preceding observations.

In such a combination the diurnal variation is approximately eliminated and the means follow the gradual non-periodic changes with considerable closeness. Thus, in the accompanying chart of isobars for 7 a.m. February 4, 1883, Springfield, Ill., is in the front of an advancing mass of cold

dry air. Now if we examine the record at this station we find the temperatures as given in the second column of the following table; in the third column is given, opposite each hour of observation, the mean of its own and the two preceding figures. These latter are seen to follow the gradual diminution of temperature and to be freed from diurnal change. They indicate approximately therefore the current temperature of the mass of air beyond the diurnal changes determined by the surface of the earth.

SPRINGFIELD, ILLINOIS.

Date.	Hour of Observation.	Observed Temperature.	Mean Temperature for computing Reduction to Sea Level.
1883.			
February 2	11 p.m.	32·	—
„ 3	7 a.m.	33·5	—
„ „	3 p.m.	26·	30·5
„ „	11 „	15·	25·
„ 4	7 a.m.	7·	16·
„ „	3 p.m.	8·	10·
„ „	11 „	3·	6·
„ 5	7 a.m.	— 1·	3·
„ „	3 p.m.	11·	4·
„ „	11 „	11·	7·
„ 6	7 a.m.	16·	13·
„ „	3 p.m.	26·	18·

For stations that telegraph but one observation daily, as in Europe, where the 7 or 8 a.m. (local time) observation is usually sent, it might be considered desirable to combine the morning temperature with that of the previous evening, usually 9 p.m., or to combine the morning minimum with the preceding maximum, or again to utilize the ordinary combination, $\frac{7 + 2 + 2 + 9}{4}$, or again simply correct the observed temperature for the average diurnal periodicity.

In all of these methods such combinations are to be chosen that the monthly mean of the individual reduced barometers will sensibly coincide with the mean actual pressure reduced to sea-level by using the mean temperature of the month.

II.

In some such manner as above, the fictitious diurnal variation in the reduced barometer is approximately eliminated. We propose the above as the important point of the present communication, but in order to complete the reduction there remains still an important step, namely, to reduce the average temperature observed at the station to the mean of the air column. The rate of diminution of temperature with altitude varies both with the season and the geographical location, and the method of determining it must be left to each country to settle for itself. In any case it is not desirable to introduce too great refinements into this computation.

Two methods of approximating to the mean temperature of the column of air, which is assumed to replace the continents have been hitherto employed; one assumes that the vertical variation of temperature existing above the present continents can be carried down by extrapolation to the fictitious continent at sea-level; the other method assumes that the isotherms for those portions of the existing continents that are near sea-level can be prolonged by extrapolation underneath the highlands.

The defects of the first method increase with the height of the plateau, the defects of the second method increase with the geographical extent of the plateau.

For the United States, and, if we mistake not, for the whole world, the second method is to be preferred to the first.

Following this second method, we have projected low-level isotherms of the United States for each month, and have extended them across the interior and underneath the elevated plateaus of the western portion of the continent. These represent the surface temperature at an average elevation of 500 feet. A sample copy of such isotherms for January 1883 is enclosed.

The difference between the mean temperature at a high station and the corresponding low-level isotherm gives a monthly series of approximate allowances for altitude.

We have thus completely provided for the temperature of the mass of air under consideration and the completion of the reduction to sea-level becomes sufficiently simple.

The accompanying chart of isobars over the United States for 7 a.m., Feb. 4, 1883, is prepared by means of Scott's tables and the hypsometric formula, and in accordance with the preceding considerations.

I am, &c.
(Signed) W. B. HAZEN,
Brig. and Bvt. Maj.-General,
Chief Signal Officer, U.S.A.

Robert H. Scott, Esq.,
Meteorological Office, 116, Victoria Street,
London, S.W., England.

Submitted—The following Report :—

CHECKING of STORM WARNINGS, 1884.

SIR,

I BEG to submit herewith the Return showing for 1884 the results of a comparison of the Storm Warnings issued with the gales actually experienced on the coasts of our islands.

The results will, I feel sure, prove to be satisfactory to the Council, the percentage of success being greater than in any previous year.

The number of warnings issued in 1884 was much smaller than in 1883, owing partly to the fact that gales were much less frequent in the latter than in the former year, and partly to some improvement having taken place in the working of the system, the year 1883 having been marked by over-anxiety to warn in *good* time for those gales whose advent is, as a rule, too sudden for the extreme western and northern coasts to be properly warned. During 1884 the work was undertaken more deliberately, and with great success.

Yours, &c.

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

(Signed) FREDC. GASTER.

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 6 and 7.	Warnings not justified by subsequent Weather.	Warnings late, Force 9, reached at two Stations before issue.	Warnings partially late, Force 9, reached at one Station before issue.	Warnings 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	
Percentages -	—	66·4	20·0	12·1	0·0	1·1	0·4	

NOTES.

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.

Mr. Scott reported that he was making arrangements for the issue of Hay harvest forecasts as in recent years.—Approved.

Read—Letter No. 1230 from Mr. F. Morrice, of Ditchingham, Norfolk, stating that he was prepared to defray the expense of a system of signals to convey the hay harvest forecasts to the farmers in his neighbourhood, if he could receive the telegrams free of charge.

Mr. Scott was authorised to supply the forecasts to Mr. Morrice, gratis, for a period of two months (P.C. 1189).

The revised draft of the Report of the Office for 1884–85 was considered and approved, and the Chairman was requested to forward it to the Royal Society (P.C. 1191).

Read—A letter (No. 1187) from the Royal Meteorological Society inquiring if the Council would allow 25*l.* towards the cost of their inspections, as in former years.—Approved (P.C. 1190).

Read—Letter No. 1207 from the Scottish Meteorological Society stating that the Rev. Anderson, who had been appointed minister of Sandwick, in the Orkneys, was prepared to undertake the charge of the anemograph at that station (Minutes, 1884, p. 73.—Approved (P.C. 1192).

Read—A memorandum from Captain Toynbee reporting that since the last meeting five logs had been received, all of them being "Excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. P. J. Irving -	S.S. "Republic"	Dec. 10, 1884—May 18, 1885.	New York and home, five voyages.	1884, p. 82.
Capt. A. Kellett -	S.S. "Calabria"	Feb. 27—June. 9, 1885.	Suakim and home (cable ship).	1884, p. 49.
Capt. W. U. Moore	H.M.S. "Dart"	Nov. 26, 1884—Feb. 21, 1885.	Australian station (surveying).	1885, p. 17.
Capt. A. S. Thomson	S.S. "Dacia" -	April 5—June 5, 1885.	Cay West and home (cable ship).	1884, p. 95.
Capt. H. de la Cour Travers.	S.S. "Tartar" -	Jan. 16—May 25, 1885.	Cape Town and home, two voyages.	1884, p. 95.

Mr. Scott was instructed to convey the best thanks of the Council to the above observers.

Submitted—Proof of Part IV. of "Contributions to our knowledge of the Meteorology of the Arctic Regions," (Minutes, 1882, p. 31,) by Mr. R. Strachan, completing Vol. I. of the work.

116, *Victoria Street, July* 1, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN. | PROFESSOR STOKES.
MR. GALTON. | MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (June 17) were read and confirmed.

The Chairman submitted the following draft reply to the Treasury (Minutes, p. 22), which was adopted (P.C. 1331):—

(M.O. 1233.)

Meteorological Office, July 8, 1885.

SIR,

I AM directed by the Meteorological Council to acknowledge the receipt of your letter of the 9th ultimo (No. 9345) making an inquiry on behalf of the Lords Commissioners of the Treasury relative to the remuneration of Dr. Moore on account of weather reports furnished by him to the Registrar-General of Ireland.

In reply I am desired to state that the Council, on a full consideration of the circumstances of the case, are unable to assent to the propriety of making any payment to Dr. Moore from the grant administered by them.

The Council would explain that Dr. Moore has for several years past voluntarily and gratuitously supplied the Meteorological Office with registers of the weather at Dublin, which have been incorporated in the reports from time to time published by the Office. In this respect Dr. Moore

stands in precisely the same position as many other observers who are willing to devote some portion of their time to making meteorological observations, and thus contributing to the progress of a branch of science in which they are interested. The Council very cordially acknowledge the value of the work thus done, and especially of Dr. Moore's share in it, but in accordance with the recommendation contained in paragraph 22 of the Report of the Committee of 1877 on the future conduct of the Meteorological Office, which was specifically approved by the Council of the Royal Society, and presumably accepted by the Treasury in their general approval of the arrangements then settled for defining the duties and responsibilities of the Meteorological Committee, it has been thought necessary to adopt a strict rule not to make any money payments for such services, as it would be impossible for the Council to recognise any distinction among the numerous contributors of information of this description to the Office, and as systematic payments for it would discourage spontaneous action, and lead to an expenditure which experience has shown to be uncalled for, and which would certainly amount to a very large sum yearly.

The Council do not question that the appreciation of Dr. Moore's reports by the Registrar-General of Ireland is well deserved, but they submit that there would be manifest objections to their taking on themselves the duty of estimating the pecuniary value of such work, and of accepting an obligation to meet payments for it, when they cannot possibly have any power of controlling it, or of judging of the necessity for providing the returns in question in the actual form given to them or in any other, or whether it be necessary or desirable to obtain them from this particular observer.

If the Council may be permitted to offer an opinion on the subject generally, it would be to the effect that no one but the officer responsible for the preparation of the reports in which these accounts of the weather are embodied, can be a proper judge of their real importance, of the manner in which they should be obtained, or of the form in which they should be published, and that consequently any charge which it may be necessary to incur for procuring them can only be duly controlled by him, and should appear as part of the cost of his office.

I am to add that the Registrar-General of Ireland is regularly furnished from time to time from the Meteorological Office with the ordinary periodical publications relating to the weather, as well as with special returns giving the substance of all available reports received from Ireland, and the Council will be ready to do what is in their power to supply any additional information at their command which may be thought desirable.

I am, &c.
(Signed) ROBERT H. SCOTT,
Secretary.

The Secretary of the Treasury.

EXTRACT from "REPORT of the TREASURY COMMITTEE appointed to inquire into the CONDITIONS and MODE of ADMINISTRATION of the ANNUAL GRANT in aid of METEOROLOGICAL OBSERVATIONS."

With reference to the Scottish Meteorological Society, the representations of which have been specially referred for our consideration, we desire to offer the following remarks:—

It seems essential that any grant of public money for the purposes that have been indicated in our recommendations should be applied under the immediate responsibility of the Council, and that no expenditure should be incurred which those purposes do not absolutely require. There is evidence to show that a large and trustworthy amount of co-operation may be obtained in all parts of the United Kingdom from observers who do not require remuneration for their services, and it seems very important that such co-operation should be fostered to the utmost. Any system of payment for meteorological registers, which was not very strictly limited, would necessarily involve the concession of payments to all observers, and might entail a very large outlay which has hitherto been avoided, and which there is reason to believe is not at present really called for.

We are of opinion, therefore, that only such payments should be made from the grant placed at the disposal of the Meteorological Council to the Scottish Meteorological Society as are necessary for obtaining observations at stations required for the purposes of the Council; for securing the proper inspection of stations, the registers from which are required for the general purposes of the Council; for the needful compilation and check of such registers; and for meeting other charges directly arising from these services, or for special researches conducted by the Society with the approval of the Council, but that no grants should be made to ordinary observers nor for any general purposes of the Society which lie beyond the scope of the operations to be placed under the Council.

Read—The following letter:—

(M.O. 1320.)

Royal Meteorological Society,
30, Great George Street, Westminster, S.W.,
June 18, 1885.

DEAR SIR,

AT the meeting of this Society in June last year a paper was read on the Helm Wind of Cross Fell, Cumberland. The account of this phenomenon excited much interest among the Fellows; and the Council subsequently appointed a Committee to investigate the subject.

This Committee has collected a large amount of information, and has tabulated all the recorded occurrences of the Helm Wind from 1871 to 1884. On examining the Daily Weather Reports it was clearly seen that whenever the Helm Wind was blowing there was an Easterly wind not only in the locality, but generally over the entire country. Further examination showed that although the

wind over the United Kingdom was Easterly when the Helm occurred, yet the Helm by no means occurred whenever the wind was Easterly. Indeed this step in the inquiry has not at all tended to the elucidation of the phenomenon, for it frequently happened that the conditions were, to all appearances, precisely similar when the Helm was on, and yet no such occurrence had been recorded. This may in part be due to the occasional omission to record the Helm, although it cannot possibly be in the main attributable to such an omission; but it points to other conditions being necessary besides the absolute agreement of wind direction and isobaric lines. In order to further investigate the matter and to collect reliable data on the temperature and hygrometric conditions of the immediate district, the Committee has recommended to the Council that a number of observers should be obtained on both sides of the Cross Fell Range and that they should be supplied with dry and wet bulb thermometers and thermometer screens; also that a Richard dry and wet bulb thermograph should be established on the summit of Cross Fell, 2,932 feet above sea level, and, if possible, one on each side of the mountain.

As this project will entail a considerable expenditure, the Council have requested me to bring the matter to the notice of the Meteorological Council, and to ask if they will grant the sum of 75*l.* towards the cost of the outfit of these stations and the first year's work.

Yours, &c.
(Signed) JOHN W. TRIPE,
Council Secretary.

R. H. Scott, Esq., F.R.S, Secretary,
Meteorological Office.

The Secretary was instructed to request the Society to furnish further details of the proposed investigation (P.C. 1300).

Read—Letter 1875 from Professor Grant, stating that some of the thermograph thermometers at Glasgow had been accidently broken. (Minutes, 1884, p. 117.)

Mr. Scott was instructed to supply fresh thermometers, and to make arrangements with Professor Grant as to their safe transport to and erection at Glasgow (P.C. 1296).

Read—A memorandum from Captain Toynbee, reporting that since the last meeting nine logs had been received, six of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. C. Pelham Aldrich.	H.M.S. "Sylvia."	Jan. 20—May 25, 1885.	Surveying on South-east Coast of Africa.	1884, p. 118.
Capt. James Buchan	Barque "Coppename."	Jan. 6—June 21, 1885.	Bahia and home -	1884, p. 82.
Capt. W. C. Crutchley, R.N.R.	H.M.S. "Kaikoura."	March 14—June 20, 1885.	New Zealand and home -	1884, p. 106.
Capt. J. I. Dunbar -	S.S. "Arracan"	March 7—June 9, 1885.	Rangoon and home -	1884, p. 89.
Capt. C. J. Russell -	"Candahar" -	Oct. 4, 1884—June 19, 1885.	Calcutta and home -	1884, p. 49.
Capt. W. H. Trant -	S.S. "Venetian"	Dec. 13, 1884—June 21, 1885.	Boston and home, five voyages.	1884, p. 82.

Mr. Scott was instructed to convey the best thanks of the Council to the observers.

Submitted—The following Report:—

Port Stewart, June 26, 1885.

SIR,

I HAVE the honour to report, for the information of the Meteorological Council, that on June 22nd I inspected Mr. Conroy's, station at No. 40, Clooney Terrace, Londonderry. All particulars will be found on the "Notes of Inspection" enclosed. The station was in very good order.

On June 23 I proceeded to Malin Head, where I found Mr. P. O'D. Farren (who is Lloyd's signalman) in charge of the station. He is 16 or 17 years of age, and showed much intelligence, as well as willingness to learn. His brother, Mr. J. O'D. Farren (who is Lloyd's agent, and is 18 or 19 years of age), acts for him when occasion requires. He showed great intelligence, and was very anxious that the work should be done well. Both complained of the necessity there is for a bedroom in the tower, as it is frequently dangerous to go from the tower to the village (a distance of about two miles) during winter nights, more especially as the wildest part has no road.

I told them that they must apply to Lloyd's, as the Meteorological Office had nothing to do with the accommodation.

I must say, however, that their complaint seems reasonable, as I heard from others in the village that one of them had got a bad fall, and was nearly lost during a stormy night.

Full particulars will be found in the "Inspection Notes" which accompany this Report.

I remain, &c.

(Signed) HENRY TOYNBEE,
Marine Superintendent.

R. H. Scott, Esq.,
Meteorological Office,
116, Victoria Street, London, S.W.

Submitted—The following Report:—

June 25, 1885.

SEAHAM ANEMOMETER.

I WENT yesterday afternoon to Mr. Munro's works and examined the portion of the Seaham anemometer which he has there for repair. It is in a deplorably dirty and rusty state, both from want of cleaning and oil in the working parts, and also from want of paint on the portion exposed to the weather.

The inside of the direction cover is very rusty, and the rollers are clogged with dried oil and rust, cakes of which have formed around their axles and on the bed upon which they run.

The fan axle is rusted almost through, and its bearings are quite worn out, while the worm it carries and the wheel into which the worm gears are so worn away as to allow the cover to be moved while the fans are held; some of the teeth of the worm wheel are broken.

The cups are quite spoiled, and the cross and stays are rusted out.

Two of the friction balls from one of the bearings are lost, and the spindle is so bent and scored as to be useless. Solid iron rods, one of which has been sent to Mr. Munro, seem to have been used, instead of the usual tubes, for connecting the reducing and recording gear.

Many of the above-mentioned parts of the instrument will have to be replaced by new ones.

The recording portion has not been sent, but judging from the other parts it ought to be returned and examined.

I would suggest that if the repair of the instrument is to be proceeded with this should be done; and also that the height of the cabinet from the ground should be sent, in order that tubes may be supplied for making a proper connection between the recording apparatus and the upper part of the instrument.

R. H. CURTIS.

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

Submitted—The following statements of work for June 1885:—

MARINE ROOM.

July 1, 1885.

North Atlantic Weather Charts.

Obtaining lowest barometer daily in depressions during August 1882.
Making additions to isobars for December 1882 and January 1883.
Preparing weather areas and generalized winds for January and February.
Completing first drawing of isobars for May.
Making "tracings" of all data, and drawing air and sea isotherms for June and July.
Copying land isobars, isotherms, and winds.
The female clerks steaming June and July charts, plotting observations for July and August assisting in the copying of land isobars, &c., and preparing "tracings;" also practising the working of the eidographs.

General.

Preparing data to show the number of observations in ocean 10° squares, and charts giving the distribution for each month, to be inserted in the Annual Report.

The Marine Superintendent. (Signed) CHAS. HARDING.

Forwarded for the information of the Council,

(Signed) C. W. BAILLIE,
Navg. Lieut. R.N.

TELEGRAPH (FORECAST and STORM WARNING) BRANCH.

(To 30th June 1885.)

Monthly Weather Report:—
1885, *March.*—Completed.
„ *April.*—In proof.
„ *May.*—Well in hand.

Checking Daily Forecasts.—3.30 p.m. and 8.30 p.m. Well up to date.

Hay Harvest Forecasts, 1885.—System fully organised, and issue of forecasts commenced for six districts.

Weekly Weather Report.—
1884. Appendix II. completed and revised. Preface drafted.
1885. All numbers have appeared to date. Quarterly Summary: Part I. in printer's hands, Part II. almost complete.

Quarterly Weather Report, 1877.—Monthly tables of meteorological elements for all the telegraphic reporting stations for October, November, and December 1877, completed and handed over to Mr. Curtis.

Malin Head.—Special instructions for inspection prepared and handed to Captain Toynbee. Results of inspection received and being dealt with.

Instructions in use of Self-Registering Aneroids at certain telegraphic reporting stations. Rough draft prepared.

The time for summer vacations having now arrived, it is not possible that much more than the ordinary routine work can be attended to for some three or four months.

(Signed) FREDC. GASTER.

July 1, 1885.

PANTAGRAPH ROOM,

Quarterly Weather Report.—Part IV., 1877; Chart plates XVI., XVII., and XVIII. completed.

Observatory Returns.—The calculation of the hourly vapour tension values, and of the daily, five-daily, and monthly means for June 1883, is above one third finished.

Harmonic Analyser.—The examination of the readings of the machine, and the investigation of cases where unusually large differences were observed, has been completed. A note has been prepared for the Annual Report on the work done with the Analyser.

Some special sets of curves have been drawn with General Strachey's developing instrument.

Krakatoa Air Waves.—Most of my own time, and a good deal of Mr. Thompson's, has been occupied in this discussion.

Miscellaneous.—Assistance has been given to the Examination Room as required. One afternoon was spent in examining the Seaham anemometer at Mr. Munro's.

Mr. Call has been away most of the month, through sickness and on vacation.

(Signed) R. H. CURTIS.

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

Reported—That the following cheques had been drawn during the month of June:—

1885.			£	s.	d.	£	s.	d.
June	3rd	Captain H. Toynbee, inspections	-		-	20	0	0
„	6th	For weekly salaries	-		-	16	1	0
„	„	Pall Mall Coal Company, coals	-		-	5	5	0
„	13th	For weekly salaries	-		-	16	1	0
„	„	Anglo-American Telegraph Company, telegrams	-		-	6	2	9
„	„	Royal Meteorological Society, observations	-		-	16	13	4
„	„	Postmaster General, removing wire at Mullaghmore	2	6	7			
„	„	„ „ telegrams	166	2	1			
						168	8	8
„	„	L. P. Casella, rain gauges	24	0	0			
„	„	„ repairing rain gauges, &c.	2	0	0			
						26	0	0
„	20th	For weekly salaries	-		-	16	1	0
„	27th	„ „	-		-	16	1	0
„	30th	R. H. Scott, salary	-		-	66	13	4
„	„	J. S. Harding, junr., salary	27	15	6			
„	„	T. D. Bell, salary	15	0	0			
						42	15	6
„	„	J. E. Cullum, Valencia Observatory	-		-	16	13	4
„	„	J. Sheerman, Harmonic Analysis	-		-	10	0	0
„	„	R. H. Curtis — Discussion, &c. of observations	22	10	0			
„	„	J. A. Curtis — Discussion, &c. of observations	17	10	0			
„	„	T. E. Allen — Discussion, &c. of observations	16	5	0			
„	„	C. H. Thompson — Discussion, &c. of observations	11	13	4			
„	„	S. Call — Discussion, &c. of observations	10	16	8			
„	„	E. G. Aldridge — Discussion, &c. of observations	8	15	0			
„	„	R. G. Canham — Discussion, &c. of observations	6	13	4			
„	„	A. H. Bell — Discussion, &c. of observations	6	13	4			
						100	16	8
		Carried forward	-		-	£543	12	7

1885.			£ s. d.	£ s. d.
		Brought forward -	- -	543 12 7
June 30th	F. Gaster - -	Preparation, &c. of Weather Reports.	30 10 3	
,, ,,	F. J. Brodie - -		21 4 10	
,, ,,	G. G. Francis -		20 7 6	
,, ,,	A. J. Rigby - -		16 8 1	
,, ,,	R. Sargeant - -		13 14 10	
,, ,,	A. R. Simpkins -		9 7 6	
,, ,,	H. J. Stevens - -		8 6 8	
			———	119 19 8
,, ,,	Capt. H. Toynbee -	Discussion, &c. of observations.	33 6 8	
,, ,,	Nav.-Lt. C. W. Baillie, R.N. - -		20 16 8	
,, ,,	R. Strachan - -		27 15 6	
,, ,,	C. Harding - -		22 10 0	
,, ,,	H. Harries - -		14 3 4	
,, ,,	W. Allingham -		14 3 4	
,, ,,	W. G. James - -		10 8 8	
,, ,,	F. T. Bullen - -		8 15 0	
,, ,,	R. F. Wallace -		7 18 4	
			———	159 17 6
,, ,,	G. J. Mayhew, rent - - -		- -	158 15 6
,, ,,	Wightman & Co., printing - -		1 8 0	
,, ,,	,, ,, - -		0 14 0	
			———	2 2 0
,, ,,	Williams & Norgate, books - -		- -	1 17 4
,, ,,	J. S. Harding, senr., pension (Minutes, 1882, p. 43)		-	10 14 1
,, ,,	Kew Committee, special researches, (clouds and electrometer) - -		42 19 3	
,, ,,	,, allowance for quarter, postages, &c. - -		101 8 3	
,, ,,	,, verifications - -		0 7 0	
,, ,,	,, ,, - -		11 0 0	
,, ,,	,, ,, - -		11 11 0	
			———	167 5 6
,, ,,	W. Thomas, care of Scilly anemometer -		1 13 0	
,, ,,	,, Meteorological reports -		4 17 10	
			———	6 10 10
,, ,,	H. Williams, care of bridled anemometer -		2 11 1	
,, ,,	,, ,, Robinson's ,, -		2 11 4	
			———	5 2 5
,, ,,	C. Niven, Aberdeen Observatory -		66 7 10	
,, ,,	J. L. E. Dreyer, Armagh allowance and Farr's account - - -		13 0 6	
,, ,,	W. L. Fox, Falmouth - - -		62 10 2	
,, ,,	C. M. Clouston, Orkney - - -		2 17 0	
,, ,,	S. J. Perry, Stonyhurst - - -		14 0 0	
,, ,,	J. E. Cullum, Valencia - - -		44 16 2	
			———	203 11 8
,, ,,	G. T. Watson, care of Yarmouth anemometer -		3 18 0	
,, ,,	,, Meteorological reports -		4 4 6	
			———	8 2 6
,, ,,	J. O'Driscoll, rent at Valencia - -		- -	25 0 6
		Carried forward -	-	£1,412 12 1

Office

1885.			£	s.	d.	£	s.	d.
		Brought forward -	-		-	1,412	12	1
June 30th		H. Todd, Cambridge - - -	4	11	0			
„	„	H. Mohn, Christiania - - -	5	10	0			
„	„	P. Curnow, Dungeness- - -	4	12	1			
„	„	W. Edmonds, „ - - -	2	12	0			
„	„	W. Brand, Dunrossness -	3	18	6			
„	„	W. Foster, Hawes Junction - -	1	19	3			
„	„	C. Durham, Holyhead - - -	3	18	6			
„	„	G. G. Appleton, Hurst Castle - -	3	18	8			
„	„	J. Fisher, Jersey - - -	4	5	6			
„	„	F. Gaster, London - - -	3	18	0			
„	„	W. Berridge, Loughborough - -	3	5	11			
„	„	Lloyd's, for Malin Head - -	3	5	0			
„	„	K. Kerr, Mullaghmore - -	5	5	0			
„	„	W. D. Penny, Nairn - - -	4	4	6			
„	„	W. Wickham, Oxford - - -	3	12	6			
„	„	R. Budds, Parsonstown - -	3	7	6			
„	„	J. John, Prawle Point - - -	3	5	0			
„	„	S. Blake, St. Ann's Head - -	3	7	2			
„	„	J. B. Smith, Spurn Head - -	3	5	4			
„	„	D. Macdonald, Stornoway - -	5	11	4			
„	„	J. Sinclair, Wick - - -	3	5	0			
„	„	A. Guy, York - - - -	3	18	0			
						84	15	9
„	„	G. M. Whipple, removal of instruments at Falmouth - - - -	-		-	13	13	3
„	„	P. Adie, repairing instruments -	9	12	6			
„	„	„ „ - -	9	2	2			
						18	14	8
„	„	J. Fowler, Cardiff - - -	4	12	3			
„	„	L. Allen, Dundee - - -	3	16	3			
„	„	M. Walker & Son, Glasgow - -	12	0	1			
„	„	Z. Scaping, Hull - - -	2	12	6			
„	„	J. Gill, Liverpool - - -	17	17	0			
„	„	C. H. Permain, Southampton - -	1	12	9			
						42	10	10
„	„	J. H. Woodstock, packing cases -	-		-	3	6	6
„	„	Negretti & Zambra, "A" instruments	76	2	8			
„	„	„ „ "B T" „ -	23	19	6			
„	„	„ „ "C" „ -	2	19	0			
„	„	„ „ "M O" „ -	2	8	0			
						105	9	2
„	„	J. S. Harding, junr., petty cash -	-		-	60	0	0
						£1,741	2	3

116, *Victoria Street, July* 15, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (July 1) were read and confirmed.

Read—The following letter:—

M.O. 1483. Royal Meteorological Society,
DEAR SIR, 30, Great George Street, S.W., July 9, 1885.

I BEG to acknowledge the receipt of your letter of the 2nd instant, addressed to Dr. Tripe, with reference to observations on the Helm Wind, and in reply beg to forward copies of the "Report of the Committee on the Occurrences of the Helm Wind from 1871 to 1884" [not printed here], for the information of the Meteorological Council.

Yours, &c.
(Signed) WILLIAM MARRIOTT,
Assistant Secretary.

R. H. Scott, Esq., F.R.S.,
Secretary, Meteorological Office.

The Secretary was instructed to send the following reply (P. Copy 1400):—

DEAR SIR,

THE Meteorological Council have given careful consideration to the request of the Royal Meteorological Society that a grant of 75*l.* might be made from the funds at the disposal of the Council to aid in the investigation of the phenomenon known as the Helm Wind of Cross Fell, Cumberland, and they regret that they feel unable to comply with the proposal.

The Council have been led to the conclusion that the phenomenon in question is one which, in its general character, is not different from other similar appearances observed on other mountains, though its particular features are no doubt peculiar to the particular locality where it occurs. An inquiry into the special character of the wind which causes or accompanies the phenomenon would no doubt be of considerable scientific interest, and might properly engage the attention of persons interested in the study of meteorology, but it does not appear to the Council to be one of such a nature as would justify their making a grant for carrying it out from the funds placed at their disposal, nor are they satisfied that such observations as those suggested would be likely to throw much additional light on the subject, or lead to a complete or satisfactory solution of the questions that arise in connexion with it. They think that the true nature of the phenomenon and of its peculiar features is not likely to be ascertained except from careful observations by competent observers, of the exact manner of the formation and dispersion of the clouds, and of the accompanying directions and force of the local winds in relation to the local features of the mountains, and if any such observer can be found the Council would be prepared to give assistance in the form of the loan of thermometers or anemometers, if they were required.

(Signed) R. H. SCOTT.

J. W. Tripe, Esq., M.D.

Read—The following letter (Minutes, 1884, p. 105):—

M.O. 1530. Kew Observatory, Richmond, Surrey,
DEAR MR. SCOTT, July 14, 1885.

I BEG to hand you herewith an abstract of the comparative readings of Mr. Galton's anemometer and one Kew standard instrument for the month of July [not printed here]. I regret that the maximum velocity of wind at which we have been able to compare it has only just exceeded 30 miles per hour. We find the hand anemometer indications are generally about 10 per cent. above those of the standard, but we have not sufficient observations to enable us to construct a proper table of corrections.

Yours faithfully,
(Signed) G. M. WHIPPLE.

Mr. Scott was instructed to obtain an estimate for six of these instruments. The scales on the dials not to be engraved till these instruments have been tested at Kew.

Mr. Scott reported that the value of the apparatus, &c. belonging to the Council at the Kew Observatory was 734*l.* 18*s.* 0*d.*, and that the premium for insuring them would be 1*l.* 4*s.* 6*d.*—Sanctioned.

Submitted—The following report on the forecasts for June 1885:—

The letters used have the following signification:—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

JUNE, 1885.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	42	54	48	81
"	b	31	35	33	
"	c	19	4	12	
"	d	8	7	7	
Scotland, E.	a	42	58	50	83
"	b	38	27	33	
"	c	8	4	6	
"	d	12	11	11	
England, N.E.	a	27	77	52	77
"	b	38	12	25	
"	c	27	0	14	
"	d	8	11	9	
England, E.	a	42	77	60	83
"	b	31	15	23	
"	c	19	4	11	
"	d	8	4	6	
Midland Cos.	a	46	65	56	83
"	b	31	23	27	
"	c	15	4	9	
"	d	8	8	8	
England, S.	a	42	81	62	83
"	b	27	15	21	
"	c	19	4	11	
"	d	12	0	6	
Scotland, W.	a	31	54	43	68
"	b	27	23	25	
"	c	19	12	15	
"	d	23	11	17	
England, N.W.	a	31	73	52	79
"	b	42	12	27	
"	c	15	8	12	
"	d	12	7	9	
England, S.W.	a	31	65	48	79
"	b	46	15	31	
"	c	8	8	8	
"	d	15	12	13	
Ireland, N.	a	31	54	43	71
"	b	38	19	28	
"	c	19	12	16	
"	d	12	15	13	
Ireland, S.	a	27	54	41	62
"	b	27	15	21	
"	c	23	19	21	
"	d	23	12	17	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	43	64	54	85
"	b	30	33	31	
"	c	20	3	12	
"	d	7	0	3	
Scotland, E.	a	30	64	47	87
"	b	47	33	40	
"	c	17	0	9	
"	d	6	3	4	
England, N.E.	a	37	70	54	84
"	b	37	24	30	
"	c	23	3	13	
"	d	3	3	3	
England, E.	a	43	70	57	80
"	b	27	20	23	
"	c	23	7	15	
"	d	7	3	5	
Midland Cos.	a	43	57	50	87
"	b	37	37	37	
"	c	13	6	10	
"	d	7	0	3	
England, S.	a	44	73	59	94
"	b	43	27	35	
"	c	10	0	5	
"	d	3	0	1	
Scotland, W.	a	30	60	45	70
"	b	27	23	25	
"	c	30	10	20	
"	d	13	7	10	
England, N.W.	a	33	60	47	82
"	b	47	23	35	
"	c	13	10	11	
"	d	7	7	7	
England, S.W.	a	50	60	55	82
"	b	30	23	27	
"	c	10	10	10	
"	d	10	7	8	
Ireland, N.	a	45	60	53	80
"	b	31	23	27	
"	c	21	10	15	
"	d	3	7	5	
Ireland, S.	a	38	63	51	78
"	b	38	17	27	
"	c	17	10	14	
"	d	7	10	8	

SUMMARY.

British Isles	a	36	65	51	77
"	b	34	19	26	
"	c	17	7	12	
"	d	13	9	11	
British Isles	a	40	64	52	83
"	b	36	26	31	
"	c	18	6	12	
"	d	6	4	5	

SUBMITTED—The following STATEMENT respecting the RECORDS for June 1883, received from the SELF-RECORDING OBSERVATORIES (see Minutes, 21st December 1868 and 20th November 1876).

——	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action - - - - - - -	Direction. Good.	Velocity. Good.	Direction. Good	Velocity. Good	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good	Velocity. Good.	Direction. Good.	Velocity. Good.
Records deficient, due to stoppage of clock -	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ other causes - -	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orientation verified - - - - -	30th	—	30th	—	14th	—	30th	—	15th	—	24th	—	9th	—
No. of errors discovered by subsidiaries -	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ irregular differences	0	1	4	1	3	1	4	0	3	2	2	1	1	0
Result of 40 *Remeasurements* :—														
Greatest difference - - - - -	0·0	2·0	1·0	1·0	0·0	1·0	1·0	1·0	1·0	1·0	0·0	1·0	0·0	1·0
Mean difference irrespective of sign - -	0·0	0·3	0·0	0·2	0·0	0·3	0·0	0·2	0·1	0·4	0·0	0·3	0·0	0·3
Residual difference (— Meteorological Office) -	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	−0·1	−0·1	0·0	0·0	0·0	+0·1
RAIN GAUGE :—														
Action - - - - - - -	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient, due to stoppage of clock -	0		0		0		0		3 hrs.		0		0	
„ „ other causes - -	0		0		C		0		0		0		0	
Errors in tabulation - - - -	0		0		0		0		2		13		0	

BAROGRAPH :—

Action	Good.	Good.	Good.	Good.	Good.	Good.	Good.
Photography	Do.	Indifferent.	Indifferent.	Indifferent.	Do.	Do.	Do.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	†5 hrs.
„ „ failure of light	0	0	0	0	0	*1 hr.	0
„ „ other causes	0	0	0	0	0	0	0
No. of errors discovered—							
In entry of standard	0	2	0	1	5	6	0
„ calculating residual correction	0	2	1	0	2	1	0
„ applying residual correction	0	2	0	9	1	2	0
„ subtraction in subsidiary tables	0	1	3	1	3	1	0
„ tabulation by subsidiaries	0	1	0	0	0	2	0
„ „ irregular differences	0	4	0	2	0	1	0
Result of 40 Remeasurements :—							
Greatest difference	·005	·005	·005	·006	·006	·005	·005
Mean difference irrespective of sign	·002	·002	·002	·002	·002	·002	·002
Residual difference (— Meteorological Office)	+·001	·000	·000	·000	−·001	+·001	·000
Mean monthly difference between simultaneous barograph and barometer readings	·001	·003	·001	·002	·002	·002	·001

THERMOGRAPH :—

Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Do.		Indifferent.		Do.		Do.		Do.		Do.		Indifferent.	
	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ failure of light	0	0	0	0	0	0	0	0	1	1	‖1 hr.	‖1 hr.	**1	0
„ „ imperfectly moistened bulbs	—	0	—	0	—	0	—	0	—	‡14 hrs.	—	¶19 hrs.	—	0
„ „ partially frozen bulbs	—	0	—	0	—	0	—	0	—	0	—	0	—	0
„ „ other causes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of errors discovered in entry of standard	0	0	2	0	0	0	0	1	1	0	1	0	0	0
„ „ by subsidiary measurements	0	0	3	0	1	0	0	0	0	0	0	1	0	2
„ „ of subtraction in do. tables	1	0	0	1	0	6	2	1	7	2	8	4	1	2
„ „ detected under glass scale	0	0	2	0	0	0	0	0	1	1	2	§394	0	0
Result of 40 Remeasurements :—														
Greatest difference	0·2	0·2	0·2	0·3	0·2	0·3	0·3	0·2	0·2	0·2	0·4	0·3	0·3	0·3
Mean difference irrespective of sign	0·1	0·0	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1
Residual difference (— Meteorological Office)	+0·1	0·0	−0·1	−0·1	0·0	0·0	0·0	0·0	+0·1	0·0	−0·1	0·0	−0·1	−0·1
Mean monthly difference between simultaneous thermograph and thermometer readings	0·2	0·2	0·2	0·2	0·1	0·1	0·2	0·3	0·2	0·2	0·1	0·2	0·2	0·3
No. of errors in maxima and minima	0	—	9	—	4	—	1	—	1	—	8	—	0	—

* Standard supplied. Several other hours were interfered with, but their readings have been accepted as approximate. † 2 standards given. ‡ 4 standards given. § Owing to the use of the dry-bulb value.
‖ Standard given. ¶ 10 standards given, but 9 rejected as being out of action. ** Standard given. 6 hourly values in wet marked "approximate."

Submitted—The following statement of accounts for the Quarter ending 30th June 1885 :—

Income.	£ s. d.	£ s. d.
Balance from year 1884-85		1,265 9 8
Proportion of vote for Quarter		3,825 0 0
Repayment of expenses charged under—		
(1.) Incidental expenses	16 2	
(2.) Special researches	7 6 1	
(3.) Observatories and stations	3 15 11	
		11 18 2
Supply of Weather Information :		
D.W. Charts and Forecasts	53 3 11	
6 p.m. Charts	6 5 0	
Information for Press Agencies, &c.	21 8 2	
Telegrams	67 11 6	
Miscellaneous data	2 15 0	
		151 3 7
Sale of Instruments, &c. :		
Mercantile Marine account		37 14 3
Commission charged on work done for Colonies, &c.		8 0 7
		£5,299 6 3

Expenditure.	£ s. d.	£ s. d.
Administration :		
Payment of Council	250 0 0	
Secretary	200 0 0	
Salaries and wages	192 13 6	
Rent, fuel, and lighting	174 4 8	
Furniture and fittings	31 12 10	
Incidental and contingent expenses	79 3 5	
Pensions	10 14 1	
		938 8 6
Special Researches		207 5 1
Land Meteorology :		
Observatories and stations	452 3 8	
Discussion and reduction of observations	330 16 1	
		782 19 9
Weather Information and Forecasts :		
Telegraphic reports and storm warnings	719 10 4	
Preparation and issue of reports and forecasts	398 17 9	
		1,118 8 1
Inspections :		
Salaries and travelling expenses		133 13 3
Ocean Meteorology :		
Discussion and reduction of observations	456 17 6	
Expenses incidental to the supply of instruments :		
Proportion for care and issue of instruments	50 0 0	
Royal Navy	105 10 2	
Mercantile Marine	107 15 5	
Distant island and coast stations	4 11 0	
		724 14 1
Balance		1,393 17 6
		£5,299 6 3

Liabilities.	£ s. d.
To sundry creditors	923 12 5
„ balance	1,393 17 6
	£2,317 9 11

Assets.	£ s. d.
By cash at Bank	1,687 9 2
„ „ at Office	106 9 9
„ „ at Valencia	50 0 0
„ sundry debtors	148 11 0
„ H.M. Exchequer	325 0 0
	£2,317 9 11

Read—A memorandum from Captain Toynbee reporting that since the last meeting 5 logs had been received, 2 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. Joseph Maxwell	"Oamaru" -	Aug. 19, 1884—July 6, 1885.	New Zealand and home.	——
Capt. H. Parsell. Log kept by Mr. R. Ward, 3rd Officer.	S.S. "Adriatic"	Jan. 17—June 13, 1885.	New York, and home, five voyages.	1884, p. 112.

Mr. Scott was instructed to present the Charts (O. 27) to Captain Maxwell and to convey the best thanks of the Council to Captain Parsell.

Mr. Scott reported that a meeting of the International Meteorological Committee was to be held in Paris at the beginning of September, and that he had to attend it as its secretary.

Submitted—The following report:—

SIR, Meteorological Office, June 30, 1885.

I HAVE the honour to report, for the information of the Council, on the work which has been done for the quarter ending 30th June 1885.

Additions have been made to the Pressure Charts from the remark books kept by officers of Her Majesty's ships; 260 of these books having been examined during the past quarter, making a total of 730 which have been dealt with.

Extracts from the published records of the old voyagers have also been made and plotted on the charts where required, a distinguishing mark being placed against them (*vide* Minutes, 1884, p. 82). Modifications have been made in the isobars where they have been affected by the introduction of additional data.

Two small charts have been drawn, showing the barometrical ranges over the Atlantic, Pacific, and Indian Oceans for the months of February and August.

I have been absent from the Office for 21 days summer vacation, and since the 8th of June I have discharged the duties of Marine Superintendent.

I am, &c.
(Signed) C. W. BAILLIE.

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

116, *Victoria Street, July* 29, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

The Secretary was in attendance.

The Minutes of the last meeting (July 15) were read and confirmed.

Read—A letter from Mr. Whipple (M.O. 1632) stating that the observations with the cloud camera were in progress as directed (Minutes, p. 19).

With reference to the rain band observations, Professor Stokes reported that since the date of the resolution (Minutes, 1884, p. 79) he had been in the constant habit of observing the spectrum of the sky with a view to the rain band, using a small direct-vision spectroscope which he generally carried about with him. As regards the appearance of a darkening on the red side of the line D, so much depends on the intensity of the light to be observed, and on the width of the slit employed, and so unsatisfactory is a comparison of what the observer actually sees with his memory of what he had seen on other occasions, that he doubted whether anything could be made of it, unless perhaps by an amateur who was free to devote much of his attention to it. Under these circumstances he was unwilling to incur expense in ordering apparatus unless again requested by the Council to do so.

Professor Stokes also explained, with reference to the resolution (Minutes, 1882, p. 31), the plan he proposed for determining the constant of the bridled anemometer, that is, the ratio of the moment of the pressure on the cups to the moment of the pressure on a pressure plate acting at a known leverage.—He was authorised by the Council to expend a sum not exceeding 15*l.* on apparatus for the determination of the constant.

Read—A memorandum from Captain Toynbee reporting that since the last meeting 5 logs had been received, 4 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last Mention on Minutes.
D. W. Barker, Esq., F.R. Met. Soc., (Chief Officer).	S.S. "International."	Mar. 18—July 15, 1885.	Suakim and home -	1884, p. 95.
Capt. W. R. Lugar, log kept by Mr. John Bevan, Navigating Officer.	S.S. "Mackay Bennett."	Feb. 17—June 17, 1885.	London to Halifax -	—
Capt. A. M'Dougall	S.S "Chittagong."	Mar. 31—July 27, 1885.	Suakim and home -	1884, p. 106.
Capt. H. Walker -	R.M.S. "Cephalonia."	Jan. 22—July 13, 1885.	Boston and home, five voyages.	1884, p. 95.

Mr. Scott was instructed to present the Charts (O. 27) to Captain Lugar, and to convey the best thanks of the Council to the other observers.

Mr. Scott reported that Miss M. E. Anderson had requested leave of absence for three months without pay, and that the state of the Atlantic work was such that she could be spared for that time.—Permission granted.

Reported—That the following cheques had been drawn during the month of July:—

			£	s.	d.	£	s.	d.
July	4th	For weekly salaries - - -	-		-	16	1	0
„	11th	„ „ „ - - -	-		-	16	1	0
„	15th	Gas Light and Coke Co., gas - -	3	10	3			
„	„	G. A. Gillett, wood, &c. - - -	1	4	5			
						4	14	8
„	„	Bond & Son, furniture and repairs -	23	10	10			
„	„	E. Higgs „ „ -	8	2	0			
						31	12	10
„	„	Anglo-American Telegraph Co., telegrams	8	1	6			
„	„	A Légé & Co., alterations to integrating machine - - - -	19	10	0			
						27	11	6
„	„	F. Hatchett, compo-litho plates - -	1	2	0			
„	„	Post Office, telegrams - - -	191	10	6			
						192	12	6
„	„	R. Met. Soc., inspections - -	25	0	0			
„	„	„ „ observations - -	19	3	4			
						44	3	4
„	„	R. Riviere & Son, labels for charts -	-		-	2	5	0
„	„	J. J. Hicks, glass pens - - -	4	9	0			
„	„	„ „ rain-gauge glasses - -	15	0	0			
						19	9	0
„	„	T. De la Rue & Co., sunshine cards -	-		-	3	18	3
„	18th	Weekly salaries - - - -	-		-	16	1	0
„	25th	„ „ - - -	-		-	16	1	0
						£390	11	1

Office

116, *Victoria Street, October* 21, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

The Secretary was in attendance.

The Minutes of the last meeting (July 29) were read and confirmed.

Mr. Scott reported (Minutes, p. 39) that he attended the meeting of the International Meteorological Committee in Paris, September 1–8, and submitted the following report:—

This Committee held its third meeting in Paris at the Ministry of Public Instruction on September 1 to 8. The meeting was attended by the President, Professor Wild (Russia); the secretary, Mr. R. H. Scott; Professors Buys Ballot (Holland); Hann (Austria); Mascart (France); Mohn (Norway); Dr. Neumayer (Germany); and Professor Tacchini (Italy). M. de Brito Capello (Portugal), the only remaining member, was unfortunately unable to be present.

In addition certain gentlemen were present by invitation at some of the meetings; among these we may mention Brigadier-General Hazen (Chief Signal Officer, U.S.A.), Professor Hildebrandsson (Upsala), and M. Léon Teisserenc de Bort.

The following is a brief notice of the most important subjects discussed, with the action taken on each:—

A valuable report on cirrus observations by the Committee appointed at Copenhagen (1882), MM. Capello, Hildebrandsson, and Ley, was submitted, and will be printed.

The subject of Atlantic telegrams was discussed with General Hazen. It was decided to maintain the present system of reports from ships' logs, which has been carried on since Christmas by the Meteorological Offices of France and this country, and to endeavour to improve it.

At the same time a proposal made by M. L. Teisserenc de Bort for the telegraphic transmission of a daily résumé of the weather in the New England States was considered. General Hazen expressed his perfect readiness to furnish such reports, and it was resolved to procure such telegrams, provided the cost of the service could be guaranteed by the European offices which would participate in it.

A wish was expressed that barometrical observations should be corrected for the force of gravity at latitude 45°.

A letter from General Hazen respecting the reduction of barometer readings at sea-level, which has been lately circulated, was considered, and two memoranda on the subject from Hamburg and St. Petersburg respectively were handed in, and will be printed.

It was considered desirable, as absolute synchronism in weather observations appears to be unattainable in Europe, that the same hours of local time should be adopted in each country (which would mean a change from 8 a.m. to 7 a.m. in this country).

It was decided that such of the International Reduction Tables (proposed by the Committee at its meeting at Berne in 1880) as did not involve any question which is still in an undecided state (such as, *e.g.*, hygrometrical tables, or tables of sea-level reduction) should be published.

It was decided to recommend that the next Congress should not take place till 1889, and Professor Mascart stated that probably the French Government would propose that it should be held in Paris.

It was resolved—That the correction for the force of gravity in latitude 45° should not be introduced into the charts of barometrical pressure in preparation by Mr. Baillie (Minutes, 1882, p. 56), but that a small table showing the amount of the correction should be printed on each chart.

Read—The following memorandum:—

SIR, Meteorological Office, October 20, 1885.

I HAVE the honour to report, for the information of the Council, on the work of the Marine Branch during the vacation.

Finding that it would be requisite to take up fresh work in the Marine Room before the next meeting of the Council, I laid before the Chairman the following subjects, which I thought the Council might consider of sufficient importance to be dealt with:—

(*a.*) Gales on various coasts of the British Islands at the different seasons. (This was suggested by a letter from Captain Wharton asking where such data could be found.)

(*b.*) Meteorology of the Red Sea and Suez Canal, with the route through the Mediterranean from Gibraltar to Port Said.

(*c.*) Meteorology of the Southern Indian Ocean extending from the Equator as far south as ships go, and from our work off South Africa to Sydney, New South Wales.

(*d.*) Winds and currents of the world.

(*e.*) More North Atlantic work, issuing forms again, but slightly modified to meet the experience we have gained, and to be dealt with much more rapidly than the work now in hand, so that the history of each month's weather might be published shortly after date.

The Chairman instructed me to commence extracting the data of the Red Sea, and for some time a clerk has been employed on the observations in that sea for the month of January.

Appended is Mr. C. Harding's report of the state of the North Atlantic work now in hand. The advantage to which he alludes is, that by not preparing all the charts for eidographing before taking up new work, he is able to provide suitable work for the whole staff.

I am, &c.
(Signed) HENRY TOYNBEE,
Marine Superintendent.

R. H. Scott, Esq., F.R.S.,
Secretary, Meteorological Office.

SIR, October 20, 1885.

THE following is a statement of the present stage of the North Atlantic charts for the 13 months August 1st, 1882, to August 31st, 1883.

All the observations are plotted for the 13 months, and the isobars and isotherms are drawn, except for the last half of August 1883. The charts are prepared for the generalised winds and weather to the end of February 1883, and the values of the lowest barometers, occurring in the several depressions, have been entered for the three months ending October 1882.

In addition to the above work, the charts undergo a thorough and systematic examination prior to being taken up for reduction. This, and the other work mentioned as necessary to complete the charts, can be advanced (chiefly by one person) as quickly as they are required for reduction, and it is a distinct advantage to the arrangements of the Branch that this work should not be completed offhand.

The final reduction of the charts for publication is now well commenced.

It is scarcely possible to employ the whole of our staff on the further stages of our North Atlantic work, so that two or three will be available for the discussion of the Red Sea data, or other work decided on by the Council.

I am, &c.
(Signed) CHAS. HARDING.

The Marine Superintendent.

Submitted—The following letter respecting the instruments at Glasgow Observatory (see Minutes, p. 29) :—

(M.O. 1721.)

DEAR SIR, Park Place, Elie, Fife, August 7, 1885.

THE Town Council of Glasgow have unanimously voted a hundred pounds yearly towards conducting the meteorological and chronometric work of Glasgow Observatory.

What the Clyde Trust may give will, I understand, be given solely for time purposes.

I have been induced, by the support of the Town Council, to decide upon continuing the meteorological operations with the self-recording instruments, even if I should not in the meantime be able to accomplish the tabulation of the results.

I shall be much obliged if the Council will kindly give instructions to have the thermograph repaired.

Yours truly,
(Signed) R. GRANT.

Robert H. Scott, Esq.

Mr. Scott reported that Professor Grant had made arrangements with Mr. Whipple for the conveyance and erection of the thermometers (Letter M.O. 1760), and that Mr. Whipple had been instructed accordingly, and directed to look generally into the state of the instruments at Glasgow Observatory (Letter P.C. 1612).

Submitted—A correspondence with Mr. Buchan and others respecting the maintenance of the anemograph, &c. in the Orkney Islands (Minutes, p. 27). Mr. Buchan (Letter 2021) recommends the appointment of Mr. Fortescue, of Orphir, inasmuch as Dr. Clouston's successor finds himself unable to continue the work.

Mr. Scott was authorised to inform Mr. Buchan (P.C. 2120) that the Council agree to the appointment of Mr. Fortescue, and to make the necessary arrangements

Mr. Scott reported that he had received the following report from Mr. Ley, on the relative advantages of a site for an anemograph on the coast of Durham or Northumberland, the instrument which has been at Seaham Harbour for the last 13 years being worn out :—

(M.O. 2177.)

DEAR SIR, October 12, 1885.

ON the 9th and 10th instant I visited Seaham, Sunderland, Shields, and the neighbourhood, in accordance with your instructions, with the purpose of examining available sites for the anemometer formerly at Seaham.

Some years ago I suggested to you the park at Sunderland as a site preferable to the shed at Seaham. The head of the Londonderry offices strongly requests that the site at Sunderland should be chosen, and I am informed that the Sunderland authorities would gladly offer every facility.

But the exposure at Sunderland cannot be compared to that which I am finally about to recommend; and the summer-house in the highest part of the Sunderland grounds is in reality the ornament of the ventilating shaft of a tunnel.

At Shields and in its neighbourhood I can find only three sites at all eligible. The Dockwray Square lighthouse has a moderately good exposure. The summit of the building is 155 feet above mean sea-level. The anemometer box would be 15 feet below this. The buildings in the square, though of less altitude, might probably affect the instrument. A still worse effect would be produced by the higher land (*at present* unoccupied by houses) on the north-west. But the consideration of this site may perhaps be dismissed when it is mentioned that Mr. Spence, one of the Town Council, informed me that that body "will probably before long remove the lighthouse to a position nearer to the edge of the water." The Town Council, it should be observed, are both ready and anxious to have the anemometer at the lighthouse.

The police station, between Dockwray Square and Tynemouth, has a moderately good exposure, and the roof appears as regards structure very suitable, but the elevation above the surrounding buildings is not sufficient to justify a recommendation of this site. The authorities at North Shields would, I understand, be glad to have the instrument at this locality, if the Dockwray Square light be rejected.

But, for a really *satisfactory* exposure I would recommend Tynemouth lighthouse, for the adoption of which site the Trinity Board would probably give facilities. The anemometer case would here stand 159 feet above the sea, and the cups, perpendicularly above it, would have to be 20 feet higher (or even more, unless the large brass vane now on the cupola be somewhat lowered. The height need not be quite so great if the present vane can be *removed*). I could only, it should be said, determine these heights approximately. It was difficult on the afternoon of the 10th to prevent being blown off the top of the lighthouse, and I considered the wind-force to be two figures (estimated) above that which I experienced on the Dockwray Square lighthouse, the difference being due to the difference of exposure all round, but especially on the north-west.

The clock work of the anemometer, now at Seaham, will be sent to any address which you may give.

Yours, &c.

The Secretary, Meteorological Office. (Signed) W. Clement Ley.

Submitted—The following:—

Report of the Inspection of the Irish and Welsh Stations.

I have the honour to report that I have completed the inspection of the Irish and Welsh stations, with the following exceptions:—*Telegraphic stations*—Roche's Point, Donaghadee, and Malin Head (the last visited by Captain Toynbee in July). *Stations of the Second Order*—St. David's, Armagh, and Londonderry (Captain Toynbee), and *Weekly Weather Report Station* Foynes; the last-named being omitted owing to inconvenience in the train arrangements.

Telegraphic Stations.

St. Ann's Head, September 30.—The only point calling for remark is the appointment of a new observer, J. F. Spicer, in place of Baker promoted to another lighthouse.

Parsonstown, October 2.—Here also there is a new assistant observer, W. Harding, junior. A slight change was required here, the sunshine recorder being somewhat shaded on summer evenings by a tree. It was removed by me a few feet southwards.

Valencia, October 7.—The station was as usual in good order. Some details as to the observatory will be found below.

Mullaghmore, October 12.—The instruments here have been removed to a fresh site. The exposure does not differ appreciably from that previously existing. The thermometer screen and rain-gauge are erected in a small enclosure surrounded by a stone wall 3 feet high.

Belmullet, October 14.—I find this station in a much better condition than previously. The wind reports are, however, not quite satisfactory as yet. The vane has been supplied, but has not yet been erected, as the telegraph workmen have not been in the town lately. The coastguard render material assistance to Miss Tolan in reporting.

Holyhead, October 19.—The new observer, Captain Richards, seems very capable. The instruments are in good order.

Stations of the Second Order.

Parsonstown, October 2.—See above.

Dublin, Fitz William Square, October 9.—The rain-gauge and thermometers have been raised on a mound 5 feet high, which raises them nearly on a level with the top of the garden wall.

Dublin, Glasnevin, October 9.—The station is in good order. It is proposed to move the thermometers, &c. a little further from the conservatory. They are very conspicuous, and are much interfered with by visitors, three grass minimum thermometers having been stolen or broken.

Dublin, Mountjoy, October 9.—The only matter calling for remark is that I discovered that the sunshine recorder was not level. This was suspected by the observer, but the fact had not been proved. The defect has existed for the last two years, and has affected the indications close to the summer solstice. It is now corrected.

Colebrooke, October 10.—The question about the level of this station has apparently been set at rest by the running of a set of levels from the Ordnance B.M. to the site. The level shown on the map is apparently 31 feet too low.

Markree, October 13.—This station calls for no remark. Dr. Marth has at last succeeded in finding an assistant observer, whom he is training.

Weekly Weather Report Stations.

Llandovery, September 29.—The thermometers have now been removed to the garden, and erected in a screen, which only requires a slight change to be satisfactory. This will be carried out.

Waterford, October 1.—The station calls for no remark.

Kilkenny Castle, October 1.—The thermometer screens and rain-gauge have been moved to the lawn, and are well exposed, excepting that they are rather near trees on the north.

Killarney, October 6.—This station is considered to give exceptionally low minimum readings. I believe that this arises from its being situated near the foot of a slope, down which the cold air descends.

Currygrane, Edgeworthstown.—This is a new station. Mr. J. M. Wilson has organised it. The thermometers are in a Stevenson screen, fairly well exposed on a lawn. There are no trees very close, and none to the southward.

Observatory.

Valencia, October 7.—At this observatory I find, as usual, some repairs wanting. The stove for distilling water is out of order, and requires to be reset. The sea wall has also suffered from storms and requires repair. I have directed Mr. Cullum to send in estimates for both of these works.

October 21, 1885. Robert H. Scott.

The following table shows the results of thermometric comparisons:—

Stations.	Dry Bulb.	Wet Bulb.	Max.	Min.	Spare Ther.	Remarks.
Stations of the Second Order.						
Birr Castle	−0·3	0·0	−0·3	−0·1	—	
Colebrooke	−0·6	−0·4	−0·4	−0·1	—	
Dublin (City)	−0·5	−0·5	−0·8	+0·2	−0·3	Grass min. not graduated on stem.
Dublin (Phœnix Park O.S.O.).	−0·3	−0·5	−0·3	+0·1	—	Grass min. −0·7.
Glasnevin	0·0	−0·3	−0·3	+1·1	—	Grass min. +1·9. New instrument by Yeates.
Markree Castle	0·0	+0·1	+0·1	+0·6	—	
Telegraphic Reporting Stations.						
Mullaghmore	+0·1	+0·3	+0·4	+0·2	—	Instruments shifted since last inspection.
Belmullet	+0·2	+0·2	0·0	+0·2	—	
Parsonstown	+0·3	0·0	+0·2	+0·1	—	
Valencia	+0·2	+0·2	+1·0	−0·7	+0·4	Spirit in min. found detached.
St. Ann's Head	+0·3	+0·3	−0·3	+0·3	+0·3	
Holyhead	+0·6	+0·3	+0·3	+0·5	−0·3	Spare ther. substituted for dry bulb.
Weekly Weather Report Stations.						
Edgeworthstown	+0·6	+0·7	+0·8	+0·1	−0·3*	*Grass min. ther.
Waterford	+0·2	+0·2	+0·6	−0·4	−1·4*	* Do. do.
Kilkenny	+0·5	0·0	−0·3	0·0	—	Screen shifted since last inspection.
Killarney	+0·5	+0·6	+0·4	+0·3	—	

Submitted—The following report:—

REPORT to the METEOROLOGICAL OFFICE on the INSPECTION of AGENTS' STATIONS.

I HAVE the honour to report, for the information of the Meteorological Council, that on July 8th I inspected the Greenock branch of the Glasgow agency for supplying ships with instruments, &c.

This agency has recently changed hands, in so far as the old firm of D. McGregor & Co. has dissolved partnership, and the Council have appointed the new firm which retains that name, as their agent. I found that in both Greenock and Glasgow this firm has taken new buildings, which were in progress of being fitted.

Mr. Alexander Glendenning, Messrs. D. McGregor's representative at Greenock, is accustomed to the work of interviewing captains and getting them to observe for the Office. I learnt from him that Captains Buchan and W. Scott, who are excellent observers, were obtained through him. He has not been in the habit of keeping a set of instruments at Greenock for the inspection of captains and officers, as nearly all ships which discharge at Greenock load at Glasgow. I also learnt this fact from other persons, so that I do not think it necessary to make any change in the working of the Greenock branch. Mr. Glendenning showed me a frame containing the two latest Daily Weather Reports, which was about to be placed in a very suitable position for inspection by the seamen of the port of Greenock.

From Greenock I proceeded to Glasgow, where I found Messrs. D. McGregor's business premises in a state of less progress than were those at Greenock. Mr. McGregor was in attendance; he showed me a very suitable room which he was fitting for the reception of our instruments, and also a frame similar to the one at Greenock for exhibiting the two latest Daily Weather Reports.

There is a Navigation School in connexion with Mr. McGregor's firm at Glasgow, and the work of the agency has been made over to Captain Barnet, who is in charge of that school. I went very carefully through the work with Captain Barnet, supposing him to be a captain I was about to supply; he took careful notes, and showed an intelligent interest in the work. I also explained to him the fittings required for taking the specific gravity of salt and fresh water, and the most suitable vessel for comparing a set of six thermometers with his standard in water. All these fittings Mr. McGregor promised to supply. Since my return to Office, Captain Barnet has written to say that the room is fitted.

On the 9th I proceeded to Aberdeen, and went through the whole work of supply with Mr. Jones, who is head master of the Navigation School, he taking notes when he found an important difference from his own method. I sanctioned Mr. Jones getting a stand for a bucket of water, in which he explains the use of the hydrometer, and also a suitable vessel in which to compare thermometers in water. He complained of the difficulty he had had when comparing thermometers in air. Most of the ships supplied by Aberdeen are whalers belonging to Peterhead, and Mr. Jones carries the instruments to and fro himself.

On the 11th I went to Dundee and found that the Trinity Board have granted Mr. Allen a very suitable room for our work. As in the previous cases I went through the whole operation of explaining the use of the instruments and the keeping of a log, Mr. Allen took notes when requisite and seemed thoroughly to understand the work. I sanctioned his getting a stand for a bucket of water, and a vessel suitable for testing a set of seven instruments in water. Mr. Allen asked for a copy of Official No. 27. Having been newly appointed, he did not get our earlier publications. I have sent him a copy, with Mr. Scott's sanction.

On the 27th, I proceeded to Liverpool and went through the work with Mr. Gill, who is Navigation master there, and found his method very good. Mr. Gill has always used water for the purpose of comparing thermometers, having received from Mr. Hartnup a circular metal frame on which he can hang seven thermometers, *i.e.*, the ordinary set of six supplied to a ship and his own standard. This frame he lowers into a circular glass vessel of about 10 inches in diameter and 18 inches high which is partially filled with water.

On Tuesday July 28th I visited Hull, and went through the work of the agency with Mr Scaping, who is head master of a school for training more than 100 boys for the sea, and also prepares officers and captains for their examinations. I found that he is limited for space, so that he cannot exhibit a set of instruments so thoroughly as could be wished, though his method of explaining them is very good. Mr. Scaping's schools are under the Trinity House of Hull, and I have asked him to use his influence to get more space for the work.

As Mr. Scaping is training so many boys for the sea, as well as preparing officers for their examination, I think he might get more observers for the Office. He seems to have given too much weight to the rule which states that the fees for the supply or receipt of instruments will be deducted from the agent's account if it is found that sufficient care has not been taken in preparing the captain to undertake the work. I explained to him the cause for the adoption of this rule, which was not likely to be applied in his case, and hope the result will be more work by him.

Mr. Scaping quite realized the advantage of testing thermometers in water. I sanctioned his getting a vessel for the purpose.

(Signed) HENRY TOYNBEE,
Marine Superintendent.

August 4th, 1885.

P.S.—Mr. Scott visited Cardiff on his way to Ireland, but unfortunately Captain Fowler was away for his health, and nobody was there who could act for him. Mr. Scott put the set of instruments in order and left a letter for Captain Fowler. I have written to Captain Fowler asking him to call in at this Office when he comes to London, but have not yet seen him.

October 20th, 1885. H. T.

SIR, Meteorological Office, September 30, 1885.

I HAVE the honour to report, for the information of the Council, on the work which has been done for the quarter ending 30th September 1885.

Additions have been made to the pressure charts from the remark books kept by the officers of Her Majesty's ships; 147 of these books have been examined during the past quarter, which brings the total number which has been dealt with up to 877, extending over a period of 18 years, viz., from 1867 to 1884 inclusive.

Two small charts have been drawn, showing the barometrical ranges and isobars over the Atlantic, Pacific, and Indian Oceans for the month of May.

I regret to say that I was absent from the Office through illness during the month of September.

I am, &c.
(Signed) C. W. BAILLIE,
Navigating Lieutenant.

The Marine Superintendent.

Read—A memorandum from Captain Toynbee reporting that since the last meeting 52 logs had been received, 37 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. B. J. Barlow, R.N.R.	S.S. "Tainui"	June 20—Oct. 2, 1885.	Plymouth, New Zealand, and home.	1883, p. 90.
Capt. Geo. Burton	S.S. "British Crown."	April 16—Aug. 9, 1885.	Philadelphia, three voyages.	1885, p. 10.
Capt. A. Campbell	S.S. "Circassia"	April 18—Sept. 29, 1885.	Moville to New York, five voyages.	1885, p. 10.
Capt. James Clarke, R.N.R.	S.S. "Olbers"	Feb. 26—Aug. 12, 1885.	Rio Janeiro, New York, two voyages.	1884, p. 112.
Capt. G. Denham	S.S. "Ocean King."	April 30—Sept. 2, 1885.	London to Montreal and „ Quebec home.	1884, p. 118.
Capt. R. A. Donaldson.	S.S. "Glenavon"	March 28—Aug. 29, 1885.	London, China, Japan, New York, and home.	1884, p. 113.
Capt. Wm. Ellery	"Majestic"	Dec. 26, 1884—Aug. 3, 1885.	Liverpool, Calcutta, and home.	1883, p. 75.
Capt. Thomas England.	Barque "Jane"	April 16—Oct. 5, 1885.	England to N. America, two voyages.	1884, p. 118.
Capt. W. V. Graham	"Bowfell"	Aug. 5, 1884—July 22, 1885.	Manila and home	1884, p. 8.
Capt. David Gray	S.S. "Eclipse"	March 12—Aug. 16, 1885.	Greenland whaling	1884, p. 49.
Capt. C. Grey, R.N.R.	"MacMillan"	Sept. 18, 1884—Jan. 23, 1885.	Middlesborough to Calcutta.	1883, p. 54.
Capt. E. Halley	"City of Madras"	Sept. 20, 1884—Aug. 9, 1885.	Liverpool, San Francisco, Calcutta, and home.	1884, p. 49.
Capt. J. P. Holdich, R.N.R.	"British Envoy"	Oct. 10, 1884—Sept. 22, 1885.	San Francisco and home	1884, p. 49.
Capt. R. F. Hoskyn, R.N., Lieut. J. H. E. East, R.N., and Sub-Lieut. G. A. Heyman, R.N.	H.M.S. "Myrmidon."	Nov. 1, 1884—July 5, 1885.	Surveying in Red Sea, Passage to Singapore.	1883, p. 99. Lieut. East, 1884, p. 78. Sub-Lieut. Heyman.
Capt. W. P. Hughes	"Laomene"	Oct. 4, 1884—Aug. 9, 1885.	Liverpool, Rangoon, and home.	1884, p. 43.
Capt. A. W. Jeffery, F.R.Met.Soc.	S.S. "Teniers"	Oct. 4, 1884—March 26, 1885.	River Plate and home, two voyages.	1884, p. 49.
Capt. W. R. Lugar	S.S. "Mackay Bennett."	June 18—Sept. 16, 1885.	London, Halifax, and home.	1885, p. 40.

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. J. F. L. P. Maclear, R.N., Lieut. W. V. Howard, R.N., and Sub-Lieut. W. O. Lyne, R.N.	H.M.S. "Flying Fish."	Dec. 5, 1884—April 7, 1885.	Surveying in China Sea	Capt. Maclear and Lieut. Howard, 1884, p. 100. Lieut. Lyne, —
Capt. H. Manning	S.S. "Seine"	July 3—Sept. 16, 1885.	London, Zanzibar, and home.	1884, p. 49.
Capt. J. Metcalfe	S.S. "Oceanic"	Feb. 9, 1884—Feb. 2, 1885.	San Francisco to Japan, China, and back.	1884, p. 8.
Capt. P. Moignard	Barque "Allonby"	July 1, 1884—Sept. 20, 1885.	Liverpool, Sydney, San Francisco, and home.	—
Capt. F. Norman	"Pole Star"	Oct. 10, 1884—July 31, 1885.	Callao and home	1884, p. 49.
Capt. G. F. Parson	"Earnock"	Oct. 21, 1884—Aug. 8, 1885.	Launceston and home	1884, p. 49.
Capt. Thos. Potter	S.S. "Durham"	May 22—Sept. 14, 1885.	Tyne, Cronstadt, Cardiff, Mediterranean, &c.	1884, p. 104.
Capt. J. C. Prout	"Cape St. Vincent."	Oct. 1, 1884—Aug. 14, 1885.	Cardiff, Java, and home	1884, p. 49.
Capt. D. W. A. Quaile.	"Orissa"	May 10, 1884—July 9, 1885.	Penarth, Java, and home	—
Capt. W. Randall	"Dynomene"	May 27—Sept. 25, 1885.	Calcutta to London	1884, p. 49.
Capt. W. Sangster	S.S. "Dracona"	Jan. 28—June 26, 1885.	India, Bremerhaven, Montreal, and home.	1885, p. 10.
Capt. A. H. Sargent	Barque "Glenlora."	Nov. 4, 1884—Aug. 9, 1885.	Auckland and home	—
Staff-Comr. W. M. Savage, R.N.	Sch. "Richmond."	Feb. 4—June 7, 1885.	At the Bahamas	1884, p. 113.
Capt. G. Scott	"Iolanthe"	Dec. 25, 1884—April 27, 1885.	New York to Shanghai	—
Capt. W. Scott	Barque "Commewyne."	March 1—July 31, 1885.	Greenock, Surinam, and home.	1884, p. 106.
Capt. Alex. Simpson	S.S. "Traveller"	March 30—Aug. 10, 1885.	Copenhagen, Ivigtut, Dantzig, Dunkirk, and home.	1884, p. 106.
Capt. W. Spratly	S.S. "Mozart"	Feb. 14—Aug. 27, 1885.	Liverpool to Monte Video „ Rio Janeiro	1884, p. 112.
Capt. the Hon. Foley C. P. Vereker, R.N. Lieut. A. Balfour, R.N.	H.M.S. "Rambler."	Jan. 3—April 30, 1885.	Plymouth to Diego Garcia	1884, p. 36.
Capt. N. J. Wheaton	Barque "Eliza"	Nov. 13, 1884—Aug. 14, 1885.	Rio Grande do Sul, West Indies, Nantes, Swansea, Madeira, and home.	1884, p. 49.
Capt. W. Wilson	Barque "Horsa"	Sept. 4, 1884—July 30, 1885.	Ports in Java and home	1884, p. 50.

Mr. Scott was instructed to present the Charts (O. 27) to Captains Moignard, Quaile, G. Scott, Sub-Lieut. Heyman, Lieut. Lyne, (O. 32) to Captain Sargent, and convey the best thanks of the Council to the other observers.

Mr. Scott submitted a correspondence which had taken place with the Post Office, with the view of the adoption by this Office of the reduced rates for inland telegrams, instead of press rates, for the reports to this Office. He reported that the ordinary inland rate had now been adopted, and that it was estimated that the Office should thereby effect an annual saving of nearly 500*l*. At the suggestion of the Post Office the registered telegraphic address "Weather, London," had been adopted, subject to the approval of the Council, as this abbreviated style will effect a considerable saving. The Post Office charge for registration is 1*l*. 1*s*. 0*d*. per annum.—Action approved.

Submitted—The following reports on the forecasts for the months of **July**, August, and September 1885:—

The letters used have the following signification:—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

JULY.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	48	55	52	81
,,	b	33	26	29	
,,	c	19	4	12	
,,	d	0	15	7	
Scotland, E.	a	59	63	61	91
,,	b	33	26	30	
,,	c	8	0	4	
,,	d	0	11	5	
England, N.E.	a	63	56	60	87
,,	b	33	22	27	
,,	c	4	7	6	
,,	d	0	15	7	
England, E.	a	41	70	56	87
,,	b	41	22	31	
,,	c	15	0	8	
,,	d	3	8	5	
Midland Cos.	a	56	74	65	89
,,	b	33	15	24	
,,	c	11	7	9	
,,	d	0	4	2	
England, S.	a	74	63	69	91
,,	b	19	26	22	
,,	c	7	0	4	
,,	d	0	11	5	
Scotland, W.	a	52	52	52	80
,,	b	33	22	28	
,,	c	8	15	11	
,,	d	7	11	9	
England, N.W.	a	67	52	60	82
,,	b	22	22	22	
,,	c	11	11	11	
,,	d	0	15	7	
England, S.W.	a	52	67	60	86
,,	b	41	11	26	
,,	c	7	7	7	
,,	d	0	15	7	
Ireland, N.	a	30	48	39	80
,,	b	48	33	41	
,,	c	22	11	16	
,,	d	0	8	4	
Ireland, S.	a	45	48	47	85
,,	b	44	33	38	
,,	c	11	4	8	
,,	d	0	15	7	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	55	45	50	84
,,	b	26	42	34	
,,	c	16	3	10	
,,	d	3	10	6	
Scotland, E.	a	48	68	58	88
,,	b	39	20	30	
,,	c	13	6	9	
,,	d	0	6	3	
England, N.E.	a	45	58	52	94
,,	b	55	29	42	
,,	c	0	10	5	
,,	d	0	3	1	
England, E.	a	52	77	65	92
,,	b	32	23	27	
,,	c	16	0	8	
,,	d	0	0	0	
Midland Cos.	a	61	71	66	99
,,	b	36	29	33	
,,	c	3	0	1	
,,	d	0	0	0	
England, S.	a	68	71	70	97
,,	b	29	26	27	
,,	c	3	3	3	
,,	d	0	0	0	
Scotland, W.	a	49	58	54	81
,,	b	32	23	27	
,,	c	13	6	10	
,,	d	6	13	9	
England, N.W.	a	58	45	52	80
,,	b	36	20	28	
,,	c	6	19	12	
,,	d	0	16	8	
England, S.W.	a	68	65	67	81
,,	b	23	6	14	
,,	c	9	13	11	
,,	d	0	16	8	
Ireland, N.	a	32	65	49	84
,,	b	45	26	35	
,,	c	20	9	15	
,,	d	3	0	1	
Ireland, S.	a	42	49	46	81
,,	b	42	29	35	
,,	c	13	3	8	
,,	d	3	19	11	

SUMMARY.

British Isles	a	53	59	56	85
,,	b	35	23	29	
,,	c	11	6	9	
,,	d	1	12	6	
British Isles	a	53	61	57	87
,,	b	36	25	30	
,,	c	10	7	19	
,,	d	1	7	4	

The letters used have the following signification:—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

AUGUST.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	38	69	54	88
,,	b	46	23	34	
,,	c	12	0	6	
,,	d	4	8	6	
Scotland, E.	a	39	69	54	85
,,	b	42	19	31	
,,	c	15	8	11	
,,	d	4	4	4	
England, N.E.	a	61	62	62	89
,,	b	31	23	27	
,,	c	4	8	6	
,,	d	4	7	5	
England, E.	a	58	54	56	83
,,	b	27	27	27	
,,	c	8	8	8	
,,	d	7	11	9	
Midland Cos.	a	69	42	56	85
,,	b	23	35	29	
,,	c	8	15	11	
,,	d	0	8	4	
England, S.	a	50	50	50	85
,,	b	31	38	35	
,,	c	12	4	8	
,,	d	7	8	7	
Scotland, W.	a	27	65	46	85
,,	b	50	27	39	
,,	c	19	4	11	
,,	d	4	4	4	
England, N.W.	a	46	54	50	79
,,	b	27	31	29	
,,	c	19	8	14	
,,	d	8	7	7	
England, S.W.	a	31	73	52	81
,,	b	42	15	29	
,,	c	15	8	11	
,,	d	12	4	8	
Ireland, N.	a	27	65	46	77
,,	b	46	15	31	
,,	c	4	8	6	
,,	d	23	12	17	
Ireland, S.	a	35	62	49	79
,,	b	42	19	30	
,,	c	12	12	12	
,,	d	11	7	9	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	42	61	52	86
,,	b	39	29	34	
,,	c	13	3	8	
,,	d	6	7	6	
Scotland, E.	a	39	55	47	83
,,	b	45	26	36	
,,	c	13	13	13	
,,	d	3	6	4	
England, N.E.	a	49	61	55	84
,,	b	32	26	29	
,,	c	13	10	12	
,,	d	6	3	4	
England, E.	a	65	58	62	84
,,	b	19	26	22	
,,	c	10	10	10	
,,	d	6	6	6	
Midland Cos.	a	71	55	63	89
,,	b	19	32	26	
,,	c	10	13	11	
,,	d	0	0	0	
England, S.	a	58	65	62	89
,,	b	26	29	27	
,,	c	6	6	6	
,,	d	10	0	3	
Scotland, W.	a	42	49	46	78
,,	b	29	35	32	
,,	c	10	6	8	
,,	d	19	10	14	
England, N.W.	a	48	55	52	79
,,	b	26	29	27	
,,	c	10	6	8	
,,	d	16	10	13	
England, S.W.	a	23	61	42	78
,,	b	45	26	36	
,,	c	26	10	18	
,,	d	6	3	4	
Ireland, N.	a	29	52	41	81
,,	b	55	26	40	
,,	c	3	6	5	
,,	d	13	16	14	
Ireland, S.	a	29	55	42	75
,,	b	42	23	33	
,,	c	19	6	12	
,,	d	10	16	13	

SUMMARY.

British Isles	a	44	60	52	83
,,	b	37	25	31	
,,	c	12	8	10	
,,	d	7	7	7	

British Isles	a	45	57	51	82
,,	b	34	28	31	
,,	c	12	8	10	
,,	d	9	7	8	

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

SEPTEMBER, 1883.

3.30 P.M.

DISTRICTS.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
SCOTLAND, N.	a	20	38	29	88
,,	b	68	50	59	
,,	c	12	8	10	
,,	d	0	4	2	
SCOTLAND, E.	a	20	27	24	73
,,	b	56	42	49	
,,	c	24	19	21	
,,	d	0	12	6	
ENGLAND, N.E.	a	31	46	39	77
,,	b	46	31	38	
,,	c	12	12	12	
,,	d	11	11	11	
ENGLAND, E.	a	42	65	54	88
,,	b	46	23	34	
,,	c	4	4	4	
,,	d	8	8	8	
MIDLAND COS.	a	35	42	39	79
,,	b	42	39	40	
,,	c	19	4	12	
,,	d	4	15	9	
ENGLAND, S.	a	39	61	50	85
,,	b	38	31	35	
,,	c	19	4	11	
,,	d	4	4	4	
SCOTLAND, W.	a	27	23	25	68
,,	b	39	46	43	
,,	c	15	16	15	
,,	d	19	15	17	
ENGLAND, N.W.	a	46	39	43	83
,,	b	42	38	40	
,,	c	8	15	11	
,,	d	4	8	6	
ENGLAND, S.W.	a	35	42	39	81
,,	b	38	46	42	
,,	c	12	12	12	
,,	d	15	0	7	
IRELAND, N.	a	12	31	22	81
,,	b	65	54	59	
,,	c	23	11	17	
,,	d	0	4	2	
IRELAND, S.	a	19	38	29	62
,,	b	35	31	33	
,,	c	35	23	29	
,,	d	11	8	9	

8.30 P.M.

DISTRICTS.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
SCOTLAND, N.	a	30	44	37	84
,,	b	54	40	47	
,,	c	13	13	13	
,,	d	3	3	3	
SCOTLAND, E.	a	43	37	40	77
,,	b	37	37	37	
,,	c	13	16	15	
,,	d	7	10	8	
ENGLAND, N.E.	a	47	40	44	89
,,	b	43	47	45	
,,	c	3	10	6	
,,	d	7	3	5	
ENGLAND, E.	a	50	57	54	91
,,	b	47	27	37	
,,	c	3	16	9	
,,	d	0	0	0	
MIDLAND COS.	a	48	47	48	87
,,	b	45	33	39	
,,	c	7	17	12	
,,	d	0	3	1	
ENGLAND, S.	a	57	40	49	81
,,	b	27	37	32	
,,	c	16	23	19	
,,	d	0	0	0	
SCOTLAND, W.	a	20	43	32	75
,,	b	50	37	43	
,,	c	17	7	12	
,,	d	13	13	13	
ENGLAND, N.W.	a	37	53	45	77
,,	b	43	20	32	
,,	c	10	17	13	
,,	d	10	10	10	
ENGLAND, S.W.	a	37	44	41	84
,,	b	43	43	43	
,,	c	10	10	10	
,,	d	10	3	6	
IRELAND, N.	a	27	40	34	84
,,	b	53	47	50	
,,	c	10	13	11	
,,	d	10	0	5	
IRELAND, S.	a	33	47	40	77
,,	b	44	30	37	
,,	c	13	23	18	
,,	d	10	0	5	

SUMMARY.

BRITISH ISLES	a	30	41	36	79
,,	b	47	39	43	
,,	c	16	12	14	
,,	d	7	8	7	
BRITISH ISLES	a	39	45	42	82
,,	b	44	36	40	
,,	c	11	15	13	
,,	d	6	4	5	

Submitted—The following statements of work for the three months ended September 30, 1885 :—

MARINE ROOM.

October 20, 1885.

Examined 67 new logs and 3 lighthouse registers (in four months from June 1).

North Atlantic Weather Charts.

The chart for August 1, 1882, reduced by eidograph as a specimen for reproduction by photo-lithography.

The August 1882 charts prepared for eidographing, and the final reduction commenced.

Obtaining the lowest barometer daily in depressions to end of October 1882.

Generalized winds and weather prepared to end of February 1883.

"Tracings" of all data made to middle of August 1883.

Isobars and isotherms of air and sea drawn up to first week of August 1883.

European isotherms and American isobars, isotherms and winds copied to the end of the period.

The female clerks plotting observations for July and August, and steaming the charts; also assisting in copying land isobars, isotherms, and winds. Considerable time devoted to practising with eidograph for the reduction of charts. One member on special leave since August 10th.

General.

Indexing data in ocean 10° squares.

Monthly charts showing the distribution of meteorological data in ocean 10° squares contained in Office logs received to the end of 1884 prepared for photo-lithographing for insertion in the Annual Report.

Copying hydrographical notices for transmission to the Hydrographer.

Supplying the Deutsche Seewarte with a copy of observations from document 6174 relative to a hurricane in the Gulf of Aden.

Commenced a discussion of Red Sea data.

Assistance given to the Office Administration in indexing the distribution of official publications, &c.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE.

PANTAGRAPH ROOM.

October 1, 1885.

Quarterly Weather Report, Part IV., 1877.—Chart plates completed ready for printer. Rough draft of General Summary, Monthly Notes for October and November, Gale Tables, and Tables of Cyclonic and Anticyclonic Systems written. Monthly charts drawn. Part I., 1878.—Chart plate I. nearly completed.

Observatory Returns.—The calculation of the hourly vapour tension values, and of the daily, five-daily, and monthly means, completed to near the end of August 1883. The "Hourly Readings," Part II., 1883, signed for press. Proof for July 1883 is now being read.

Harmonic Analyser.—The examination of the temperature results has been completed another stage by checking the monthly increments of the cylinders and the application of the factors. The analysis of the barograms has been commenced, and the curves for Valencia, Armagh, and Glasgow, 1871, passed through the machine.

Miscellaneous.—The Bunhill Row sunshine cards for April–June 1885 tabulated for Royal Meteorological Society. The examination, &c. of sunshine records during these three months has occupied more time than usual. Most of my own time till the end of July was employed on the discussion of records connected with the Krakatoa eruption.

The usual summer vacation was taken in the interval covered by this report.

(Signed) R. H. CURTIS.

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

SUBMITTED—The following STATEMENT respecting the RECORDS for July 1883, received from the SELF-RECORDING OBSERVATORIES (see Minutes, 21st December 1868 and 20th November 1876).

—	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Indifft.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.
Action														
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ other causes	0	*24 hrs. 1 hr.	0	0	0	0	0	0	0	0	‡2 hrs.	‡4 hrs.	¶6	0
Orientation verified	31st	—	31st	—	16th	—	28th	—	14th	—	26th	—	4th	—
No. of errors discovered by subsidiaries	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ irregular differences	0	0	0	0	0	3	3	0	8	3	1	4	0	1
Result of 40 *Remeasurements* :—														
Greatest difference	1·0	1·0	1·0	1·0	0·0	1·0	1·0	1·0	0·0	1·0	0·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·0	0·5	0·1	0·4	0·0	0·2	0·1	0·2	0·0	0·3	0·0	0·3	0·0	0·3
Residual difference (—Meteorological Office)	0·0	—0·1	0·0	—0·1	0·0	0·0	—0·1	—0·1	0·0	+0·1	0·0	0·0	0·0	—0·2

RAIN GAUGE :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient, due to stoppage of clock	0		0		17 hrs.		0		0		3		0	
„ „ other causes	0		0		0		0		0		‖15 hrs.		0	
Errors in tabulation	0		2		0		1		0		1		0	

BAROGRAPH —

Action	Good.	Good.	Good.	Good.	Good.	Good.	Good.
Photography	Do.	Indifferent.	Do.	Indifferent.	Indifferent.	Do.	Do.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0
„ „ failure of light	0	0	0	0	0	0	0
„ „ other causes	0	§1 hr.	0	0	0	0	0
No. of errors discovered—							
In entry of standard	0	1	4	0	1	6	1
„ calculating residual correction	0	1	0	2	0	0	0
„ applying residual correction	0	13	0	21	0	2	0
„ subtraction in subsidiary tables	0	0	0	0	2	0	0
„ tabulation by subsidiaries	0	0	0	0	0	0	0
„ „ irregular differences	0	10	1	0	3	0	5
Result of 40 *Remeasurements* :—							
Greatest difference	·007	·005	·005	·006	·009	·008	·009
Mean difference irrespective of sign	·002	·002	·002	·002	·002	·003	·002
Residual difference (—Meteorological Office)	—·001	—·001	·000	—·001	—·001	·000	—·001
Mean monthly difference between simultaneous Barograph and Barometer readings	·001	·003	·001	·002	·002	·001	·001

THERMOGRAPH :—

Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Do.		Do.		Do.		Indifferent.		Do.		Do.		Indifferent.	
	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ failure of light	0	0	0	0	0	0	0	0	1 hr. (S. given.)	1 hr. (S. given.)	0	0	1 hr. (S. given.)	0
„ „ imperfectly moistened bulbs	—	0	—	7 hrs.	—	0	—	2 hrs.	—	1 hr. (S. given.)	—	9 hrs. (3S.given.)	—	0
„ „ partially frozen bulbs	—	0	—	0	—	0	—	0	—	0	—	0	—	0
„ „ other causes	**4 hrs. (1S.given.)	**4 hrs. (1S.given.)	0	0	0	0	0	0	0	0	0	0	0	0
No. of errors discovered in entry of Standard	0	0	0	4	0	0	0	0	0	0	3	0	2	2
„ „ by subsidiary measurements	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ of subtraction in do. tables	0	0	1	0	2	3	3	0	5	11	0	1	1	0
„ „ detected under glass scale	0	0	0	1	0	1	0	0	0	3	2	0	0	0
Result of 40 *Remeasurements* :—														
Greatest difference	0·2	0·2	0·3	0·2	0·2	0·2	0·2	0·2	0·2	0·5	0·2	0·4	0·3	0·3
Mean difference irrespective of sign	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1
Residual difference (—Meteorological Office)	+0·1	0·0	—0·1	—0·1	—0·1	+0·1	—0·1	0·0	0·0	0·0	0·0	+0·1	—0·1	—0·1
Mean monthly difference between simultaneous Thermograph and Thermometer readings	0·1	0·2	0·2	0·2	0·1	0·1	0·2	0·3	0·1	0·2	0·1	0·2	0·2	0·2
No. of errors in maxima and minima	0	—	0	—	3	—	0	—	2	—	7	—	2	—

* Curve non-metallic. † Painting cups. ‡ Instrument not sufficiently clamped. § Renewing clock-line.
|| Pencil working irregularly. ¶ Trace faint. ** Irregular action of light-stop.

SUBMITTED—The following STATEMENT respecting the RECORDS for August 1883, received from the SELF-RECORDING OBSERVATORIES (see Minutes, 21st December 1868 and 20th November 1876).

	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH:—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Action	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ other causes	0	0	0	0	0	0	0	0	†2 hrs.	†7 hrs.	‡2 hrs.	‡2 hrs.	‡5 hrs. † 1hr.	†1 hr.
Orientation verified	31st	—	31st	—	20th	—	—	—	2nd 23rd	—	29th	—	9th	—
No. of errors discovered by subsidiaries	0	0	0	0	1	0	0	0	0	0	0	0	0	0
„ „ irregular differences	0	1	1	0	0	1	2	1	3	1	0	5	0	1
Result of 40 *Remeasurements*:—														
Greatest difference	0·0	1·0	1·0	1·0	0·0	1·0	2·0	1·0	1·0	2·0	0·0	1·0	1·0	2·0
Mean difference irrespective of sign	0·0	0·3	0·0	0·4	0·0	0·1	0·1	0·4	0·0	0·3	0·0	0·4	0·0	0·5
Residual difference (— Meteorological Office)	0·0	0·0	0·0	−0·1	0·0	−0·1	−0·1	+0·2	0·0	0·0	0·0	0·0	0·0	−0·1
RAIN GAUGE:—														
Action	Good.		Good.		Good.		Indifferent.		Good.		Good.		Good.	
Records deficient, due to stoppage of clock	0		0		0		0		0		0		0	
„ „ other causes	0		*28 hrs.		0		0		0		0		0	
Errors in tabulation	0		0		1		8		1		5		0	

BAROGRAPH :—							
Action *	Good.	Good.	Good.	Good.	Good.	Good.	Good.
Photography	Do.	Indifferent.	Do.	Indifferent.	Do.	Do.	Do.
Records deficient, due to stoppage of clock	0	0	0	0	1 hr.	0	0
„ „ failure of light	0	0	1 hr.	0	0	2 hrs.	0
„ „ other causes	0	0	0	0	‖3 hrs.(1 S. given). †3 hrs. (S. given).	0	0
No. of errors discovered—							
In entry of standard	0	1	1	2	2	3	0
„ calculating residual correction	0	0	0	7	0	1	0
„ applying residual correction	0	3	0	17	0	1	0
„ subtraction in subsidiary tables	0	0	0	6	2	0	2
„ tabulation by subsidiaries	0	0	0	0	0	0	0
„ „ irregular differences	0	0	1	10	0	0	20
Result of 40 *Remeasurements* :—							
Greatest difference	·005	·005	·006	·008	·007	·006	·005
Mean difference irrespective of sign	·002	·002	·002	·003	·002	·002	·002
Residual difference (—Meteorological Office)	·000	—·001	+·001	—·002	·000	+·001	—·001
Mean monthly difference between simultaneous barograph and barometer readings	·002	·002	·001	·002	·001	·001	·002

THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Do.		Bad.		Do.		Indifferent.		Do.		Do.		Indifferent.	
	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ failure of light	0	0	0	0	0	0	0	0	0	0	2 hrs.	7 hrs. (1S.given).	0	0
„ „ imperfectly moistened bulbs	—	0	—	19 hrs. (4S.given).	—	0	—	0	—	3 hrs. (2S.given).	—	38 hrs. (6S.given).	—	0
„ „ partially frozen bulbs	—	0	—	0	—	0	—	0	—	0	—	0	—	0
„ „ other causes	0	0	§9 hrs.	§9 hrs.	0	0	0	0	†6 hrs. (S. given).	†6 hrs. (S. given).	0	0	0	¶1 hr. (S. given).
No. of errors discovered in entry of standard	0	0	1	0	2	1	0	2	0	0	2	2	0	0
„ „ by subsidiary measurements	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ of subtraction in do. tables	0	0	0	0	0	0	6	7	4	2	1	2	2	1
„ „ detected under glass scale	0	0	1	0	0	0	0	0	0	1	1	1	0	0
Result of 40 *Remeasurements* :—														
Greatest difference	0·2	0·1	0·3	0·2	0·3	0·3	0·2	0·2	0·2	0·2	0·3	0·2	0·4	0·2
Mean difference irrespective of sign	0·1	0·0	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1
Residual difference (—Meteorological Office)	+0·1	0·0	—0·1	0·0	0·0	0·0	0·0	+0·1	0·0	0·0	—0·1	0·0	—0·1	0·0
Mean monthly difference between simultaneous thermograph and thermometer readings	0·1	0·2	0·2	0·2	0·1	0·1	0·2	0·2	0·2	0·2	0·1	0·2	0·2	0·2
No. of errors in maxima and minima	0	—	1	—	2	—	3	—	1	—	6	—	0	—

* Funnel choked. † Cleaning instrument. ‡ No trace. ‖ Clamp of light shutter unscrewed. § Light shutter stopped clock. ¶ Finger-marked.

Submitted—The following statement of accounts for the six months ended 30th September 1885 :—

Income.	£ s. d.	£ s. d.
Balance from year 1884–85		1,265 9 8
Proportion of vote for 2 Quarters		7,650 0 0
Repayment of expenses charged under—		
(1.) Incidental expenses	3 14 8	
(2.) Special researches	19 14 1	
(3.) Observatories and stations	13 15 11	
		37 4 8
Supply of Weather Information :		
D.W. Charts and Forecasts	128 14 10	
6 p.m. Charts	12 10 0	
Information for Press Agencies, &c.	43 4 8	
Telegrams	135 13 3	
Miscellaneous data	5 12 0	
		325 14 9
Sale of Instruments, &c. :		
Royal Navy account	0 7 6	
Mercantile Marine account	40 9 0	
		40 16 6
Commission charged on work done for Colonies, &c.		11 18 9
		£9,331 4 4

Expenditure.	£ s. d.	£ s. d.
Administration :		
Payment of Council	500 0 0	
Secretary	400 0 0	
Salaries and wages	384 12 0	
Rent, fuel, and lighting	346 19 8	
Furniture and fittings	31 12 10	
Incidental and contingent expenses	157 17 3	
Expenses incidental to International Meteorological Congress	17 13 4	
Pensions	21 8 2	
		1,860 3 3
Special Researches		362 4 9
Land Meteorology :		
Observatories and stations	881 2 6	
Discussion and reduction of observations	659 19 1	
		1,541 1 7
Weather Information and Forecasts :		
Telegraphic reports and storm warnings	1,482 11 9	
Preparation and issue of reports and forecasts	792 9 9	
		2,275 1 6
Inspections :		
Salaries and travelling expenses*		205 4 11
Ocean Meteorology :		
Discussion and reduction of observations	912 10 0	
Expenses incidental to the supply of instruments :		
Proportion for care and issue of instruments	100 0 0	
Royal Navy	296 6 9	
Mercantile Marine	234 16 11	
Distant island and coast stations	11 3 0	
		1,554 16 8
Balance		1,532 11 8
		£9,331 4 4

Liabilities.	£ s. d.
To sundry creditors	1,526 0 8
„ balance	1,532 11 8
	£3,058 12 4

Assets.	£ s. d.
By cash at Bank	2,029 9 5
„ „ at Office	111 16 2
„ „ at Valencia	50 0 0
„ sundry debtors	217 6 9
„ H.M. Exchequer	650 0 0
	£3,058 12 4

* The proportion due for salaries is included here, but the amounts due for expenses are not yet known.

Reported—That the following cheques had been drawn :—

List of cheques for July :—

1885.			£	s.	d.	£	s.	d.
July 31st	R. H. Scott, salary			-		66	13	4
„ „	J. S. Harding, junr., salary		27	15	6			
„ „	T. D. Bell, salary		15	0	0			
						42	15	6
„ „	J. Sheerman, harmonic analysis			-		10	0	0
„ „	J. E. Cullum, Valencia observatory			-		16	13	4
„ „	R. H. Curtis	Discussion, &c. of observations.	22	10	0			
„ „	J. A. Curtis		17	10	0			
„ „	T. E. Allen		16	5	0			
„ „	C. H. Thompson		11	13	4			
„ „	S. Call		10	16	8			
„ „	E. G. Aldridge		8	15	0			
„ „	R. G. Canham		6	13	4			
„ „	A. H. Bell		6	13	4			
						100	16	8
„ „	F. Gaster	Preparation, &c. of Weather Reports.	30	10	3			
„ „	F. J. Brodie		21	7	10			
„ „	G. G. Francis		20	7	6			
„ „	A. J. Rigby		16	8	1			
„ „	R. Sargeant		13	16	9			
„ „	A. R. Simpkins		9	7	6			
„ „	H. J. Stevens		8	6	8			
						120	4	7
„ „	Capt. H. Toynbee	Discussion, &c. of observations.	33	6	8			
„ „	Nav. Lieut. C. W. Baillie, R.N.		20	16	8			
„ „	R. Strachan		27	15	6			
„ „	C. Harding		22	10	0			
„ „	H. Harries		14	3	4			
„ „	W. Allingham		14	3	4			
„ „	W. G. James		10	8	8			
„ „	F. T. Bullen		8	15	0			
„ „	R. F. Wallace		7	18	4			
						159	17	6
„ „	Hopkin & Williams, chemicals			-		1	4	9
„ „	J. H. Woodstock, packing-cases		3	0	6			
„ „	J. J. Hicks, thermometer screens		25	8	4			
						28	8	10
„ „	R. H. Curtis, Krakatoa discussion		2	8	0			
„ „	A. Légé, compound aneroid		15	0	0			
						17	8	0
„ „	J. Chambers, repairing stoves		2	17	0			
„ „	Bank of England, sale of forms		1	9	6			
						4	6	6
„ „	J. Green, care of Bermuda anemometer			-		4	11	0
„ „	R. H. Curtis, glass scales for Batavia			-		1	0	6
„ „	J. S. Harding, petty cash			-		40	0	0
„ „	R. Strachan, registers for Gold Coast			-		1	2	6
						£615	3	0

List of cheques for August :—

1885.		£	s.	d.
August 1st	For weekly salaries	16	1	0
„ 8th	„ „	16	1	0
„ 15th	„ „	15	1	0
„ „	Anglo-American Telegraph Company, telegrams	5	0	0
„ „	Postmaster-General, telegrams	146	8	0
„ „	R. Jenkin, thermometer screen	2	0	0
	Carried forward	£200	11	0

1885.			£	s.	d.
		Brought forward - - -	200	11	0
August	22nd	Pickford & Co., carriage of parcels - - -	1	13	4
„	„	For weekly salaries - - - - -	15	1	0
„	„	W. Watson & Sons, apparatus for cloud camera -	5	3	6
„	„	J. L. E. Dreyer, Valencia thermometer observations (Minutes, 9th Jan. 1884) - - - -	3	3	0
„	28th	R. H. Scott, petty cash - - - -	30	0	0
„	29th	For weekly salaries - - - - -	14	6	0
„	„	J. S. Harding, junr., petty cash - - -	50	0	0
„	31st	R. H. Scott, salary - - - - -	66	13	4
„	„	J. S. Harding, junr., salary - - - -	27	15	6
„	„	T. D. Bell, salary - - - - -	15	0	0
„	„	J. Sheerman, harmonic analysis - - -	10	0	0
„	„	J. E. Cullum, Valencia Observatory - - -	16	13	4
„	„	R. H. Curtis -	22	10	0
„	„	J. A. Curtis -	17	10	0
„	„	T. E. Allen -	16	5	0
„	„	C. H. Thompson -	11	13	4
„	„	S. Call - } Discussion, &c. of observations.	10	16	8
„	„	E. G. Aldridge -	8	15	0
„	„	R. G. Canham -	6	13	4
„	„	A. H. Bell - -	6	13	4
„	„	F. Gaster -	28	11	3
„	„	F. J. Brodie -	23	9	10
„	„	G. G. Francis -	20	7	6
„	„	A. J. Rigby - } Preparation, &c. of Weather Reports.	16	8	1
„	„	R. Sargeant -	14	6	4
„	„	A. R. Simpkins -	9	7	6
„	„	H. J. Stevens -	8	6	8
„	„	Capt. H. Toynbee -	33	6	8
„	„	Nav.-Lieut. C. W. Baillie, R.N. -	20	16	8
„	„	R. Strachan -	27	15	6
„	„	C. Harding - } Discussion, &c. of observations	22	10	0
„	„	H. Harries - - } and care of instruments.	14	3	4
„	„	W. Allingham -	14	3	4
„	„	W. G. James -	10	8	8
„	„	F. T. Bullen -	8	15	0
„	„	R. F. Wallace -	7	18	4
„	„	J. H. Woodstock, packing cases - - -	2	7	0
			£839	18	4

List of cheques for September:—

1885.			£	s.	d.	£	s.	d.
Sept.	1st	C. Durham, Holyhead - - -	-	-	-	2	12	3
„	5th	For weekly salaries - - -	-	-	-	15	1	0
„	„	T. De La Rue, sunshine cards - -	-	-	-	8	15	0
„	„	Anglo-American Telegraph Co., telegrams	-	-	-	2	18	9
„	„	Postmaster General „	-	-	-	174	3	10
„	19th	For weekly salaries - - -	-	-	-	30	2	0
„	24th	J. S. Harding, jun., petty cash -	-	-	-	50	0	0
„	30th	R. H. Scott, salary - - -	-	-	-	66	13	4
„	„	J. S. Harding, jun., salary - -	27	15	6			
„	„	T. D. Bell „ - -	15	0	0			
						42	15	6
„	„	J. Sheerman, harmonic analysis -	-	-	-	10	0	0
„	„	J. E. Cullum, Valencia Observatory -	-	-	-	16	13	4
		Carried forward - - -				£419	15	0

1885.				£ s. d.	£ s. d.
		Brought forward - - - -			419 15 0
Sept. 30th	R. H. Curtis -	Discussion, &c. of observations.		22 10 0	
„ „	J. A. Curtis -			17 10 0	
„ „	T. E. Allen -			16 5 0	
„ „	C. H. Thompson -			11 13 4	
„ „	S. Call - -			10 16 8	
„ „	E. G. Aldridge -			8 15 0	
„ „	R. G. Canham -			6 13 4	
„ „	A. H. Bell -			6 13 4	
					100 16 8
„ „	F. Gaster -	Preparation, &c. of Weather Reports.		33 6 7	
„ „	F. J. Brodie -			19 5 10	
„ „	G. G. Francis -			16 17 6	
„ „	A. J. Rigby -			16 8 1	
„ „	R. Sargeant -			15 15 1	
„ „	A. R. Simpkins -			9 7 6	
„ „	H. J. Stevens -			8 6 8	
					119 7 3
„ „	Capt. H. Toynbee -	Discussion, &c. of observations and care of instruments.		33 6 8	
„ „	Nav.-Lieut. C. W. Baillie, R.N. -			20 16 8	
„ „	R. Strachan -			27 15 6	
„ „	C. Harding -			22 10 0	
„ „	H. Harries -			14 3 4	
„ „	W. Allingham -			14 3 4	
„ „	W. G. James -			10 8 8	
„ „	F. T. Bullen -			8 15 0	
„ „	R. F. Wallace -			7 18 4	
					159 17 6
„ „	G. J. Mayhew, rent - - -			- -	158 15 0
„ „	J. S. Harding, senior, pension (Minutes, 1882, p. 43) - - - -			- -	10 14 1
„ „	Wightman & Co., printing - -			1 5 0	
„ „	„ „ - -			6 16 10	
					8 1 10
„ „	Williams and Norgate, books - -			- -	2 7 6
„ „	W. Thomas, care of Scilly anemometer			1 13 0	
„ „	„ meteorological reports -			4 18 0	
					6 11 0
„ „	H. Williams, care of bridled anemometer			2 10 5	
„ „	„ „ Robinson's „			2 11 2	
					5 1 7
„ „	C. Niven, Aberdeen - - -			59 5 0	
„ „	J. L. E. Dreyer, Armagh - - -			12 10 0	
„ „	W. L. Fox, Falmouth - - -			62 8 1	
					134 3 1
„ „	Kew Committee, allowance for quarter -			100 0 0	
„ „	„ waxed paper - -			10 0 0	
					110 0 0
„ „	W. G. T. Watt, Orkney - - -			4 16 6	
„ „	S. J. Perry, Stonyhurst - - -			13 14 3	
„ „	J. E. Cullum, Valencia - - -			42 10 0	
					61 0 9
„ „	G. T. Watson, care of Yarmouth anemometer - -			3 18 0	
„ „	„ Meteorological reports -			4 1 6	
					7 19 6
		Carried forward - -			£1,304 10 9

			£	s.	d.	£	s.	d.
1885.		Brought forward -	-		-	1,304	10	9
Sept. 30th	P. Adie, repairing tabulator, &c. -	-	0	16	3			
„ „	„ „ "A" barometers	-	14	18	5			
„ „	„ eidograph fittings and repairs	-	26	2	0			
						41	16	8
„ „	H. Todd, Cambridge - -	-	4	11	0			
„ „	H. Mohn, Christiania - -	-	5	10	0			
„ „	P. Curnow, Dungeness - -	-	4	11	8			
„ „	W. Brand, Dunrossness - -	-	3	18	4			
„ „	W. Foster, Hawes Junction -	-	1	19	3			
„ „	G. G. Appleton, Hurst Castle -	-	3	18	10			
„ „	J. Fisher, Jersey - - -	-	4	5	6			
„ „	F. Gaster, London - -	-	3	18	0			
„ „	W. Berridge, Loughborough -	-	3	5	9			
„ „	Lloyds', for Malin Head - -	-	3	5	0			
„ „	K. Kerr, Mullaghmore - -	-	5	5	3			
„ „	W. D. Penny, Nairn - -	-	4	4	6			
„ „	W. Wickham, Oxford - -	-	3	12	6			
„ „	B. Budds, Parsonstown - -	-	3	7	6			
„ „	J. John, Prawle Point - -	-	3	5	0			
„ „	S. Blake, St. Ann's Head -	-	3	12	4			
„ „	J. B. Smith, Spurn Head -	-	3	5	5			
„ „	D. Macdonald, Stornoway -	-	5	11	5			
„ „	J. Sinclair, Wick - -	-	3	5	0			
„ „	A. Guy, York - - -	-	3	18	0			
„ „	J. E. Clark (postages), York -	-	1	11	9			
						80	2	0
„ „	Post Office private wire (Valencia)	-	-		-	20	15	0
„ „	J. R. Jones, Aberdeen agent -	-	6	6	9			
„ „	J. Fowler, Cardiff „ -	-	3	11	11			
„ „	L. Allen, Dundee „ -	-	1	5	0			
„ „	J. Gill, Liverpool „ -	-	19	2	0			
						30	5	8
						£1,477	10	1

116, *Victoria Street, November* 4, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (October 21) were read and confirmed.

Submitted—The following Report:—

November 4, 1885.

I HAVE the honour to report, for the information of the Council, that as our experience showed that a third eidograph would be required, I, with the Chairman's sanction, ascertained that if such were ordered, Mr. Adie (Letter 2196) would allow half price for it when done with. Mr. Adie went on to say that he thought the Metropolitan Board of Works might be able to lend us an eidograph.

Subsequently application was made to the Metropolitan Board of Works for the loan of such an instrument, and some days later an instrument was sent in by the Metropolitan Board of Works.

I therefore requested Mr. C. Harding to draw up a report showing what results he hoped to get from three eidographs, and what advantage would accrue from the employment of a fourth. That report is appended. It seems to show that a fourth eidograph would come in very useful, more especially when it must be borne in mind that eidographs sometimes get out of order.

(Signed) HENRY TOYNBEE,
Marine Superintendent.

REDUCTION of NORTH ATLANTIC WEATHER CHARTS.

SIR, November 3, 1885.

THE rate at which the lithography of the North Atlantic Charts for the 13 months August 1882 to August 1883 will progress depends greatly upon the instruments at our disposal for effecting the reduction.

If three eidographs are worked, we should propose to keep two of these making the reduction to one third of original scale, for photography, that is reducing isobars, winds, and sea isotherms, and with these two instruments the photographic work (black stones) for seven days' charts could be produced in six working days, so that the reduction of charts for 13 months would occupy, say, 14 months, inclusive of holidays, &c. Employing the third eidograph for the weather shading, mountain winds, and air temperature work (to be reproduced on red stones), this branch would probably take one working day to each chart, or 400 working days (18 months) to reduce the charts for 13 months.

By the employment of a fourth eidograph the work necessary for the production of the red stones (weather shading and air temperature) could be made to keep pace with the black (photographic) work of charts, and help could at times be given to advance the rate of eidographing in all its branches, so that with four eidographs the whole of the reduction could be effected in say 12 months from now, and probably, with experience gained as the work progresses, a considerable saving of time might be effected. The final handling of charts in connexion with the lithography can keep pace with the ordinary eidographing.

Captain Toynbee. (Signed) CHAS. HARDING.

The Secretary was instructed to express the thanks of the Council to the Metropolitan Board of Works.

The Hydrographer stated that he could place a fourth eidograph at the service of the Office, and his offer was accepted with thanks.

Read—The following letter (Minutes, p. 34) :—

(M.O. 1320.) Royal Meteorological Society,
30, Great George Street, Westminster, S.W.,
October 24, 1885.

DEAR SIR,

SINCE the receipt of your letter of the 16th July, Mr. Marriott has visited the helm wind district and has been fortunate enough to witness a slight helm. He has furnished the Council with some valuable and interesting observations, which point out in what direction further observations are required.

The co operation of a number of observers at fixed stations has been enlisted, and also a number of gentlemen from Penrith have promised to go into the district when the helm is on and make observations with thermometers, &c. on each side, and beneath the bar, and at various places.

As a number of instruments will be required for this purpose, the Council would be glad if the Meteorological Council would grant the loan of the following:—

12 pairs of dry and wet-bulb sling thermometers ;
2 pairs of ordinary dry and wet-bulb thermometers ;
1 maximum thermometer ;
1 minimum thermometer ;
2 Stevenson thermometer screens.

Yours, &c.
(Signed) JOHN W. TRIPE,
Council Secretary.

R. H. Scott, Esq., F.R.S.,
Secretary, Meteorological Office.

Mr. Scott was authorised to supply the instruments as requested (P. C. 2212), on loan for one year.

Read the following letter from Baron van Heerdt, head of the Marine Department of the Dutch Meteorological Office :—

(M.O. 1927.)

MY DEAR MR SCOTT, Utrecht, September 10, 1885.

I AM occupied at this moment to compile an atlas on the Indian Ocean, similar to that published by the Deutsche Seewarte on the Atlantic, and have been working at this publication since about eight or nine months. Finding but a small amount of information in some parts, I made up my mind how much better work we might do by co-operation, if all those institutions who are occupied in nautical meteorology could work together, not only by sending the data from their logs to each other when asked for, and without costs, but also by dividing the business, and of course by discussing the same on an agreed method. It is this suggestion that made me take up

pen and paper to write you. Would it not be possible for you to make a proposal in this way to the Meteorological Council?

Professor Neumayer would like the arrangement as well as me, and beside that I receive all the Swedish logs from Dr. Malmberg, at Stockholm. At the same time I am sure we may get the French logs also, now that Brault is dead, as Professor Buys Ballot is a great friend to Professor Mascart, and Brault was not officially appointed as Marine Superintendent.

I only write you this as a suggestion, and especially as a trial to give better results to the captains in general, as being compiled from a larger amount of material. If you think it would be possible (with regard to the Meteorological Council), I shall speak about it with Professor Buys Ballot.

Robert H. Scott, Esq., London.

(Signed) P. F. VAN HEERDT.

Mr. Scott reported that there were in the Office 155 data books for the North Indian Ocean, and that about 2,200 logs contained data referring to the whole Indian Ocean. He was instructed to forward the data books, and inform Baron van Heerdt that the Council would be willing to allow him access to the logs, if he could send copyists to this country (P.C. 2252).

The Hydrographer inquired if he could obtain for a forthcoming edition of the "Sailing Directions for the Coast of Scotland" a tabular statement of the prevalence of gales from different directions on the various parts of the coasts.

Mr. Scott was instructed to prepare such a table from the data existing in the Office.

Submitted—The following Reports:—

(M.O. 2395.)

Kew Observatory, Richmond, Surrey, November 3, 1885.

DEAR SIR,

I BEG herewith to hand a report on the working of the hand anemometer (Minutes, 1884, p. 105) at this observatory.

The instrument seems to work very well, and when its readings are corrected the results accord very well with the standard Robinson anemometer.

Throughout the comparisons the Robinson factor of 3 has been employed in the reduction of the indications of the standard instrument.

Believe me, &c.

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

(Signed) G. M. WHIPPLE.

Kew Observatory, November 3, 1885.

COMPARISON of HAND ANEMOMETER, M.O. 20, by HICKS, with the KEW ANEMOGRAPH.

This instrument was set up on the experimental stand on the roof of the Observatory, with its cups at the same level as the standard anemograph, and 9 feet distant on the north side. Readings were taken at frequent intervals, and the following is a table of the corrections to be applied to its readings to reduce them to those of the standard instrument corrected for friction, at velocities between 5 and 30 miles per hour:—

Reading of M.O. 20, in Miles per Hour.	Correction to be applied to reduce to Kew Anemograph.	Reading of M.O. 20, in Miles per Hour.	Correction to be applied to reduce to Kew Anemograph.
	Miles per Hour.		Miles per Hour.
5	+0·3	18	−3·0
6	−0·2	19	−3·0
7	−0·5	20	−3·0
8	−1·0	21	−3·0
9	−1·1	22	−2·2
10	−1·3	23	−1·9
11	−1·6	24	−2·0
12	−1·6	25	−2·6
13	−1·8	26	−2·6
14	−2·2	27	−2·7
15	−2·2	28	−2·7
16	−2·4	29	−2·7
17	−2·4	30	−2·6

The following defects in this instrument were noticed. First, in relation to the sand glass, occasionally while in action it ceased running. It appears, therefore, whilst observing with this class of instrument, that a sharp eye must be kept on the sand glass. From 5 miles per hour upwards to 30 miles per hour the instrument always read higher than the Kew anemograph. No readings of velocity between 30 and 50 miles per hour were taken, but it would appear that −2·5 miles may be used as a correction for all readings between those two points.

Before taking an observation, owing to considerable play in the gearing of the graduated dial, it is necessary to allow the zero value to reach the pointer by a motion of the cups. There appears also to be some defect in the connexion between the driving and the graduated dials, as the latter does not partake of the even motion of the former, but moves in jumps.

(Signed) G. M. WHIPPLE.

RE ELECTRICAL ANEMOGRAPH (Minutes, 1884, p. 105).

(M.O. 2396.) Kew Observatory, Richmond, Surrey,
November 2, 1885.

DEAR SIR,

I HAVE to report that this instrument was erected at this Observatory on March 23, being put up on the roof of the Experimental House, whilst the recording apparatus was fixed on a table in the interior.

The instrument having been put into adjustment by Mr. Kempe, of the Chief Engineer's Department of the G.P.O., was started in action on March 23, and curves were obtained daily up to April 8. During this period the direction apparatus frequently got out of sympathy with the vane, and it would appear that the direction record had traversed the whole round of the compass in a day, whilst the ordinary anemograph showed the wind had only fluctuated to and fro over two or three points. The velocity electro-magnet also stuck at times.

Mr. Kempe came down on the 8th and made certain alterations in the gear. The velocity recorder continued defective until it was again examined on April 14, on which occasion Mr. Kempe discovered and removed the cause of failure.

From April 14 to May 9 the velocity pencil worked correctly, but the direction still failed.

On May 14 further alterations were made in the direction gear, and on May 23 the fans were dismounted and sent to the G.P.O. to have their pitch altered, and render them less sensitive to wind veering.

On June 3 the direction contact maker was taken out and returned to G.P.O., and on June 29 Mr. Kempe brought down the altered parts, and the instrument worked at intervals until September 16. Finding then that light winds were erroneously recorded owing to lack of sensitiveness in the fans as altered, Mr. Baker got Mr. Munro to make their pitch to the standard pitch. The anemograph was again started on October 1, and ran until October 28. The direction work still proved to be faulty in high winds, and having reported it to Mr. Kempe, that gentleman requested me to have the whole apparatus dismounted, packed, and returned to the G.P.O. Stores, Camden Town, where he proposes to set it up on the roof and test his modified arrangements under his own eyes.

This was accordingly done on October 29. I beg to submit herewith specimen curves obtained from the instrument in its different conditions, together with tracings of the corresponding standard anemograph, in order to exhibit the defective action of the apparatus.

Yours, &c.
(Signed) G. M. WHIPPLE,
Superintendent.

P.S.—The velocity attachment has worked most satisfactorily ever since April 14, neither batteries nor connexions having needed the slightest attention.

Submitted—The following Reports:—

REPORT of INSPECTION of the SCOTTISH STATIONS for 1885.

BAROMETERS.

The barometers at the stations were compared with inspector's mercurial standard barometer No. 588. The results are shown in the following table, which gives the corrected readings of standard No. 588 and the uncorrected readings of the reporting and check barometers at each of the stations. It thus appears that each of these instruments continue to be in excellent order.

STATIONS.	Inspector's Standard No. 588, corrected.	Reporting Barometer, not corrected.	Check Barometer, not corrected.	REMARKS.
	inches.	inches.	inches.	
Laudale	29·843	29·845	29·835	Check barometer is 8 feet higher. Reduced to same temperature.
Stornoway	30·189	30·188	30·190	
Sandwick	30·158	30·169	—	
Dunrossness	29·868	29·866	29·866	
Wick	30·222	30·224	—	In shop.
Do.	30·144	—	30·144	In house.
Dunrobin	30·251	30·252	—	
Inverness	30·162	30·160	—	
Nairn	30·031	30·031	30·032	
Aberdeen	29·733	—	29·735	In house, Braemar Place.
Do.	29·787	29·787	—	In Post Office.
Braemar	28·405	28·414	—	
Dundee	28·883	28·880	—	
Glenalmond	28·811	28·808	—	Reduced to same temperature.
Pinmore	29·865	29·866	—	
Ardrossan	30·040	30·037	—	In Post Office.
Do.	30·024	—	30·022	In house at Saltcoats.
Rothesay	30·078	30·080	—	
Leith	29·973	29·960	—	In Post Office.
Do.	29·942	—	29·935	In house, 52, Great Junction Street.
King's College, Aberdeen	29 695	29·696	—	

The difference between the inspector's and observer's readings was generally nil, and, excepting in two cases, did not exceed 0·002 inch. The assistant at Stornoway read 0·005 inch and the assistant at Wick 0·004 inch too low, owing to their method of setting the vernier. After being shown the proper method they read correctly.

THERMOMETERS.

The results of comparison made with inspector's standard thermometer No. 2522 and the thermometers at the different stations and at Aberdeen Observatory are given in the following table, the readings of the standard having been corrected for instrumental errors, but the thermometers at the stations are uncorrected :—

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 - -	60·1	+0·1	+0·1	—	+0·2	+0·2	90	Uniform.	
Stornoway -	52·3	+0·6	+0·5	+0·3	−0·4	−0·5	100	Uniform.	
Sandwick -	52·7	+0·3	0·0	—	+0·5	−0·5	90	+0·3	
Dunrossness -	60·5	+0·3	+0·3	+0·2	+0·2	−0·7	100	+0·3	
Wick - -	56·9	+0·3	+0·4	—	−0·2	0·0	80	−0·2	
Dunrobin -	56·1	−0·4	−0·6	—	+0·5	−0·6	105	+0·2	
Inverness -	53·8	—	—	—	0·0	+0·1	100	Uniform.	New hygrometer not yet got.
Nairn - -	52·9	+0 6	+0·7	+0·2	−0·2	+1·0	70	Uniform.	
Aberdeen -	60·7	+0·3	+0·4	—	+0·6	+0·1	90	−0·2	
Braemar - -	51·3	+0·5	+0·5	—	+0·6	0·0	95	+0·3	
Dundee - -	50·2	+0·4	+0·5	—	+1·3	−0·3	80	+0·4	
Glenalmond -	48·6	+0·1	+0·2	—	+0·2	−0·2	120	Uniform.	
Pinmore - -	44·8	+0·2	+0·3	—	−0·2	−0·3	75	+0·5	
Ardrossan -	48·1	+0·3	+0·4	—	0·0	−0·3	105	Uniform.	
Rothesay -	47 3	−0·1	−0·1	—	0·0	−0·4	120	Do.	
Leith - -	48·0	+0·1	+0·5	—	0·0	−0·3	70	+0·2	

NOTES on the STATIONS.

Laudale, August 7.—The observations appear to continue to be carefully made. The discrepancies in the barometric readings of March 8 and 20 were examined, and the liability to make errors of observations of one-tenth and half-tenth inch was explained. Attention will be more fully given in future to avoid these errors. Directions were given to use H. exclusively for hail in future, and not as heretofore occasionally for haze. It is satisfactory to report that during the extensive alterations in the building made last year, neither of the two barometers sustained any damage in the removals which took place.

Stornoway, August 14.—The instruments were well observed by Mr. M'Donald, and in very good order, except the rain-gauge which was slightly elliptical, but which was put right.

Annabella M'Donald, the assistant, on my first visit on Thursday read the barometer 0·005 inch too low, and had great difficulty in making up the telegram from the observations, but on Saturday she read all the instruments correctly and expeditiously, and made up the telegram with despatch and accuracy. For some time before my visit she had not made up any telegram, an inadvertence which will not recur. As regards the winds at this station, the observer is of opinion that South-east winds tend to draw more to southward, and North winds to westward. The reported fewness of Northerly gales from Stornoway may be explained, at least in part, by the physical configuration of the ground towards the North.

The barograph was fully explained and set agoing, and to secure the firm support required, a little shelf is to be made for it on the wall.

Sandwick, August 19.—The instruments were in the same positions they had when under the late Dr. Clouston's care, and Mr. and Mrs. Anderson made the observations fairly well. The sunshine recorder was very slightly out of position, but was put right and its proper position shown. The Rev. Mr. Anderson, who had been appointed observer here, intimated his resolution to cease being observer, as his duties as clergyman left him no time to attend to the observations. A list of all the instruments hitherto in use at Sandwick Manse was made up and sent to the Office.

Dunrossness, August 22.—The instruments were in good order and correctly observed. The observations and notes for previous 12 months were examined. Though thunder occurred three or four times and hail two or three times during the year, they are not in the observation book. No aurora were observed; it is, however, probable that the hill to north of the Manse prevents many aurora being seen. A note with directions as to the notes of weather which it is necessary to make and enter in his diary was left with the observer. During my visits to this station the estimations of wind force have been correctly given. All instances of wind force 7 and upwards recorded since inspection of August 1884 were extracted. These have since been compared with the wind observations at the lighthouses at Sumburgh Head and Bressay with the result that the general correctness of the Dunrossness observations is confirmed by the lighthouse records. Indeed the only gale recorded at Sumburgh Head, and not noticed in the Dunrossness register was one of short duration on the nights of November 9–10.

Wick, August 25.—The thermometer screen had been repaired and repainted, and the instruments were all in good order and the observations made very accurately by Mr. Sinclair. His assistant, Jessie Sinclair, read the barometer 0·004 inch too low. The proper method for setting the vernier was explained, after which she read the barometer correctly.

Dunrobin, August 26.—A new Stevenson screen has replaced the old one since January 1, which was considered to be the most suitable time to make the change. The rain-gauge, which was slightly deformed, was put right. As the scale of the hygrometer is now rather indistinct a new one is very desirable for this station, and has been recommended.

Inverness, August 27.—A new hygrometer has not yet been obtained for this station, but I was informed it would shortly be had. The observations which were to have been resumed on October 1, 1884, were not resumed till July 23, 1885, and then only for a few days. The thermometer screen was found to be out of repair and at the time of inspection was in the joiner's hands undergoing repair. No rainfall observations were made during the year. The barometer, maximum and minimum thermometers and rain-gauge were in good order, and the observations were expected to be resumed on September 1.

Nairn, August 29.—The thermometer screen had been repainted and repaired and the rain-gauge removed to the new position referred to in last year's report. The instruments were in very good order. Miss Penny, who, in the absence of her father, was in charge of the station, made the observations and prepared the telegram with despatch and intelligence. A large additional portion of the neighbouring wood has been cut down; and now only a small portion to westward remains to interfere in any material degree with the observations, and this patch is being cut down as required.

Aberdeen, September 7.—The Stevenson screen had been recently repainted and all the instruments were in excellent order and observed with much intelligence. The spare thermometer had recently been accidentally broken.

The barograph had been some weeks at work and Mr. McCormick understood and handled it properly. It has been placed in a good firm position on a shelf on the wall.

Braemar, September 8.—The instruments were all in good order and well observed. A Stevenson screen had been added since October 1, 1884, and a comparison will shortly be made between the observations made in this screen and those in the old thermometer screen of the station.

Dundee, September 30.—The instruments were all in good order and the observations were ntelligently made. The hygrometer is very well attended to.

Glenalmond, October 1.—The instruments were in excellent order, and the new observer, Mr. A. S. Reid, M.A., F.G.S., mathematical master in the College, is a careful observer of quite remarkable intelligence, and takes much interest in the observations. The outside observations are made only at 9 a.m. and the maximum temperature then read is entered for the previous day and the minimum temperature for the day it is read.

Pinmore, October 13.—The hygrometer and other instruments were in very good order, and the observations intelligently made. The observer continues to take a good deal of trouble to observe the direction and force of the wind in positions which give results as little influenced by the valley of the Stinchar as circumstances permit.

Ardrossan, October 14.—The thermometer screen was painted and the rain-gauge firmly fixed shortly after last inspection, and these instruments were in a very satisfactory state. The minimum thermometer had nearly a degree of spirit separated about half-way up the tube. The observer, under direction, set it right. The cloth of the wet bulb was rather dirty, probably from the soot and dust of the railway, from which towards the station an easterly wind with mist had been blowing for some time. Otherwise the instruments were in fairly good order, the readings on opening the screen being dry bulb 50°·2 and wet 46°·9. The cloth had been changed 10 days previously. For the future the observer was directed to change the cloth at least once a week, proximity to the railway rendering a frequent change of the muslin necessary. The observer and assistant made the observations carefully and intelligently. The code for cirrus cloud observations, and methods for making the observations and preparing the cirrus telegram were gone over in detail, and reports of cirrus cloud will commence forthwith to be sent.

Rothesay, October 14.—The instruments were in good order, and the observations made with much intelligence. At the end of the year a new pole 50 feet in height is to be erected for the vane, which at this station is kept in excellent order.

Leith, October 20.—In July 1885 the gate of the fence round the thermometers and rain-gauge was repaired, and the thermometer screen made secure. As the glass measure of the rain-gauge is cracked half-way down a new one is desirable. There is no spare thermometer at this station. The cloth of the wet bulb was rather dirty with the soot and dust of Leith. The cloth, however, was quite wet, as shown by the dry bulb reading 44°·8 and the wet 41°·3 at 3 p.m., with a dull foggy atmosphere. Instructions were given to have the muslin changed more frequently. In May last the observer removed to 52, Great Junction Street; a comparison of the barometer showed that it had sustained no damage during the removal to its new position.

The pamphlet giving directions regarding the cirrus observations and the code relative thereto were minutely gone over and explained to the observer. He had had considerable difficulty with these observations, but after the explanations given, he quite understood the cirrus code, and will commence to send the reports when the cirrus is noticed by him.

The Observatory, Aberdeen, September 7.—All the instruments were in excellent order. The ground where the Stevenson screen has been placed in the University grounds, has been turfed for some distance round it. The dry and wet bulbs and the maximum thermometer in the screen were lowered 3 inches each; they now stand, dry and wet bulbs 4 feet above ground, maximum thermometer 4 feet 6 inches, and minimum thermometer 3 feet 10 inches.

All the thermometers were again compared with the greatest care with standard thermometer No. 2522, and after several comparisons by Mr. Boswell and myself, substantially the same result was obtained as from the comparison of 1884.

November 3, 1885. (Signed) ALEXANDER BUCHAN.

(M.O. 236C.)

INSPECTIONS of OBSERVATORIES and ANEMOGRAPHS, 1885.

Yarmouth, August 10 and 13.--The anemograph at the station having been working very inefficiently for some time, I was instructed by Mr. Scott to examine it, and, if possible, determine the causes of its failure. The defective action was in the velocity pencil, which frequently ceased to make a trace upon the paper. On examining the recording apparatus, the supporting arms of the pencil appeared stiff, and I filed the discs of the coupling clutch to give them more play. Having done this I ran the pencil round a great many times upon the curve, and found this defect was entirely removed. Two days later Mr. Watson, the observer, informed me the trace had again failed. I then discovered that the pencil had not been completely lowered on the paper after changing, and as the lifter was too tight to allow of the pencil falling by its own weight no trace was being produced. I accordingly instructed Mr. Watson in future always to press the lifter down as far as it would go after changing. Since he has done this the action of the instrument has been quite satisfactory. The external apparatus was somewhat out of repair, not having been looked to for some years; one cup was loose and would soon have been blown away, and the oil holder had slipped down the cup shaft. These and other defects I set right, and the instrument is now in good order.

Sandwick, Orkney.—The anemograph at this station was inspected on September 5. Not having been cleaned for some years, I found the recording part very clogged and stiff, although the clock was going quite well. The external gear was in good repair, with the exception of the counter shaft, which was much cut and jambed in its bearing. I took it out and filed it up true, and also cleaned it as far as possible without dismounting. As the observer has resigned charge of the instrument and it will have to be taken down and re-erected elsewhere very shortly, I did not think it desirable to thoroughly overhaul it, as that operation would have necessitated my remaining in the place for an uncertain time on account of the weather, which was quite unsuitable on the day of inspection.

Aberdeen, September 11–16.—I thoroughly examined and cleaned all the instruments at this observatory, finding them in good order. The anemograph required some external repairs which I had executed.

Glasgow, September 18 and 19, October 1 and 2.—The two thermograph tubes and the wet bulb standard thermometer having been accidently broken, as well as the supporting frame, I took a set of new thermometers down with me from the stock preserved at the Kew Observatory and set them up. The brass work having been repaired by Mr. White, I had the clock, lenses, &c. all cleaned, and the barograph was similarly treated.

The anemograph was dismouted, thoroughly cleaned, and certain trivial defects madegood before it was again started. The rain-gauge was found in good order and was cleaned.

Being compelled by a domestic bereavement to leave Glasgow somewhat hurriedly, I had no time to see to the working of the instruments properly after setting them up, and therefore failed to detect a serious defect in the dry bulb thermograph tube which was brought to my notice by Professor Grant soon after I had returned to Kew. I accordingly went back to Glasgow and found that the mercury in the bore of the thermometer had united at the air speck, which consequently remained at a fixed point in the tube, giving a straight line instead of a temperature curve. I dismounted the tube, and after considerable trouble, succeeded in separating the column, re-blacking the tube, and again setting it up. It has since acted perfectly. The operation will necessitate fresh determination of the thermometer scale and zero values.

Stonyhurst Observatory, visited September 21.—The instruments at this observatory were all found to be in excellent order, and the anemograph well oiled and cared for.

The thermometers were compared and their corrections found to be as follows:—

At 55°: Dry bulb	0·0	Maximum — 0·2
Wet bulb	— 0·3	Minimum + 0·1

Mr. Baker's report is subjoined.

October 1885. (Signed) G. M. WHIPPLE.

Valencia, visited October 9–13.—At this observatory the whole of the instruments were working in a satisfactory manner.

The barograph and thermograph clocks were taken entirely to pieces and cleaned, and the lenses, condensors, and mirrors carefully wiped.

The zero lines were changed to the winter position and the standard thermometers were compared and found to require the following corrections; namely,—

Dry bulb, No. 399 −0·6. Wet, No. 398 −0·5.

I would beg to suggest that Mr. Cullum be advised to apply these corrections.

The maximum and minimum thermometers were also examined and found in good order, but the scales were re-blackened.

The anemometer was going well and the clock did not require special cleaning. I examined the external parts, but the weather at the time of my visit was too squally to permit of the withdrawal of the velocity shaft, however, care was taken to well oil the various bearings.

The rain-gauge was taken to pieces and the clock thoroughly cleaned.

My attention was called to the small self-recording aneroid recently received at the observatory, which read approximately 0·2 inch higher than the standard mercurial barometer; this was set right and the method of adjustment pointed out to Mr. Cullum.

As regards the old anemometer which was dismounted last year the clock appears in a good state and also the recording parts with the exception of the pencils which would require re-grinding or new spirals attached. The cups and direction vane are completely worn out and quite useless, but the reducing gearing and pillar are in a satisfactory condition.

Falmouth, visited October 19.—All the self-recording instruments were in good order and none of the clocks required cleaning, the whole of them having been done in May last under the direction of Mr. Whipple at the time of shifting them from the old to the new observatory.

A comparion of the standard thermometers gave the following corrections:—

Dry, No. 383 −0°·6. Wet, No. 388 −0°·3.

The corrections now being used are—

Dry, 383 −0°·4 and Wet, 388 −0°·2.

It would therefore be advisable to instruct Mr. Kitto to apply the new corrections at once, especially as extra observations are being taken for the purpose of determining the scale value of the thermograph dry bulb.

My attention having been called to an irregularity in the temperature trace of the barograph, I made a special examination. I found that it had been rectified the day preceding my visit. The superintendent discovered that the end of the temperature compensation lever had caught in the zero line supporting frame, for cutting off the light. It had probably received a jar which caused its displacement, but he was not aware of such an accident having occurred.

October 29, 1885. (Signed) T. W. BAKER.

Read—A memorandum from Captain Toynbee reporting that since the last meeting 8 logs had been received, 7 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. W. Deuchars -	S.S. "Jan Mayen"	Feb. 4—Oct. 19, 1885.	Dundee, sealing and whaling.	1884, p. 48.
Capt. T. W. Freeman	S.S. "Bellerophon"	June 2—Oct. 12, 1885.	London, China, and home	1885, p. 17.
Capt. C. W. Kennedy	S.S. "Germanic"	May 1—Oct. 15, 1885.	Queenstown to New York 5½ voyages.	1884, p. 113.
Capt. Archd. McLean	S.S. "Titania" -	May 5—Oct. 19, 1885.	Montreal and home, 6 voyages.	—
Capt. Thos. Mesnard	"Sierra Miranda"	Feb. 15—Oct. 25, 1885.	Liverpool, India, and home	1880, p. 54.
Capt. W. F. Milne -	S.S. "Esquimaux"	Jan. 31—Oct. 7, 1885.	Newfoundland, Davis Strait, and home, sealing, &c.	1884, p. 49.
Capt. H. Youlden -	Barque "May Hulse."	Nov. 18, 1884—Oct. 4, 1885.	Maryport, Buenos Ayres, Pisagua, and home.	1884, p. 50.

Captain Freeman has retired from the sea. He has been an observer for this Office since September 1872, and has kept 22 logs for the Office, of which 21 contain "excellent" data.

Mr. Scott was instructed to present the Charts (O. 32) to Captain McLean and to convey the best thanks of the Council to the other observers.

HAY HARVEST FORECASTS, 1885.

SIR,

I BEG to submit herewith a report on the Hay Harvest Forecasts for 1885.

The issue of the forecasts commenced on June 15 with those for England, E., the Midland counties, and England, S., and as the time advanced those for other districts were added. The forecasts were issued daily (excepting on Sundays), and in most instances they were sent for about five weeks. In two or three cases, however, they were continued until the close of the wheat harvest; the additional expense of this extension was borne in one instance (Knutsford) by Lord Egerton of Tatton.

It was scarcely probable that the high per-centage of success noticed last year in England, E., and England, S., would be maintained, but the result of this year's checking shows that while, owing to a falling off in the number of *partial* successes, the general per-centage was a little lower than in the two preceding years, the proportion of *completely* successful forecasts (56 per cent.) was much greater than in any year since the institution of the service. The largest general per-centage (88) was reached in Scotland, N., Scotland, E., England, E., and England, S., while the smallest (74) was in Scotland, W., and England, N.W.

The following is a brief resumé of the larger table appended to this report:—

SUMMARY of RESULTS.

Districts.	Names of Stations.	Per-centages.				Total Per-centage of Success.
		Complete Success.	Partial Success.	Partial Failure.	Total Failure.	
SCOTLAND, N.	Golspie and Munlochy	48	40	6	6	88
SCOTLAND, E.	Grange, Glamis, Aberfeldy, and Longniddry.	57	31	11	1	88
ENGLAND, N.E.	Chatton and Ulceby	60	18	19	3	78
ENGLAND, E.	Thorpe, Ditchingham, and Rothamsted.	64	24	10	2	88
MIDLAND COUNTIES	Cirencester and Gerrard's Cross	63	23	12	2	86
ENGLAND, S.	Maidstone and Downton	60	28	12	—	88
SCOTLAND, W.	Dumbarton, Islay, and Stranraer	51	23	21	5	74
ENGLAND, N.W.	Leyburn, Prescot, and Knutsford	51	23	21	5	74
ENGLAND, S.W.	Bridgend (Glamorgan), Falfield, Clifton, and Glastonbury.	63	24	11	2	87
IRELAND, N.	Antrim, Moynalty, and Hollymount	49	27	17	7	76
IRELAND, S.	Moneygall, Kilkenny, and Ardfert	50	27	18	5	77
	Mean for all districts	56	26	15	3	82

Two features in the forecast service of the year are deserving of special mention. The first of these was the establishment at Ditchingham, in Norfolk, of a system of weather signalling, by means of which the terms of the forecasts were made known over a considerable area. The signals consisted of a ball, a drum, and a double cone, and were hoisted at about 5.30 p.m. each day, on the summit of Ditchingham Church tower, and remained up until the forenoon of the following day. The entire arrangements were organised and the expenses arranged for by F. Morrice, Esq., of Ditchingham Hall, who at the close of the time wrote as follows:—"The *signals* caused a wide "difference of opinion as to their utility, and some fierce opposition. On the whole I think they "were a great success. During the last week I shall call a meeting of farmers and others "interested, and if they agree, I hope another year to extend the system considerably, paying for "our own telegrams by subscription, and copying from one church tower to another." (M.O. 1879.) After a severe analysis of the *forecasts* Mr. Morrice reported that 72 per cent. (or, omitting the last week, 77 per cent.) were *right*; this result is even more satisfactory than that obtained by our own system of checking.

The other feature of interest in connexion with the service was the fact that there were this year as many as four subscribers for the forecasts, one in England, E., two in the Midland counties, and one in England, N.W. At the close of the time these persons were unanimous in their testimony to the success and value of the system. The subscribers in England, E. (Mr. Fergusson), wrote:—"There has not been one mistake during the time I have had them." (M.O. 1512.) From the Midland counties one of the recipients (Mr. Harcourt Vernon) wrote:—"My agent informs me "that they were wonderfully accurate, and of the greatest help to him and those of my tenants "who live near enough to use them." (M.O. 1868.) The other subscriber in this district (Lord Vernon) gave practical proof of his appreciation of the forecasts by depositing with the Office at the close of the time a sum of money sufficient to defray the cost of similar telegrams next year. The subscriber in England, N.W. (Mr. Earle), remarked that the forecasts had "answered every purpose." (M.O. 1511.)

The opinions of Mr. Jacob Wilson, Mr. Birkbeck, and Mr. Farrell, quoted in the larger table, are worthy of note.

I am, &c.

(Signed) FREDC. GASTER.

To R. H. Scott, Esq.,
Secretary, Meteorological Council.

HAY HARVEST FORECASTS, 1885.

RETURN showing the **NUMBER** of **FORECASTS** sent to each of the under-mentioned **PERSONS**, with the **SUCCESS** or otherwise of the **FORECASTS**.

Districts.	To whom sent.	Address.	No. of Forecasts sent.	No. of Forecasts checked.	Per-centages.				Remarks.
					Complete Success.	Partial Success.	Partial Failure.	Total Failure.	
0. SCOTLAND, N.	D. Melville, for the Rev. Dr. Joass.	Dunrobin Gardens, Golspie -	33	21	47·6	38·1	4·8	9·5	
	Major Smith -	Munlochy, Inverness - -	33	33	48·5	42·4	6·1	3·0	
1. SCOTLAND, E.	A. F. Leslie - -	Braes Grange, Banffshire -	30	30	53·3	40·0	6·7	—	
	G. Johnston -	The Gardens, Glamis, Forfar -	30	30	56·7	26·7	13·3	3·3	
	C. W. L. Forbes -	Aberfeldy - - -	30	30	60·0	26·7	13·3	—	
	W. S. Macdonald -	Craigielaw, Longniddry -	30	24	58·3	29·2	12·5	—	
2. ENGLAND, N.E.	J. Wilson - -	Chillingham Barnes, Chatton, Northumberland.	54	54	57·4	18·5	20·4	3·7	Mr. Jacob Wilson remarks "they are very much appreciated in my neighbourhood."
	J. Turner - -	The Grange, Ulceby - -	30	30	63·3	16·7	16·7	3·3	
3. ENGLAND, E.	W. Birkbeck -	High House, Thorpe, Norwich -	30	30	53·4	30·0	13·3	3·3	Mr. W. Birkbeck reports that with few exceptions the forecasts were "very accurate."
	F. Morrice - -	Ditchingham Hall, Bungay -	50	50	60·0	30·0	6·0	4·0	
	Sir J. B. Lawes, Bart.	Rothamsted, Harpenden -	30	18	77·8	11·1	11·1	—	
4. MIDLAND COUNTIES	Professor Ohm -	Royal Agricultural College, Cirencester.	30	30	63·4	23·3	10·0	3·3	
	C. King, for the Duke of Somerset.	Gerrard's Cross, Bucks - -	30	30	63·4	23·3	13·3	—	
5. ENGLAND, S.	C. Whitehead -	Barming House, Maidstone -	30	30	70·0	16·7	13·3	—	
	E. P. Squarey -	The Moot, Downton, Wilts -	30	30	50·0	40·0	10·0	—	
6. SCOTLAND, W.	W. Calder - -	Castlehill, Dalreock, Dumbarton	30	30	53·4	23·3	23·3	—	
	J. S. R. Ballingal -	Eallabus, Bridgend, Islay -	30	28	46·5	21·4	21·4	10·7	
	M. J. Stewart -	Ardwell, Stranraer - -	30	30	53·4	23·3	20·0	3·3	
7. ENGLAND, N.W.	G. W. Wray -	Leyburn, Yorkshire - -	30	30	63·3	16·7	16·7	3·3	
	F. Harrison, for the Earl of Derby.	Knowsley, Prescot - -	24	24	50·0	20·8	29·2	—	
	J. F. Smith, for the Lord Egerton of Tatton.	Tatton Park, Knutsford - -	78	78	41·0	32·0	16·7	10·3	
	Colonel T. P. Turbervilie	Ewenny Priory, Bridgend, Glamorgan.	30	30	53·4	40·0	3·3	3·3	
8. ENGLAND, S.W.	J. Harle, for the Earl of Ducie.	Whitfield, Falfield, R.S.O. -	30	30	70·0	13·3	16·7	—	
	T. Dyke - -	Long Ashton, Clifton, Bristol -	30	29	69·0	13·8	13·8	3·4	
	R. Neville - -	Butleigh Court, Glastonbury -	30	30	60·0	26·7	10·0	3·3	
9. IRELAND, N.	J. B. Johnstone -	Antrim Castle, Antrim - -	30	18	55·6	27·8	11·1	5·5	
	E. F. Farrell -	Moynalty, Kells - - -	40	40	50·0	22·5	17·5	10·0	Mr. E. F. Farrell, in asking for a continuance of the forecasts, says "they "have been most useful in regulating "farming operations."
	Rev. A. Brown -	The Manse, Hollymount -	30	30	40·0	30·0	23·3	6·7	
10. IRELAND, S.	D. A. McCready -	Larchvale, Moneygall - -	30	30	43·3	30·0	16·7	10·0	
	D. A. Milward -	Lavistown, Kilkenny - -	30	29	55·2	20·7	24·1	—	
	W. Talbot Crosbie -	Ardfert Abbey, Ardfert - -	30	30	50·0	30·0	13·3	6·7	

Submitted—The following report on the forecasts for October 1885 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

OCTOBER.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	26	56	41	88
,,	b	56	37	47	
,,	c	3	4	3	
,,	d	15	3	9	
Scotland, E.	a	19	63	41	76
,,	b	48	22	35	
,,	c	15	4	10	
,,	d	18	11	14	
England, N.E.	a	41	70	56	85
,,	b	37	22	29	
,,	c	15	8	12	
,,	d	7	0	3	
England, E.	a	22	48	35	72
,,	b	41	33	37	
,,	c	30	11	21	
,,	d	7	8	7	
Midland Cos.	a	30	67	49	76
,,	b	33	22	27	
,,	c	22	8	15	
,,	d	15	3	9	
England, S.	a	30	59	45	78
,,	b	41	26	33	
,,	c	22	11	17	
,,	d	7	4	5	
Scotland, W.	a	15	48	32	65
,,	b	48	19	33	
,,	c	26	11	19	
,,	d	11	22	16	
England, N.W.	a	19	48	34	69
,,	b	41	30	35	
,,	c	22	11	17	
,,	d	18	11	14	
England, S.W.	a	22	59	41	80
,,	b	56	22	39	
,,	c	22	11	16	
,,	d	0	8	4	
Ireland, N.	a	26	59	43	70
,,	b	33	22	27	
,,	c	30	11	21	
,,	d	11	8	9	
Ireland, S.	a	41	59	50	72
,,	b	23	22	22	
,,	c	33	8	21	
,,	d	4	11	7	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	48	58	53	78
,,	b	23	26	25	
,,	c	16	6	11	
,,	d	13	10	11	
Scotland, E.	a	45	55	50	84
,,	b	39	29	34	
,,	c	6	10	8	
,,	d	10	6	8	
England, N.E.	a	39	61	50	89
,,	b	55	23	39	
,,	c	3	6	5	
,,	d	3	10	6	
England, E.	a	32	45	39	78
,,	b	39	39	39	
,,	c	26	3	14	
,,	d	3	13	8	
Midland Cos.	a	35	61	48	81
,,	b	39	26	33	
,,	c	16	10	13	
,,	d	10	3	6	
England, S.	a	42	45	44	84
,,	b	42	39	40	
,,	c	10	10	10	
,,	d	6	6	6	
Scotland, W.	a	35	42	39	74
,,	b	42	29	35	
,,	c	10	6	8	
,,	d	13	23	18	
England, N.W.	a	35	32	34	76
,,	b	45	39	42	
,,	c	10	23	16	
,,	d	10	6	8	
England, S.W.	a	48	55	52	87
,,	b	39	32	35	
,,	c	10	10	10	
,,	d	3	3	3	
Ireland, N.	a	19	45	32	77
,,	b	55	35	45	
,,	c	10	10	10	
,,	d	16	10	13	
Ireland, S.	a	32	58	45	83
,,	b	49	26	38	
,,	c	13	3	8	
,,	d	6	13	9	

SUMMARY.

British Isles	a	27	58	43	76
,,	b	41	25	33	
,,	c	22	9	15	
,,	d	10	8	9	
British Isles	a	37	51	44	81
,,	b	42	31	37	
,,	c	12	9	10	
,,	d	9	9	9	

Submitted—The following statements of work for October 1885 :—

MARINE ROOM.

November 3, 1885.

Examined 19 new logs and 2 lighthouse registers.

North Atlantic Weather Charts.

The reduction of charts for August 1882 in progress.
September charts prepared for eidographing.
"Tracings" of all data made to end of August 1883.
Isobars and isotherms drawn to middle of August.
The female clerks completing the plotting of observations for August 1883, and steaming charts; also eidographing August 1882 charts.

General.

Discussion of Red Sea observations.
Copying observations made in an American log by Captain Randall on board the "Dynomene," during a voyage from New York to Bombay, Calcutta, and home. Also for shorter periods.
Additions made to logs 6222, 6246, and 6251.
Assistance given to the Office administration.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

1st July to 31st October 1885.

Monthly Weather Reports.—1885, *March, April,* and *May,* completed and published. 1885, *June, July,* in proof. 1885, *August,* ready for printer. 1885, *September,* tables and maps prepared.

Checking Daily Forecasts.—(3.30 p.m. and 8.30 p.m.) All done to date. Report for October herewith.

Weekly Weather Report, 1884—All completed (new preface, with tables, &c.) and published. 1885.—All numbers have appeared to date, and the third Quarterly Summary (July to September) has been published.

Inspection Notes for Telegraphic and Weekly Weather Report Stations prepared, and inspectors carefully instructed verbally as to peculiarities at various stations.

Instructions for using self-registering aneroids at selected Telegraphic Reporting Stations prepared and issued.

Report on Storm Warning Telegrams received from Chief Signal Officer, U.S., prepared and handed in to the Secretary.

Provisional Instructions to Telegraphic Reporters so as to take advantage of sixpenny rates prepared and issued. [Note.—The time occupied in getting the new system into working order was very considerable.]

Similar Alterations were necessary for other (Weekly Weather Report) stations, and were prepared and sent off.

Hay Harvest Forecasts, 1885—June completed. Accuracy of forecasts checked.

Preparation of New Monthly Rainfall Averages for Telegraphic and Weekly Weather Report Stations, so as to include values for the lustrum 1881–85 now closing; more than half done.

During this interval of four months the annual vacations of the various clerks have been taken. There has also been a great deal of sickness among the clerks. I was myself absent from this cause on four working days and one Sunday, and Mr. Francis was absent for nearly a month.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

November 2, 1885.

Quarterly Weather Report, Part IV., 1877.—Letterpress nearly ready for printer. Part I., 1878.—Chart Plates I. to IV. complete, except dates and figures.

Observatory Returns.—The calculation of mean values for August 1883 completed, and Hourly Readings for that month sent to printer. Proof of Hourly Readings revised to end of July 1883.

The calculation of mean pressure and temperature values for Kew (for the Annual Report of the Observatory) for the year ending September 1885 is in progress.

Harmonic Analyser.—The analysis of the barograms for the year 1871 has been completed.

Miscellaneous.—The Bunhill Row sunshine cards for the quarter ended September 1885 have been tabulated for the Royal Meteorological Society.

R. H. Scott, Esq., F.R.S. (Signed) R. H. CURTIS.

EXAMINATION ROOM.

SIR, November 2, 1885.

OWING to my late illness and the usual summer interval, this report embraces the period since February last, during which time the following work has been done:—

EXAMINATION.

April 1883:—Two *barograms* and six *anemograms*.
May 1883:—Four *thermograms*, four *barograms*, and seven *anemograms*.
June 1883:—Four *thermograms*, four *barograms*, and seven *anemograms*.
July 1883:—Four *thermograms*, four *barograms*, and five *anemograms*.
August 1883:—Four *thermograms*, four *barograms*, and five *anemograms*.
October 1884 to April 1885:—Kew *thermograms*, *barograms*, and *anemograms*.
May and June 1885:—Kew *thermograms* and *barograms*.
January to September 1885:—Such portions of the Valencia *thermograms* and *barograms* as are required for the report of the Registrar-General of Ireland.

REPORTS.

April to August 1883:—Monthly to Council.
April and May 1883:—*Notes of Errors* to all observatories.
June to August 1883:—*Notes of Errors* to Valencia, Aberdeen, Falmouth, Stonyhurst, and Kew.
October 1884 to April 1885:—*Notes of Errors* to Kew.

INVESTIGATIONS.

The remarkable agreement between the standards and tabulated values of the thermograph and barograph instruments at Falmouth Observatory (*report thereon submitted*).
Fluctuations of the barometer residuals during the months of November 1884 to October 1885 at Kew Observatory (*report thereon submitted*).
Defect in barograph curves at Kew Observatory, September 1885.
Sudden changes of barometer residual at Valencia Observatory, October 1885.
Scale value of Falmouth dry-bulb thermograph instrument.

ABSENCE of STAFF.

A severe attack of rheumatic fever enforced my absence from 19th March to 4th July, and Mr. Aldridge has had the annual vacation.
The acknowledgement of receipt, and examination of the weekly curves and documents have occupied a fortnight, extending over the period.

I am, &c.
R. H. Scott, Esq., F.R.S. (Signed) T. E. ALLEN.

Reported—That the following cheques had been drawn during the month of October:—

1885.			£	s.	d.
Oct.	3rd	J. S. Harding, jun., petty cash	50	0	0
,,	21st	,, ,,	50	0	0
,,	,,	Gas Light and Coal Co., gas	2	9	3
,,	,,	Pall Mall Coke Co., coals	14	0	0
,,	,,	Anglo-American Telegraph Co., telegrams	1	18	0
,,	,,	Kew Committee, verifications	32	5	0
,,	,,	Negretti & Zambra, instruments and repairs	235	19	8
,,	,,	Royal Meteorological Society, observations	33	6	8
,,	,,	H.M. Postmaster General, telegrams	221	16	3
,,	30th	R. H. Scott, salary	66	13	4
,,	,,	J. S. Harding, jun. } "Office" salaries	27	15	6
,,	,,	T. D. Bell } "Office" salaries	15	0	0
,,	,,	J. Sheerman, harmonic analysis	10	0	0
,,	,,	J. E. Cullum, Valencia observatory	16	13	4
,,	,,	R. H. Curtis } Discussion, &c. of observations	22	10	0
,,	,,	J. A. Curtis } Discussion, &c. of observations	17	10	0
,,	,,	T. E. Allen } Discussion, &c. of observations	16	5	0
,,	,,	C. H. Thompson } Discussion, &c. of observations	11	13	4
,,	,,	S. Coll } Discussion, &c. of observations	10	16	8
,,	,,	E. G. Aldridge } Discussion, &c. of observations	8	15	0
,,	,,	R. G. Canham } Discussion, &c. of observations	6	10	4
,,	,,	A. H. Bell } Discussion, &c. of observations	6	13	4
		Carried forward	£878	10	8

1885.			£	s.	d.
		Brought forward - -	878	10	8
Oct. 30th	F. Gaster -	Preparation, &c. of Weather Reports.	31	3	3
,, ,,	F. J. Brodie -		20	18	10
,, ,,	G. G. Francis -		21	13	9
,, ,,	A. J. Rigby -		16	8	1
,, ,,	R. Sargeant -		13	5	3
,, ,,	A. R. Simpkins -		9	7	6
,, ,,	H. J. Stevens -		8	6	8
,, ,,	Captain H. Toynbee - -	Discussion &c. of observations and care of instruments.	33	6	8
,, ,,	Nav. Lieut. C. W. Baillie, R.N.		20	16	8
,, ,,	R. Strachan - - -		27	15	6
,, ,,	C. Harding - - -		22	10	0
,, ,,	H. Harries - - -		14	3	4
,, ,,	W. Allingham - - -		14	3	4
,, ,,	W. G. James - - -		10	8	8
,, ,,	F. T. Bullen - - -		8	15	0
,, ,,	R. F. Wallace - - -		7	18	4
,, ,,	Bank of England, sale of stationery, Office forms -		1	3	6
,, ,,	A. Buchan, travelling expenses - - -		42	8	6
,, ,,	D. McGregor & Co., Glasgow agent - - -		18	10	1
,, ,,	T. W. Baker, travelling expenses - - -		18	0	11
,, ,,	G. M. Whipple ,, - - -		31	9	7
,, ,,	J. S. Harding, jun., petty cash - - -		40	0	0
			£1,311	7	1

116, *Victoria Street, November* 18, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	MR. STONE.
MR. GALTON.	THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (November 4) were read and confirmed.

Read—The following letter (Minutes, p. 43) :—

(M.O. 2511.)

DEAR SIR, The Observatory, Glasgow, November 13, 1885.

WILL you kindly inform the Meteorological Council that the Town Council of Glasgow and the Clyde Trustees have each agreed to give a yearly subscription of 100*l.* towards the maintenance of the meteorological work of the Observatory and the distribution of time signals.

The thermograph has been in operation since Mr. Whipple was here, and continues to give very satisfactory results. All the other instruments are actively employed.

Believe me, &c.
(Signed) R. GRANT.

Robert H. Scott, Esq.

The Chairman was requested to prepare a reply.

Submitted—The pressure charts of barometrical pressure for all the oceans, prepared by Lieut. Baillie (Minutes, 1882, p. 56).

The Secretary was instructed to have these charts engraved, after revision by the Hydrographer.

Read—A memorandum from Captain Toynbee, reporting that since the last meeting ten logs had been received, six of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. T. B. Bouchette.	S.S. "Montreal"	May 15—Nov. 12, 1885.	Liverpool and Montreal, six voyages.	1885, p. 17.
Capt. L. C. Dart -	"Alcester" -	Nov. 3, 1884—Oct. 25, 1885.	Liverpool, Bombay, Rangoon and home.	1884, p. 48.
Capt. W. D. Fraser -	Barque "Thomas S. Stowe."	Nov. 19, 1884—Sept. 3, 1885.	Goole to Buenos Ayres, Adelaide, Port Pirie, and home.	——
Capt. Moses Parry -	S.S. "Prydain"	April 8—Oct. 24, 1885.	Mediterranean Ports, New York and home.	1885, p. 17.
Capt. C. W. Pearson	S.S. "Strathleven."	Feb. 11—Aug. 5, 1885.	New York, Shanghai, Nagasaki, and home.	1884, p. 113.
Capt. Herbert Pomeroy.	"Elissa" - -	Sept. 15, 1883—March 13, 1884.	Newport, Tampico and home.	1883, p. 54.

Mr. Scott was instructed to present the Charts (O. 27) to Captain Fraser, and to convey the best thanks of the Council to the other observers.

Read—A letter (No. 2449) from Miss M. E. Anderson, requesting an extension of leave, without pay, for a further period of three months (Minutes, p. 40).—Sanctioned.

Submitted—A memorandum stating that for the Helm Wind observations (Minutes, p. 61), the following instruments must be ordered :—

24 sling thermometers,
12 rotators for do.
2 Stevenson's screens.

—Approved.

Submitted—The following memoranda :—

MATERIALS for preparing ESTIMATES for the year 1886–87.

	Data for framing Estimates.	Estimated Expenditure for 1886–87.	Proposed for Estimates for 1886–87.	Proposed for last year.
Administration :		£	£	£
(1.) Council	- -	1,000	1,000	1,000
(2.) Secretary	- -	800	800	800
(3.) Salaries :—	- -	790	800	767
Chief Clerk	333			
1 Junior Clerk	*185			
2 Boys	88			
Office Keeper	109			
Messenger	65			
	780			
There will be probably an increase in the pay of the two boys.				
(4.) Rent, fuel, and lighting	- -	705	700	700
Payments for one year ending 30th Sept. 1885 :—				
Rent	635			
Fuel	41			
Gas	27			
	703			
(5.) Incidental and contingent expenses	- -	430	450	450
Payments for one year ending 30th Sept. 1885:—				
Office Keeper's contingent account, including porter's allowance for cleaning, &c.	194			
Postage	78			
Furniture and Office repairs	83			
Carriage of parcels, &c.	18			
Stationery Office: Annual Reports and sale of forms	17			
Copying synchronous observations	9			
Books	22			
International meteorology	18			
Sundries	36			
	475			
Deduct repayments under this head, including "Commission"	49			
	426			
(6.) Pensions	- -	43	40	43
Mr. J. S. Harding, senr.				
Special Researches and Experiments	- -	1,000	1,000	1,000
Salaries :—				
Harmonic analysis (Mr. Sheerman)	*125			
Atlantic synchronous work (female staff)	234			
Other payments for one year ending 30th September 1885 :—				
Copying observations for M. Neumayer	2			
Bridled anemometer (Holyhead)	10			
Scilly anemometer	8			
Clouds	51			
Instruments (Légé)	34			
Sunshine cards	31			
Payment to Mr. Abercromby	60			
„ Dr. Russell	50			
Ben Nevis Observatory	100			
U. S. telegrams	51			
Sundries	6			
	762			
Deduct repayments under this head	26			
	736			
The amount under this head is, as usual, put at 1,000*l.*, without regard to expenditure. It is proposed to include the U. S. reports and allowance to Ben Nevis Observatory under Telegraphy in the year 1886–7.				
Carried forward	- -	4,768	4,790	4,760

* Increment specified in Minutes of 1884–5, p. 119, allowed for.

	Data for framing Estimates.	Estimated Expenditure for 1886–87.	Proposed for Estimates for 1886-87.	Proposed for last year.
	£	£	£	£
Brought forward - - -	- -	4,768	4,790	4,760
Land Meteorology:				
(1.) Observatories and stations - - - -	- -	1,740	1,760	1,750
(Regular allowances to observatories):—				
Aberdeen - - - - - -	266			
Armagh - - - - - -	51			
Falmouth - - - - - -	250			
Kew - - - - - -	415			
Stonyhurst - - - - -	56			
Valencia (including rent and salaries) - -	445			
Four anemograph stations - - -	44			
Observations supplied by Meteorological Societies -	142			
Instruments - - - - -	64			
Sundries - - - - - -	3			
	1,736			
The charge for instruments will perhaps not exceed the amount for the past year.				
(2.) Salaries:—Discussion and reduction of observations -	- -	1,380	1,380	1,300
2 Senior Clerks - - - -	*490			
6 Junior Clerks - - - -	*760			
3 Boys - - - - - -	114			
	1,364			
This list includes the late Pantagraph Branch, now engaged on the Quarterly Weather Report, and the Computation and Examination Branches. There will be probably an increase in the pay of the boys.				
Weather Information and Forecasts - - - -	- -	2,200	2,400	2,750
(1.) Telegraphic reports and storm warnings:				
Payments for one year ending 30th September 1885:—				
Reports to Meteorological Office - -	1,024			
Reports sent abroad - - - -	521			
Storm warnings - - - -	471			
Hay harvest forecasts - - - -	48			
Private wires - - - - -	93			
Payments to reporters, &c. - - -	608			
Reports to Jersey - - - -	38			
Sundry telegrams, forecasts, &c. - -	22			
Postage of charts and incidental expenses -	229			
Instruments, screens, &c. - - -	57			
Delivery of charts by hand - - -	33			
Wrappers, printing, &c. - - -	22			
Sundries - - - - -	18			
	3,184			
Repayments during the same period - - £608				
Deduct for possible saving by the introduction of Sixpenny Telegrams - - 400				
	1,008			
	2,176			
The amount stated on Minutes of 21st October as the probable saving on telegrams (viz., 500*l.*), has for the present been reduced to 400*l.*, the arrangements with the Post Office regarding repetition not being yet settled. The storm warnings issued will nearly cost 1*s.* each, owing to the amount of detail it is considered necessary to put in them. It is proposed to include the U. S. telegrams and allowance to Ben Nevis Observatory under this head in future.				
Carried forward - - -	- -	10,088	10,330	10,530

* Increments specified in Minutes of 1884–5, pp. 118–119 allowed for.

	Data for framing Estimates.	Estimated Expenditure for 1886–87.	Proposed for Estimates for 1886–87.	Proposed for last year.
	£	£	£	£
Brought forward - - -	- -	10,088	10,330	10,530
(2.) Salaries:—Preparation and issue of reports and forecasts - - - - - - -	- -	1,650	1,650	1,530
1 Senior Clerk (9 hours daily) - - -	*309			
6 Junior Clerks (5 work 9 hours daily) - -	*988			
2 Boys - - - - - - -	83			
1 Messenger - - - - - -	55			
Addition for late evening and Sunday attendance. The payments for this, for one year ending 30th Sept. 1885, were - - - - -	200			
	1,635			
There will probably be an increase in the pay of the boys.				
Inspections - - - - - - - -	- -	550	550	550
Salaries of Messrs. Buchan and Ley - - -	300			
Travelling Charges for current year:				
Mr. Baker - - - - -	18			
Mr. Buchan - - - - - -	44			
Mr. Ley - - - - - -	53			
Mr. Scott - - - - - -	45			
Captain Toynbee - - - - -	17			
Mr. Whipple - - - - - -	31			
Contribution to Royal Meteorological Society - -	25			
	533			
There is a decrease under this head this year.				
Ocean Meteorology:				
(1.) Salaries:—Discussion and reduction of observations -	- -	1,850	1,850	1,820
Marine Superintendent - - - -	400			
Assistant „ - - - -	250			
1 Senior Clerk (in charge of instruments) -	333			
1 „ „ („ Marine Rooms) -	*275			
5 Junior Clerks - - - - -	*690			
2 Temporary Clerks - - - -	104			
	2,052			
Deduct proportion chargeable to care and issue of instruments (say) - - - -	200			
	1,852			
(2.) Salaries:—Proportion chargeable to care and issue of instruments - - - - -	- -	200	200	200
(3.) Supply of instruments to the Royal Navy - -	- -	250	300	200
Payments for one year ending 30th Sept. 1885:—				
Instruments, repairs, &c. - - -	231			
Verifications - - - - -	29			
[Receipts during same period 3*l.*]	260			
(4.) Supply of instruments, &c. to Mercantile Marine -	- -	350	400	420
Payments for one year ending 30th Sept. 1885:—				
Instruments and repairs - - -	129			
Verifications - - - - -	19			
Agents fees, &c. - - - -	159			
Packing cases - - -	21			
Presentation labels - - - -	5			
[Receipts during the same period 50*l.*]	333			
(5.) Distant island or coast stations - - -	- -	20	20	20
The only regular payments under this head are for care of anemometer at Bermuda, 18*l.* 5*s.* 0*d.* a year.				
Totals - - - -	- -£	14,958	15,300	15,300

* Increments specified in Minutes of 1884–5, pp. 118–19, allowed for.

The actual expense, estimated as closely as possible, may be taken as about 15,000*l.*, leaving 300*l.* to be distributed over various heads. Of this amount 200*l.* has been allocated to *Weather Information*, as the greatest fluctuation will occur under this head.

[J. S. H.]

SYNOPSIS of OFFICE SALARIES.

Service.	1886-87.	1885-86.	1886-87. Increase.
	£	£	£
Administration - - -	1,580	1,575	5
Special Researches - -	359	354	5
Land Meteorology - -	1,364	1,324	40
Weather Information - -	1,635	1,585	50
Ocean Meteorology - -	2,052	2,022	30
Totals - - £	6,990	6,860	130

In the above statement the payment of 1,000*l.* to the Council is not included.
The amounts stated are the salaries authorised by Minutes of 1884, pp. 118-19, for the respective years, with the addition of an approximate amount for late evening and Sunday attendance.

METEOROLOGICAL OFFICE. ESTIMATES for the Year 1886-87.

Heads of Service.	Proposed for 1886-87.		Proposed for 1885-86.		1886-87. Increase.	1886-87. Decrease.
Administration:	£	£	£	£	£	£
Payment of Council - - -	1,000	- -	1,000			
Secretary - - - - -	800	- -	800			
Salaries and wages - - -	800	- -	767			
Rent, fuel, and lighting - - -	700	- -	700			
Incidental and contingent expenses -	450	- -	450			
Pensions - - - - - -	40	- -	43			
		3,790		3,760	30	
Special Researches and Experiments -	- -	1,000	- -	1,000		
Land Meteorology:						
Observatories and stations - - -	1,760	- -	1,750			
Discussion and reduction of observations -	1,380	- -	1,300			
		3,140		3,050	90	
Weather Information and Forecasts:						
Telegraphic reports and storm warnings -	2,400	- -	2,750			
Preparation and issue of reports and forecasts - - - - - -	1,650	- -	1,530			
		4,050		4,280	- -	230
Inspections:						
Salaries and travelling expenses - -	- -	550	- -	550		
Ocean Meteorology:						
Discussion and reduction of observations -	1,850	- -	1,820			
Expenses incidental to the supply of instruments:						
Care and issue of instruments -	200	- -	200			
Royal Navy - - - -	300	- -	200			
Mercantile Marine - - -	400	- -	420			
Distant islands (and coast) stations -	20	- -	20			
		2,770		2,660	110	
Totals - - - £	- -	15,300	- -	15,300	230	230

[R. S.]

The estimates were approved, and the Secretary was instructed to forward a copy to the Treasury (P.C. 2382).

116, *Victoria Street, December* 2, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (November 18) were read and confirmed.

Reported—That the following letter had been sent to Professor Grant (Minutes, p. 74), and that the subjoined reply had been received :—

(P.C. 2420.)

DEAR SIR, November 25, 1885.

I AM directed by the Meteorological Council to inform you that they have received with much satisfaction the statements (in your letter of the 13th inst.) that the continued operation of the self-recording meteorological instruments at Glasgow, has now been secured, through the liberality of the Town Council and the Clyde Trust, and they will be glad if you will convey to those bodies the acknowledgments of the Council.

I am further to inform you that the Council will be glad to enter into an arrangement with you on the same basis as that now in force with the College at Stonyhurst, for the supply to this Office of duplicate photographic traces of the barogram and thermogram, and tracings of the wind and rain registers, together with the sunshine cards as heretofore, and tabulated daily registers of the usual meteorological observations prepared at Stations of the Second Order and the weekly returns of "Agricultural Statistics of the Weather," in the form adopted for the publications of the Meteorological Council. (Specimens of these forms are enclosed.)

In consideration of the supply of this information, should you feel able to undertake it, the Council will make a yearly grant of 56*l*, with a quarterly allowance for postage, on your sending in a statement of the actual disbursements.

The Council hope that this may enable you to continue the valuable work which has been going on under your supervision for so long a period at Glasgow, in a form which will ensure its being kept among the records of this Office, and they request that they may be favoured with a reply on the subject at your early convenience.

I am, &c.
(Signed) ROBERT H. SCOTT,
Secretary.

Prof. R. Grant, F.R.S.,
Observatory, Glasgow.

(M.O. 2669.)

DEAR SIR, The Observatory, Glasgow, November 30, 1885.

I HAVE received your letter of the 25th instant. It would give me great pleasure indeed to co-operate in the important work in which the Meteorological Council are engaged, but I regret to state that the terms proposed are not such as I can accept.

I consider that an allowance of fifty pounds yearly is nothing more than fair remuneration for the work which the Council proposes, *independently of supplying duplicate copies of the barograms and thermograms*. To this latter part of the proposed arrangement there would, therefore, remain to be assigned a remuneration of only six pounds, which I regard as altogether inadequate, more especially considering the personal sacrifice which I have made during the last two years to maintain the continuity of the meteorological observations conducted at this observatory.

I shall be very glad to undertake the work proposed by the Council on the consideration of receiving by way of remuneration an annual allowance of seventy-five pounds. Furthermore, I would cordially undertake, on the occasion of a great storm, to supply the Council with the *temporary* use of the anemograms relating thereto.

The University of Glasgow has cordially given me its moral support in my efforts to obtain the means of continuing the meteorological work of the observatory. It is with the sanction of the University that the work is carried on, and the originals will be carefully preserved in the observatoy as University property.

I shall be obliged by your laying this letter before the Council.

And believe me, &c.
(Signed) R. GRANT.

Robert H. Scott, Esq.

The Chairman was requested to draft a reply.

Read—The following letter (Minutes, 1884, p. 3) :—

(M.O. 2645.)

21, Chapel Street, Belgrave Square,
London, S.W., November 26, 1885.

DEAR MR. SCOTT,

HEREWITH I send 21 cloud negatives, which with the four others sent May 9, 1884, complete the set of 25, which I arranged to supply the Office with for 25*l.*, as *per* your letter of April 9, 1884, No. 858.

I also send proofs of the whole set, and a descriptive list of them in enclosure marked A. [not printed here].

You will observe that several are given in pairs, which were taken at intervals of about two minutes. These are very valuable for showing the motion and changing forms of clouds.

In all the English examples, the shape of isobars with which the clouds were associated has been recorded.

There are still many interesting varieties of cloud, such as "mackerel," &c., which I have not been able to obtain at present, and I should be very glad to receive a commission from the Council for another set.

As, however, the cost of producing this set has been much greater than I had anticipated, I would suggest that a new set, if required, should be at the slightly higher rate of 25*l.* for 20 negatives, C.D.V. size.

I have, &c.
(Signed) R. ABERCROMBY.

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

The Secretary was instructed to pay the amount agreed upon by the Council.

The Secretary reported that a second edition of the "Principles of Forecasting by Means of Weather Charts" had been called for by the Stationery Office, and that Mr. Abercromby had supplied some corrections to the book, and had forwarded the following letter (Minutes, 1884, p. 98) :—

(M.O. 2590.)

21, Chapel Street, Belgrave Square,
London, S.W., November 28, 1885.

DEAR MR. SCOTT,

HEREWITH I return a revise of my "Principles of Forecasting."

Would you ask the Council if they would be willing to allow me something for the second edition of my book.

I might be allowed to point out that the 75*l.* which I have received is very small remuneration for a work of 106 pp., without appendices, of royal 8vo. type.

Few magazines give less than 1*l.* a page; a work of research requires far more labour than an ordinary article.

Yours, &c.
(Signed) R. ABERCROMBY.

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

Submitted—A specimen of one page of the proposed issue of North Atlantic Weather Charts.—Approved.

Read—A letter (No. 2667) from Mr. Whipple, reporting that the electrical anemometer (Minutes, p. 63) had been set in order by Mr. Kempe.

The Secretary was instructed to have the instrument returned to Kew (P.C. 2497).

Read—A letter (No. 2650), from Valencia, containing estimates for necessary repairs at the observatory (Minutes, p. 44), which were approved, as follows :—

	£	s.	d.
Resetting water still and repairs to anemometer -	5	10	0
Repairs to sea wall - - - -	5	0	0

Read—A letter (No. 2666), from Mr. Whipple, recommending that a present of a binocular glass be made to Mr. Windler, the mechanician of the Anglo-American Co. at Valencia, in return for assistance frequently rendered in alterations, &c., to the instruments.—Sanctioned; price not to exceed 5*l.*

Read—Letter 2647, from Herr Rudolph, of Strassburg, requesting that one of the clerks would extract for him notices of earthquake shocks from the logs, at his expense.—Sanctioned.

Submitted—The following report on the forecasts for November 1885 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

NOVEMBER.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	48	60	54	86
"	b	28	36	32	
"	c	16	4	10	
"	d	8	0	4	
Scotland, E.	a	32	52	42	80
"	b	48	28	38	
"	c	16	16	16	
"	d	4	4	4	
England, N.E.	a	48	60	54	86
"	b	28	36	32	
"	c	20	4	12	
"	d	4	0	2	
England, E.	a	48	40	44	76
"	b	32	32	32	
"	c	8	12	10	
"	d	12	16	14	
Midland Cos.	a	28	40	34	78
"	b	44	44	44	
"	c	12	0	6	
"	d	16	16	16	
England, S.	a	48	48	48	80
"	b	28	36	32	
"	c	20	4	12	
"	d	4	12	8	
Scotland, W.	a	24	64	44	76
"	b	36	28	32	
"	c	28	4	16	
"	d	12	4	8	
England, N.W.	a	44	52	48	74
"	b	20	32	26	
"	c	28	8	18	
"	d	8	8	8	
England, S.W.	a	40	60	50	78
"	b	20	36	28	
"	c	24	0	12	
"	d	16	4	10	
Ireland, N.	a	44	64	54	76
"	b	20	24	22	
"	c	28	8	18	
"	d	8	4	6	
Ireland, S.	a	24	72	48	68
"	b	36	4	20	
"	c	28	4	16	
"	d	12	20	16	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecasts.	Percentage of Success a + b.
Scotland, N.	a	50	54	52	87
"	b	30	40	35	
"	c	10	3	7	
"	d	10	3	6	
Scotland, E.	a	50	44	47	89
"	b	40	43	42	
"	c	7	10	8	
"	d	3	3	3	
England, N.E.	a	33	57	45	77
"	b	40	23	32	
"	c	17	13	15	
"	d	10	7	8	
England, E.	a	37	47	42	84
"	b	50	33	42	
"	c	10	10	10	
"	d	3	10	6	
Midland Cos.	a	33	57	45	79
"	b	40	27	34	
"	c	24	6	15	
"	d	3	10	6	
England, S.	a	47	60	54	87
"	b	43	24	33	
"	c	7	13	10	
"	d	3	3	3	
Scotland, W.	a	47	50	49	84
"	b	30	40	35	
"	c	17	10	13	
"	d	6	0	3	
England, N.W.	a	50	37	44	82
"	b	30	47	38	
"	c	17	13	15	
"	d	3	3	3	
England, S.W.	a	33	47	40	85
"	b	50	40	45	
"	c	7	13	10	
"	d	10	0	5	
Ireland, N.	a	43	60	52	82
"	b	37	23	30	
"	c	17	10	13	
"	d	3	7	5	
Ireland, S.	a	43	64	54	79
"	b	37	13	25	
"	c	7	13	10	
"	d	13	10	11	

SUMMARY.

British Isles	a	39	56	48	78
"	b	31	30	30	
"	c	21	6	14	
"	d	9	8	8	
British Isles	a	42	53	48	83
"	b	39	32	35	
"	c	13	10	12	
"	d	6	5	5	

Submitted—The following statements of work for November 1885 :—

MARINE ROOM.

December 2, 1885.

Examined 16 new logs.

North Atlantic Weather Charts.

Five sheets of charts (August 1–15, 1882) reduced and sent to lithographer. Reduction of remainder of month nearly completed, and September commenced.

Isobars drawn for several days of August 1883.

There are now four eidographs fully employed in reducing the charts for lithography.
The female clerks are engaged entirely on eidographing.

General.

Extraction of Red Sea data for January and July, and tentative discussion of a portion of the January observations.
Copying observations from rough books into logs 6271 and 6291.
Assistance given to the Office administration.

(Signed) CHAS. HARDING.

The Marine Superintendent.
Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.
(To 30th November 1885.)

Monthly Weather Report, 1885:—
May, June, July.—Printed and published.
August.—Sent "for press;" copies expected daily.
September.—Copy nearly ready for printer.
October.—Tables prepared, and values plotted on maps.
Weekly Weather Report.—Numbers all issued to date.
Checking of Daily Forecasts, 3.30 p.m. and 8.30 p.m.—Complete to date. Monthly summary of results for November is in course of preparation.
Preparation of Monthly Means of Rainfall for 20 years, 1866–85.—Almost complete to date.
Drawing of Curves, showing mean fall for each week at each of the stations in the Weekly Weather Report, for use in preparing said report.—Commenced.
Report on Prevalence of Gales on British Coasts during each month of years 1871–1884 (for Hydrographer).—One year done. Some delay, as printer has not sent in the forms yet.
During this month Mr. Rigby has been absent for one week on sick leave.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

December 1, 1885.

Quarterly Weather Report:—
Part IV., 1877.—The whole of the letter-press, tables, and plates completed and sent to printer, and proof of letter-press and tables revised.
Part I., 1878.—Chart-plate V. commenced.
Observatory Returns.—Proof of Hourly Readings revised for about two-thirds of the month of August 1883. The calculation of the daily and five-day means for September 1883 is now in hand.
The mean pressure and temperature values for Kew, for the year ending September 1885, completed.
Harmonic Analyser.—The calculation of the temperature coefficients, from the corrected data, completed to end of 1878, and checked to end of 1876.
Miscellaneous.—The Krakatoa air-wave charts have been worked upon for a few days. I was absent from office the greater part of one week upon a jury summons.

(Signed) R. H. CURTIS.

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

EXAMINATION ROOM.

SIR, December 1, 1885.

THE following is a report of the work done during the month of November:—

Examinations.

September (1883).—Four *thermograms* and two *barograms*.
July (1885).—One *thermogram* and one *barogram*.
August (1885).—One *thermogram* and one *barogram*.
September (1885).—One *thermogram* and one *barogram*.

Reports.

May–September 1885.—Notes of errors to Kew.
March–October, 1885.—On work done to Council.

Miscellaneous.

Revising and preparing forms Nos. 21, 22, 23, and 43.
Preparing and revising proof of "Diary of Operations, 1866."
Revising instrumental corrections, &c., from Inspectors' reports.
Acknowledgment of receipt, and examination of the weekly curves and documents.

I am, &c.

R. H. Scott, Esq., F.R.S. (Signed) T. E. ALLEN.

Read—A memorandum from Captain Toynbee reporting that since the last meeting six logs had been received, three of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. H. King Sturdee.	Schooner "Richmond."	June 8—Oct. 9, 1885.	Light house tender, Bahamas.	—
Capt. Joseph Davies	S.S. "Archimedes," S.S. "Flaxman."	Jan. 9—Nov. 15, 1885.	Liverpool, Rio Janerio, New York, Montevideo.	—
Capt. G. Scott -	S.S. "Iolanthe"	April 28—Oct. 26, 1885.	China, Manila, and San Francisco.	1885, p. 47.

Mr. Scott was instructed to present the charts (O. 27) to Captains Sturdee and Davies, and to convey the best thanks of the Council to Captain Scott.

Read—A letter (No. 2639), from W. Parsons, requesting that his allowance for printing the forecasts be increased from 3*s.* to 5*s.* per week.—Granted.

Resolved—That the usual gratuity of 3*l.* 3*s.* be allowed, as in former years (Minutes, 1884, p. 82), to those of the telegraphic reporters who have observed for the complete year.

Reported—That the cash accounts for the six months ended the 30th September 1885 had been audited this day by the Chairman and Professor Darwin, and would be sent forthwith to the Treasury for the Audit Office. The receipts for the six months, exclusive of a balance of 1,743*l.* 4*s.* 10*d.* on the 1st April, amounted to 7,500*l.* 13*s.* 5*d.* The payments amounted to 7,052*l.* 12*s.* 8*d.*, leaving a balance of 2,191*l.* 5*s.* 7*d.* in hand and at the Bank on the 1st October 1885.

Reported—That the following cheques had been drawn during the month of November:—

1885.			£	*s.*	*d.*
Nov. 7.	For weekly salaries - - - - - -		15	1	0
„ 14.	„ „ - - - - - -		15	1	0
„ 18.	G. A. Gillett, wood, oil, &c. - - - -		2	11	3
„ „	H. Bond, office repairs, &c. - - - - -		38	19	6
„ „	Anglo-American Telegraph Co., telegrams - - -		4	3	8
„ „	Kew Committee, verifications - - - -		4	10	0
„ „	Postmaster-General, telegrams - - - -		209	19	0
„ „	Wightman and Co., printing and wrappers - - -		7	0	0
„ „	A. Buchan, travelling expenses - - - -		4	1	6
„ „	J. S. Harding, petty cash - - - - -		20	0	0
„ 21.	For weekly salaries - - - - - -		15	1	0
„ 28.	„ „ - - - - - -		15	1	0
„ 30.	R. H. Scott - - -	Salaries - -	66	13	4
„ „	J. S. Harding, junr. - -		27	15	6
„ „	T. D. Bell - - -		15	0	0
„ „	J. Sheerman - - -		10	0	0
„ „	J. E. Cullum - - -		16	13	4
„ „	R. H. Curtis - - -		22	10	0
„ „	J. A. Curtis - - -		17	10	0
„ „	T. E. Allen - - -		16	5	0
„ „	C. H. Thompson - - -		11	13	4
„ „	S. Call - - - -		10	16	8
„ „	E. G. Aldridge - - -		8	15	0
„ „	R. G. Canham - - -		6	13	4
„ „	A. H. Bell - - -		6	13	4
„ „	F. Gaster - - - -		31	16	3
„ „	F. J. Brodie - - -		21	1	10
„ „	G. G. Francis - - -		21	5	0
„ „	A. J. Rigby - - -		16	8	1
	Carried forward - - -		678	18	11

1885.			£	s.	d.
	Brought forward - - -		678	18	11
Nov. 30.	R. Sergeant - - -	Salaries - -	13	12	11
„ „	A. R. Simpkins - - -		9	7	6
„ „	H. J. Stevens - - -		8	6	8
„ „	Capt. H. Toynbee - -		33	6	8
„ „	Nav.-Lieut. C. W. Baillie, R.N. -		20	16	8
„ „	R. Strachan - - -		27	15	6
„ „	C. Harding - - -		22	10	0
„ „	H. Harries - - -		14	3	4
„ „	W. Allingham - - -		14	3	4
„ „	W. G. James - - -		10	8	8
„ „	F. T. Bullen - - -		8	15	0
„ „	R. F. Wallace - - -		7	18	4
„ „	Hopkin and Williams, chemicals - - - -		4	15	7
„ „	Johnson, Matthey, & Co., chemicals - - -		5	13	0
„ „	A. Buchan, salary - - - - - -		75	0	0
„ „	W. C. Ley, travelling expenses - - - -		53	9	7
„ „	J. Green, care of Bermuda anemometer - - -		4	12	0
„ „	J. S. Harding, junr., petty cash - - - -		50	0	0
			£1,063	13	8

116, *Victoria Street, December* 23, 1885.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (December 2) were read and confirmed.

Read—The following correspondence (Minutes, p. 79):—

(M.O. 2669.)

Meteorological Office, December 12, 1885.

DEAR SIR,

WITH reference to your letter of the 30th ultimo, before coming to a final decision as to the proposal made by you that you should receive a grant of 75*l.* instead of 56*l.*, the Council will be glad to be informed precisely with what data you contemplated supplying the Office for the larger sum. They also request that you will say whether the photographic results are at present tabulated by you or how they are dealt with, and whether these records are checked by eye observations at stated hours.

It is perhaps as well also to inform you that the Council intended to undertake the regular inspection of the instruments by a trained person from Kew, so as to maintain, as far as possible, complete uniformity of method in the system of obtaining the photographic records.

(Signed) ROBERT H. SCOTT,
Secretary.

Prof. R. Grant, F.R.S.,
Observatory, Glasgow.

(M.O. 2821.)

The Observatory, Glasgow,
December 16, 1885.

DEAR SIR,

I HAVE received your letter of the 12th instant.

I intend carrying out a system of measurement tabulation and computation leading to the determination of the diurnal inequalities of the various meteorological elements. Eye observations of the barometer and dry and wet bulb thermometer have been taken here from the beginning of 1868 down to the present day without a single break so far as I remember.

They have consisted of six daily readings of each instrument on ordinary week days and two readings on Sundays.

I shall always be glad to receive any persons whom the Meteorological Council may send down here, either from the Meteorological Office or from Kew, and shall most willingly adopt any useful suggestions which they may make. Mr. Whipple will inform the Council that I have always cordially entered into his views when he paid me any of his official visits. But I must frankly inform you that I cannot agree to the inspection of this observatory by any person (*outside Kew*), who is not wholly under the control of the Meteorological Council.

I shall be very glad to supply the Meteorological Council, on the terms proposed by me in my letter of the 30th November, with the following observational results :—

1. Duplicate photographic tracings of barogram and thermogram.
2. Tracings of the wind and rain registers.
3. Eye readings of standard barometer and thermometer (dry and wet bulb).
4. Registers of sunshine.
5. Results adapted to Stations of the Second Order.
6. Weekly returns of agricultural statistics of the weather.

I should always be very glad, on the occurrence of a great storm, to supply the Council *temporarily* with the *original* anemograms, taking of course the precaution to have them carefully measured, and copies of them traced out before despatching them from the Observatory.

I am, &c.

Robert H. Scott, Esq. (Signed) R. GRANT.

The Secretary was instructed to inform Professor Grant that the Council would agree to the proposal contained in his letter.

Read—The following memorandum :—

MEMORANDUM.

Lieutenant Baillie has all but completed his present task of the pressure charts; I propose therefore that he should be directed to take up the currents of the world.

More detailed charts of these will not only be of great practical service to the mariner, but will be of great scientific interest in connection with the circulation of the ocean, and especially in relation to the charts of mean temperatures of the surface recently published.

I should propose that monthly charts be undertaken, thus utilizing every document in the Office with an eventual economy of time.

A vast mass of information on this head will be forthcoming from logs of H.M. ships and others during the past 60 years and more, and I am strongly of opinion that the commencement of this much wanted discussion should no longer be delayed.

December 5, 1885. (Signed) W. J. L. WHARTON.

The Secretary was instructed to request Mr. Baillie to report on the method he would propose to adopt, in the selection of ships with reference to accuracy and to amount of material, &c., and as to the amount of assistance that will be needed.

Submitted—A specimen of the printed matter (Letter 2897) proposed for insertion on Lieut. Baillie's Pressure Charts (Minutes, p. 74).—Approved.

Read—The following letter :—

(M.O. 102759.) Scottish Meteorological Society,

DEAR SIR, 122, George Street, December 9, 1885.

THE Council of this Society have resolved that all the observations of sea temperature made by the Society since 1855 be discussed, together with any other observations that may be obtained, with a view to a statement of the distribution of the temperature of the sea round Scotland, each month of the year.

The Council desire me to inquire of the Meteorological Council if we could be favoured with copies of the observations of sea-temperature made round the Scottish coasts which are in the Meteorological Office.

Yours, &c.

R. H. Scott, Esq., (Signed) ALEXANDER BUCHAN.
Secretary, Meteorological Office.

Mr. Scott submitted the following list of the information referred to by Mr. Buchan, and was instructed to supply it as requested. (P.C. 54, 1886.)

SCOTCH COAST GUARD STATIONS.

Aberdeen (Cove Bay)	Lamlash
Ballantrae	Lerwick
Burntisland	Montrose (Uzon)
Cromarty	Stornoway
Fraserburgh	Wick
Kirkwall	Berwick.

From July 1879—December 1885.

SUBMITTED—The following STATEMENT respecting the RECORDS for September 1883, received from the SELF-RECORDING OBSERVATORIES (see Minutes, 21st December 1868 and 20th November 1876).

—	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH:—	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.
Action														
Records deficient, due to stoppage of clock	0	0	15	15	0	0	0	0	0	0	0	0	0	0
„ „ other causes	*2 hrs.	*2	0	0	*1 hr.	0	0	0	0	*1 hr.	*5 hrs.	*8 hrs.	*6 hrs. ‡2 hrs.	*6 hrs. ‡3 hrs.
Orientation verified	29th	—	29th	—	—	—	1st 29th	—	—	—	26th	—	14th	—
No. of errors discovered by subsidiaries	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ irregular differences	0	0	0	4	0	1	1	2	11	1	4	2	4	3
Result of 40 *Remeasurements*:—														
Greatest difference	0·0	1·0	0·0	1·0	0·0	1·0	1·0	1·0	2·0	1·0	1·0	1·0	0·0	2·0
Mean difference irrespective of sign	0·0	0·3	0·0	0·4	0·0	0·3	0·0	0·3	0·1	0·2	0·0	0·2	0·0	0·7
Residual difference (—Meteorological Office)	0·0	0·0	0·0	0·0	0·0	+0·1	0·0	0·0	+0·1	0·0	0·0	0·0	0·0	—0·2

RAIN GAUGE:—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient, due to stoppage of clock	0		0		0		0		0		0		0	
„ „ other causes	*2 hrs.		0		0		0		0		†1 hr.		0	
Errors in tabulation	0		0		0		4		1		2		0	

BAROGRAPH :—							
Action	Good.	Good.	Good.	Good.	Good.	Good.	Good.
Photography	Do.	Bad.	Fair.	Bad.	Do.	Do.	Do.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0
„ „ failure of light	0	0	0	0	0	1 hr.	2 hrs. (1 Stand. given.)
„ „ other causes	*2 hrs. (1 Stand. given.)	0	0	0	0	‖ 2 hrs. (1 Stand. given.)	*5 hrs. (Stands. given.); §2 hrs. (1 Stand. given.)
No. of errors discovered—							
In entry of standard	2	3	3	7	0	7	0
„ calculating residual correction	0	1	0	7	0	0	0
„ applying residual correction	0	21	0	44	1	21	0
„ subtraction in subsidiary tables	0	0	1	44	1	0	0
„ tabulation by subsidiaries	0	0	0	0	0	0	0
„ „ irregular differences	0	0	0	0	2	2	0
Result of 40 *Remeasurements :—*							
Greatest difference	·005	·009	·006	·006	·006	·005	·009
Mean difference irrespective of sign	·002	·003	·002	·002	·003	·002	·003
Residual difference (— Meteorological Office)	+·001	·000	·000	·000	—·001	·000	—·002
Mean monthly difference between simultaneous barograph and barometer readings	·001	·003	·001	·002	·002	·001	·002

THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Do.		Indifferent.		Fair.		Indifferent.		Do.		Do.		Indifferent.	
	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Records deficient, due to stoppage of clock	0	0	0	0	9 hrs. (Standard given.)	9 hrs. (Standard given.)	0	0	0	0	0	0	0	0
„ „ failure of light	0	0	0	0	0	0	0	0	0	3 hrs.	0	3 hrs.	0	0
„ „ imperfectly moistened bulbs	—	0	—	0	—	0	—	0	—	1 S. given.	—	25 hrs. 6 S. gn.	—	14 2 S. gn.
„ „ partially frozen bulbs	—	0	—	0	—	0	—	0	—	0	—	0	—	0
„ „ other causes	*5 hrs. (2 Stands. given.); ¶1 hr. (Stands. given.); §10 hrs. (1 Stand. given.)	*5 hrs. ¶1 hr. §10 hrs.	0	0	0	0	0	0	0	0	**1 hr.	**1 hr.	*5 hrs. (Standards given.)	*5 hrs.
No. of errors discovered in entry of standard	2	0	0	0	4	3	4	4	0	0	1	2	0	0
„ „ by subsidiary measurements	0	0	0	0	0	0	0	0	0	0	0	2	0	0
„ „ of subtraction in do. tables	0	0	3	0	4	1	3	4	2	3	5	2	1	1
„ detected under glass scale	0	0	0	0	0	1	1	1	0	0	0	0	0	0
Result of 40 *Remeasurements :—*														
Greatest difference	0·2	0·2	0·3	0·2	0·3	0·2	0·3	0·2	0·2	0·2	0·2	0·3	0·3	0·2
Mean difference irrespective of sign	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1
Residual difference (— Meteorological Office)	+0·1	0·0	—0·1	0·0	—0·1	0·0	0·0	+0·1	+0·1	0·0	0·0	—0·1	0·0	0·0
Mean monthly difference between simultaneous thermograph and thermometer readings	0·1	0·1	0·2	0·2	0·1	0·1	0·2	0·2	0·1	0·2	0·1	0·1	0·1	0·3
No. of errors in maxima and minima	0	—	3	—	4	—	1	—	1	—	7	—	0	—

* Examining instrument. † Changing curve. ‡ Pencils lifted. § Shutter stopped clock. ‖ Light set on clamp. ¶ Cylinders wrongly placed. ** Curve changed too near the hour.

Submitted—The following memorandum :—

SIR,

I HAVE to report that the examination of the results obtained with the Harmonic Analyser is now completed. It has been carried out on the plan suggested in the memorandum laid before the Council on the 29th of April last, and sanctioned by them.

I beg to submit herewith the table referred to in the last two lines of the final paragraph but one of that memorandum; and from the close agreement of the figures shown in it I think it may be safely inferred that the curves have been passed through the instrument with considerable accuracy.

I have further to report that the instrument is now employed upon the analysis of the barograms for the year 1872.

I am, &c.

R. H. Scott, Esq., F.R.S. (Signed) R. H. CURTIS.

Mr. Scott was instructed to examine certain discrepancies which appeared in the tabular results.

Submitted—Two specimen charts of results for the Red Sea (Minutes, p. 42) with the following remarks :—

THE accompanying experimental charts represent the means of data observed along the ordinary track through the Red Sea during the month of January, over a period of more than 25 years.

Chart 1 shows:—

(*a.*) The winds and their forces (Beaufort's scale), by a star*.

(*b.*) The barometer readings, by a curve.

(*c.*) The dry and damp bulb readings, by curves.

NOTE.—The number of wind observations is inserted at the northern side of each circle.

Chart 2 shows :—

(*a.*) The currents, by arrows, their lengths being in proportion to speed.

(*b.*) The surface temperature of the sea, by a curve.

(*c.*) The specific gravity of the sea surface, by a curve.

The Current Chart shows over what a narrow strip the track extends, and it will probably be well to throw together adjacent and similar wind observations, although these may happen to fall in different squares, for in some cases the wind-rose at the centre of a square refers to observations which were all taken near one of its edges.

The data used is only that which exists in this Office. It can be materially increased in amount from the logs of H.M.'s ships. Data may also be obtained from the P. and O. Co. and other merchant steamer lines. The winds and currents from these last-named ships would probably be quite as good as those from ships observing for the Office, though their instrumental observations would not be so trustworthy.

As the observations in the various ports will most likely differ materially from those along the ordinary track, it will probably be considered requisite to deal with these separately.

HENRY TOYNBEE,
23/12/85.

* In a few cases the *scale* of force is shown on the longest arrow of a wind-rose In others a slight shade has been used over the space representing forces.

The Secretary reported that some of the photographic work forwarded from Falmouth observatory had been very defective, and that the attention of the superintending committee of the Observatory had been seriously called to it. (P.C. 2562 and 2578 and Letters 2736 and 2822).

Read—A memorandum from Captain Toynbee reporting that since the last meeting 7 logs had been received, 4 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. A. Simpson, (No. 90667).	S.S. "Australasian"	June 29—Nov. 23, 1885.	London, Australia, and home.	1885, p. 19.
Capt. W. N. Lailey	S.S. "Boyne" -	May 4—Dec. 5, 1885.	Mediterranean and Black Sea.	1885, p. 17.
Capt. H. Parsell -	S.S. "Adriatic"	June 30—Dec. 4, 1885.	Queenstown and New York, 5 voyages.	1885, p. 39.
Capt. J. I. Dunbar -	S.S. "Arracan"	Aug. 30—Dec. 10, 1885.	Liverpool and Rangoon, viâ Suez.	1885, p. 29.

Mr. Scott was instructed to convey the best thanks of the Council to the above observers.

116, *Victoria Street, January* 13, 1886.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (December 23) were read and confirmed.

Submitted—The following correspondence (Minutes, p. 85):—

(P.C. 2683.)

DEAR SIR, Meteorological Office, December 31, 1885.

I AM instructed by the Meteorological Council to inform you, in reply to yours of the 16th instant, that they are prepared to agree to the proposals you make, and to allow you a sum of 75*l.* yearly in aid of the charges that will be involved, commencing, if possible, from the 1st January next, on the understanding that as their annual grant is conditional on a vote of Parliament, the Council must be at liberty to reconsider the arrangement on reasonable notice, should circumstances require them to do so.

It will, of course, be understood also that the inspection of your observatory will, as heretofore, be limited in the manner you desire.

Yours, &c.
(Signed) ROBERT H. SCOTT,
Secretary.

Professor Grant, F.R.S.,
Observatory, Glasgow.

(M.O. 36.)

DEAR SIR, The Observatory, Glasgow, January 2, 1886.

I BEG to acknowledge the receipt of your letter of December 31, in which you inform me that the Meteorological Council have agreed to the proposals contained in my letter of the 16th of the same month. May I request you to offer to the Council my best thanks, and to assure them that no effort shall be wanting on my part to carry into effect the terms of this arrangement.

Yesterday being New Year's Day, which is observed as a holiday in Scotland, your letter was delivered only late in the afternoon, when everybody was away from the observatory. However, I shall do all that is possible to make the observational results commence with January 1.

I am, &c.
(Signed) R. GRANT.

Robert H. Scott, Esq.

Submitted—The following Report (Minutes, p. 85):—

I HAVE the honour to report:—

(1.) The value of the logs must be ascertained from internal evidence by examination; such as do not appear trustworthy to be rejected.

(2.) There are 3,585 Office logs which will first be dealt with, then the Remark Books of H.M. ships, then next the logs of H.M. ships between the years 1830 and 1862, and finally, possibly, the logs of merchant vessels.

I would suggest that four outline charts, on Mercator's projection, be constructed for each hemisphere, each chart embracing 90° of longitude and 60° of latitude, the scale being ·425 inch to a degree of longitude.

That the currents be extracted direct from the logs and plotted on the outline charts by means of an arrow at the midnight position, and the rate for 24 hours indicated by small figures at the arrow-head.

Currents obtained from direct experiment to be noted in red with the rate per hour. A small circle may be used to represent no current, or when the rate is of, or less than, six miles in 24 hours.

For certain parts of the world, where currents are known to divide, as also the Atlantic ocean north of 60° and Behrings Straits, specially prepared charts may be required.

(3.) As to the amount of assistance that will be needed, I would ask for three clerks, in addition to my present assistant, to be under my immediate supervision.

The time required for the above work can only be estimated very vaguely, but probably it will take about four or five years.

(Signed) C. W. BAILLIE.

Resolved—That Mr. Baillie be instructed to proceed with the work.

Mr. Scott reported that he had ascertained from the Trinity House that the light-house at Tynemouth was about to be taken down, so that the anemometer formerly at Seaham (Minutes, p. 43) could not be erected there. The Trinity House (Letter 10) had suggested Souter Point, Durham, as a suitable locality.

Mr. Scott was instructed to carry out the necessary arrangements. (P.C. 136.)

Submitted—The following Reports (Minutes, p. 42) :—

M.O. 23.

MO. $\frac{2621}{2691}$.

DEAR SIR, Aberdeen, December 1885.

IN accordance with your instructions I proceeded to Sandwick on the 8th instant, and between that date and the 17th I dismounted the meteorological instruments at the Manse there, and had them conveyed to and erected them on the new site selected for them in the grounds of W. I. Fortescue, Esq., Swanbister, near Kirkwall. As you suggested, the anemometer hut has been raised on a solid stone foundation, rising about 4 feet from the ground. I deemed it unadvisable to carry it higher on account of want of appliances to raise the house with. The height of the cups is now 17 feet from the ground, and about 115 feet above mean sea level. I selected a spot rather higher up than that marked A on the tracing, as about that spot the ground dips suddenly towards the sea. The nearest obstruction or building is Swanbister House, about one-ninth of a mile, and the distance to the sea is about one-fifth of a mile. The bearings I obtained by means of the compass sent by the Office, and verified by means of an azimuth compass which Mr. Whipple kindly sent me from Kew. I found the anemometer in a very rusty condition, and all the bearings very dry and clogged. The anemograph was also very dirty and stiff in places. I thoroughly cleaned every part of the instrument with paraffin, and the anemometer bearings, &c. I well oiled with the best sperm oil, which I took with me from Aberdeen, and the anemograph and clock with the best watch oil. Both the velocity and direction spindles are very much worn and rust-eaten, the former has also been bent at the top at some time, and gives the cups a wabbling motion. I tried to remedy this, but owing to the weak state of the spindle and the nuts and pins being so firmly fixed with rust, I had to give up the attempt to get the cups off. The direction spindle, instead of being quite smooth and bright at each end where it rests on the wooden bearings, is quite rough and out of shape with rust. I did my best with file and emery, but the result is far from satisfactory. All the other parts are in good condition, and it only requires the spindles renewed to make it a thoroughly good instrument again. The sunshine recorder has been mounted on its old support, a stout oak post, rising 7 feet above ground, and placed several feet to the south of the anemometer house. The meridian adjustment was made by means of a chronometer set to G.M.T. before I left Aberdeen,—the longitude (12′ 24″) + the equation of time for the 17th December (3′ 30″). A stone foundation has been built round the post for the double purpose of steadying it and to keep off cattle. Mr. Buchan, I believe, had written to say that I would fit up the whole of the instruments, and as Mr. Fortescue seemed to wish it, I selected a position for and fitted up the barometer in the house—the height of the cistern above mean sea-level is 70 feet. The Stevenson screen and rain gauge I placed on the lawn in front of the house, and the only near obstruction is the house itself, some 25 yards away to the northward, and the distance to the sea is about the same as the anemometer. Trusting what I have done will meet with the approval of the Meteorological Council and yourself,

I am, &c.

Robert H. Scott, Esq. (Signed) W. BOSWELL.

Kew Observatory, Richmond, Surrey,

DEAR MR. SCOTT, January 7, 1886.

I HAVE read Mr. Boswell's report on his transfer of the Orkney anemograph, and return it herewith. The two defects in the instrument he refers to are the bending of the velocity spindle at the top and the rusting of the bearings of the direction spindle. The first must have resulted from some damage done to the instrument since my visit, or possibly during its transfer. The latter I saw, but did not think of any importance.

I am of opinion that the anemograph may very well run as it is until next summer, when the inspector may get it repaired at an engineer's workshop, which I think I remember having seen at Kirkwall. The Dunsink anemometer worked quite well with a bent upright shaft for some time.

Yours, &c.

R. H. Scott, Esq. (Signed) G. M. WHIPPLE.

SIR, Meteorological Office, December 31, 1885.

I HAVE the honour to report, for the information of the Council, on the work which has been done for the quarter ending 31st December 1885. The charts of barometrical pressure for all the oceans have been completed (I had the honour to submit them to the Council on the 18th November 1885), and they are now in the hands of the lithographer. Since that date I have been chiefly occupied in making additions to the range charts in the higher latitudes, and at the close of the quarter, my time has been in some measure devoted to the work of preparation for the Ocean Current discussion contemplated by the Council.

I was absent from the Office for the first 19 days of the quarter through illness.

I am, &c.

(Signed) C. W. BAILLIE,

The Marine Superintendent. Nav. Lieut. R.N.

Forwarded for the information of the Council.

H. T.

Submitted—The following report on the forecasts for December 1885:—

The letters used have the following signification:—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

DECEMBER.

Districts.		3.30 P.M. Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.	8.30 P.M. Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	54	65	60	90	52	71	62	91
"	b	38	23	30		39	20	29	
"	c	8	4	6		9	3	6	
"	d	0	8	4		0	6	3	
Scotland, E.	a	39	54	47	79	61	61	61	84
"	b	42	23	32		23	23	23	
"	c	15	8	12		10	6	8	
"	d	4	15	9		6	10	8	
England, N.E.	a	46	54	50	81	58	55	57	89
"	b	31	31	31		32	32	32	
"	c	23	8	16		10	7	8	
"	d	0	7	3		0	6	3	
England, E.	a	35	58	47	87	58	58	58	86
"	b	50	31	40		29	26	28	
"	c	8	11	10		13	16	14	
"	d	7	0	3		0	0	0	
Midland Cos.	a	46	54	50	83	45	36	41	84
"	b	31	35	33		42	45	43	
"	c	15	0	8		10	13	12	
"	d	8	11	9		3	6	4	
England, S.	a	54	62	58	85	58	55	57	91
"	b	31	23	27		32	36	34	
"	c	11	0	6		10	3	6	
"	d	4	15	9		0	6	3	
Scotland, W.	a	38	54	46	73	61	52	57	84
"	b	35	19	27		29	26	27	
"	c	23	15	19		7	9	8	
"	d	4	12	8		3	13	8	
England, N.W.	a	31	50	41	77	45	58	52	79
"	b	46	27	36		39	16	27	
"	c	15	8	12		16	13	15	
"	d	8	15	11		0	13	6	
England, S.W.	a	50	69	60	85	68	45	57	85
"	b	31	19	25		20	36	28	
"	c	12	8	10		6	13	9	
"	d	7	4	5		6	6	6	
Ireland, N.	a	19	42	31	65	26	52	39	78
"	b	42	27	34		52	26	39	
"	c	31	12	22		19	13	16	
"	d	8	19	13		3	9	6	
Ireland, S.	a	23	58	41	72	23	52	38	85
"	b	35	27	31		58	36	47	
"	c	27	8	17		13	6	9	
"	d	15	7	11		6	6	6	

SUMMARY.

British Isles	a	40	56	48	80	50	54	52	85
"	b	37	26	32		37	29	33	
"	c	17	8	12		11	9	10	
"	d	6	10	8		2	8	5	

Read—A memorandum from Captain Toynbee reporting that since the last meeting 8 logs had been received, 6 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last Mention on Minutes.
Capt. E. C. Bennett	"Thessalus" -	April 10, 1884—Nov. 28, 1885.	New South Wales, West Coast of America, New South Wales, and home.	1883, p. 136.
Capt. Peter Murdoch	"Sierra Estrella"	Mar. 26—Dec. 20, 1885.	Bombay, Rangoon, and home.	1884, p. 113.
Capt. R. Peebles -	"Tweedsdale" -	Feb. 6—Dec. 7, 1885.	Melbourne, Java, and home.	1884, p. 95.
Capt. S. Trott - Mr. R. Ladd, F.R. Met. Soc., Navigating Officer.	S.S. "Minia" -	June 14—Oct 15, 1885.	Cablework in North Atlantic.	1885, p. 17.
Comr. Hon. F. C. P. Vereker. Lieut. A. F. Balfour	H.M.S. "Rambler."	May 1—Sept. 1, 1885.	Surveying in Japan Seas	1885, p. 47.
Capt. W. B. Whall -	S.S. "Lapland" -	June 10—Nov. 28, 1885.	Liverpool and Hamburg, several voyages.	1883, p. 30.

Mr. Scott was instructed to convey the best thanks of the Council to the above observers.

Submitted—The following statements of work for December 1885 :—

MARINE ROOM.

Examined 8 new logs.

January 13, 1886.

North Atlantic Weather Charts.

The reduction of the charts for August 1882 completed, and sent to lithographer. Proofs of the first two sheets (August 1–6) received.

Progress made with the reduction of September charts, and a commencement made with those for October.

The female clerks employed in making the reductions.

General.

Discussion of Red Sea observations for the months of January and July.
Copying observations on the storm of June 2, 1885, in the Gulf of Aden.
Copying observations from a rough book into log No. 6264 (S.S. "Titania").
Indexing data in ocean 10° squares.

The Marine Superintendent. (Signed) CHAS. HARDING.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE.

TELEGRAPH (FORECAST AND STORM WARNING) BRANCH.

(To 31st December 1885.)

Monthly Weather Report, 1885 :—
August.—Printed and published.
September—October.—Written and sent to printer.
November.—Nearly ready for printer.
December.—Well in hand.

Weekly and Daily Reports.—All issued to date.

Monthly Means of Rainfall for stations in Weekly Weather Report, during the 20 years 1866-85.—Complete to date.

Curves for same, showing weekly fall.—Done for first few months of year.

Report on Prevalence of Gales on British Coasts during years 1871–84.—Done to end of 1873.

Checking Daily Forecasts (3.30 p.m. and 8.30 p.m.)—Complete to date.

Arrangements are complete for using the new Rainfall averages (referred to above) for the Daily, Weekly, and Monthly Weather Reports, from the 1st January 1886.

Arrangements complete, also, for adding, on and after the 1st January 1886, six new columns to the summary on first page of each Weekly Weather Report, showing for each district the difference between the aggregate values for Accumulated Heat (above and below 42°), Rainfall, and Bright Sunshine from the commencement of the year, and the mean values for the corresponding periods in former years.

(Signed) FREDC. GASTER.

January 1, 1886.

PANTAGRAPH ROOM.

Quarterly Weather Report.—Revised proofs of letterpress and plates for Part IV., 1877, examined and sent to press.

Observatory Returns.—The calculation of the daily and other mean and of the hourly Vapour Tension values, for September 1883 completed. The hourly readings for the same month copied and sent to printer. The reading of the proof of "Hourly Readings" for August 1883 finished and sent to press.

Harmonic Analyser.—The calculation of the temperature coefficients from corrected data completed and checked. Some tables of differences, &c. prepared for Council. The Falmouth curves for 1872 were re-worked, and the Valencia barograms for 1872 have been analysed.

Miscellaneous.—A copper-plate containing barograph curves for the Krakatoa discussion has been engraved. Some of the curves have been enlarged and cut upon zinc plates. Work has also been done upon the charts showing the progress of the air-wave.

(Signed) R. H. CURTIS.

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

EXAMINATION ROOM.

SIR, January 1, 1886.

THE following is a report of the work done during the month of December 1885:—

Examinations.

September (1883).—Three *barograms* and six *anemograms.*
October (1883).—Six *thermograms* and two *barograms.*

Reports.

Notes of errors for Valencia, Aberdeen, Falmouth, Stonyhurst, and Kew.
Statement respecting the records for September 1883.
Reports on defects in Falmouth records.

I am, &c.
(Signed) T. E. ALLEN.

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

Reported—That the following cheques had been drawn during the month of December 1885:—

1885.			£	s.	d.
Dec. 5th.	For weekly salaries		14	16	0
,, ,,	Royal Meteorological Society, subscription for Mr. Meldrum		2	0	0
,, 12th.	G. J. Symons, rainfall values		5	5	0
,, ,,	Anglo-American Telegraph Co., telegrams		5	17	11
,, ,,	For weekly salaries		15	1	0
,, 19th.	Bank of England, reports supplied by Stationery Office		20	13	5
,, ,,	Coutts & Co., Mr. Abercromby's cloud pictures		25	0	0
,, ,,	W. L. Fox, removal of Falmouth instruments, &c.		43	6	3
,, ,,	J. H. Woodstock, packing cases		2	2	6
,, ,,	For weekly salaries		15	1	0
,, 26th.	,, ,,		15	1	0
,, ,,	R. H. Scott	Salaries	66	13	4
,, ,,	J. S. Harding, junior		27	15	6
,, ,,	T. D. Bell		15	0	0
,, ,,	J. Sheerman		10	0	0
,, ,,	J. E. Cullum		16	13	4
,, ,,	R. H. Curtis		22	10	0
,, ,,	J. A. Curtis		17	10	0
,, ,,	T. E. Allen		16	5	0
,, ,,	C. H. Thompson		11	13	4
,, ,,	S. Call		10	16	8
,, ,,	E. G. Aldridge		8	15	0
,, ,,	R. G. Canham		6	13	4
,, ,,	A. H. Bell		6	13	4
,, ,,	F. Gaster		30	5	11
,, ,,	F. J. Brodie		22	5	10
,, ,,	G. G. Francis		20	4	7
,, ,,	A. J. Rigby		16	8	1
,, ,,	R. Sargeant		14	8	3
	Carried forward		£504	15	7

			£	s.	d.	£	s.	d.
1885.		Brought forward -	-	-	-	504	15	7
Dec. 26th.	A. R. Simpkins - - -	Salaries				9	7	6
,, ,,	H. J. Stevens - - -					8	6	8
,, ,,	Capt. H. Toynbee - -					33	6	8
,, ,,	Nav.-Lieut. C. W. Baillie, R.N. -					20	16	8
,, ,,	R. Strachan - - -					27	15	6
,, ,,	C. Harding - - -					22	10	0
,, ,,	H. Harries - - -					14	3	4
,, ,,	W. Allingham - - -					14	3	4
,, ,,	W. G. James - - -					10	8	8
,, ,,	F. T. Bullen - - -					8	15	0
,, ,,	R. F. Wallace - - -					7	18	4
,, ,,	G. J. Mayhew, rent - - -		-		-	158	15	0
,, ,,	Williams and Norgate, books - -		-		-	1	8	9
,, ,,	J. S. Harding, senr., pension - -		-		-	10	14	1
,, ,,	W. Thomas, care of Scilly anemometer -		2	1	0			
,, ,,	,, Meteorological Reports* -		8	11	1			
						10	12	1
,, ,,	H. Williams, care of bridled anemometer		2	11	3			
,, ,,	,, care of Robinson's anemometer - -		2	10	10			
						5	2	1
,, ,,	C. Niven, Aberdeen observatory - -		67	9	5			
,, ,,	J. L. E. Dreyer, Armagh ,, - -		12	10	0			
,, ,,	W. L. Fox, Falmouth ,, - -		62	8	6			
,, ,,	Kew Committee, allowance - -		100	0	0			
,, ,,	S. J. Perry, Stonyhurst Observatory -		13	14	3			
,, ,,	J. E. Cullum, Valencia ,, -		38	8	4			
,, ,,	J. O'Driscoll, rent, Valencia - -		25	0	6			
						319	11	0
,, ,,	G. T. Watson, care of Yarmouth anemometer - - -		4	16	1			
,, ,,	,, meteorological reports* -		7	12	4			
						12	8	5
,, ,,	W. McCormack, Aberdeen* - -		3	3	0			
,, ,,	J. W. Mayes, Ardrossan* - -		3	3	0			
,, ,,	M. J. Tolan, Belmullet† - -		1	11	6			
,, ,,	H. Todd, Cambridge* - - -		7	19	10			
,, ,,	H. Mohn, Christiania - - -		5	10	0			
,, ,,	T. Macgowan, Donaghadee* - -		3	3	0			
,, ,,	P. Curnow, Dungeness* - - -		7	14	10			
,, ,,	W. Edmonds ,, - - -		2	12	0			
,, ,,	W. Brand, Dunrossness* - - -		7	1	6			
,, ,,	W. Foster, Hawes Junction† - -		3	10	9			
,, ,,	S. Richards, Holyhead - - -		5	10	9			
,, ,,	G. G. Appleton, Hurst Castle* - -		7	1	7			
,, ,,	J. Fisher, Jersey* - - -		7	8	6			
,, ,,	W. Hay, Leith* - - -		3	3	0			
,, ,,	F. Gaster, London* - - -		7	1	0			
,, ,,	W. Berridge, Loughborough* - -		6	9	0			
Dec. 31st.	Lloyd's, for Malin Head - -		3	5	0			
,, ,,	J. O'D. Farren ,, * - -		3	3	0			
,, ,,	K. Kerr, Mullaghmore* - - -		8	8	10			
,, ,,	W. D. Penny, Nairn* - - -		7	7	6			
,, ,,	J. W. Irvine, North Shields* - -		3	3	0			
,, ,,	W. Wickham, Oxford* - - -		6	15	6			
,, ,,	B. Budds, Parsonstown* - - -		6	10	6			
,, ,,	J. John, Prawle Point* - - -		6	8	0			
		Carried forward -	-		-	£1,200	18	8

* Bonus of 3*l.* 3*s.* allowed.

† Bonus of 1*l.* 11*s.* 6*d.* allowed (half rate).

1885.		£	s.	d.	£	s.	d.
	Brought forward	-		-	1,200	18	8
Dec. 31st.	W. Kennedy, Roche's Point* - -	3	3	0			
„ „	S. Blake, St. Ann's Head* - -	6	15	4			
„ „	J. B. Smith, Spurn Head* - -	6	8	7			
„ „	D. Macdonald, Stornoway* - -	8	15	4			
„ „	J. Sinclair, Wick* - - -	6	8	0			
„ „	F. Guy, York - - - - -	3	18	0			
					162	12	10
„ „	J. Tolan, fixing wind vane (Belmullet) -	2	8	0			
„ „	Postmaster General, telegrams - -	191	7	8			
					193	15	8
„ „	A Buchan, salary - - -	-		-	37	10	0
„ „	J. R. Jones, Aberdeen agent - -	2	10	9			
„ „	J. Fowler, Cardiff agent - - -	6	14	9			
„ „	L. Allen, Dundee „ - - -	2	11	9			
„ „	J. Gill, Liverpool „ - - -	24	3	6			
„ „	C. H. Permain, Southampton agent -	1	15	0			
„ „	Z. Scaping, Hull agent - - -	1	7	6			
„ „	D. McGregor & Co., Glasgow agent -	10	12	8			
					49	15	11
„ „	P. Adie, repairing "A" barometers -	7	19	2			
„ „	„ „ B. T. do. and fittings for eidographs	23	11	6			
					31	10	8
„ „	Rev. J. R Anderson, Orkney - -	-		-	4	5	3
„ „	J. S. Harding, junr., petty cash - -	-		-	30	0	0
					£1,710	9	0

* Bonus of 3*l.* 3*s.* allowed.

116, *Victoria Street, January* 27, 1886.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Minutes of the last meeting (January 13) were read and confirmed.

Read—The following report:—

HARMONIC ANALYSER RESULTS.

SIR, January 27, 1886.

I HAVE to report for the information of the Council on the differences observed between the monthly mean temperatures obtained by the Harmonic Analyser, and those got from the hourly measurements of the curves, in continuance of my memorandum printed on page 88 of the Minutes.

It will be seen from the tables of comparison which were submitted to the Council with that memorandum, that the largest differences, amounting to about half a degree, occur most frequently in the earliest years, 1871, 1872, and 1873; and there appears to be but little doubt that these are mainly due to the fact that in those years faulty scale-values were used in tabulating the curves, and at that date the photographic zero-lines on the curves were not used for the purpose of setting the scales. Whilst this will not explain all the differences observed, it throws a certain amount of doubt on the numerical results for those years, which does not exist later on.

In many cases the differences are explained by the fact that the numerical mean is for a smaller number of days than that contained in the month, owing to defects in the records; while in others interpolations have been made, both in the hourly tabulations and with the Analyser, to bridge over such gaps in the curves, caused by stoppage of clock, or by bad photography, &c.

In the case of Falmouth the differences were uniformly large, and the curves for the years 1871 and 1872 have been reworked with the Analyser. When the curves were first passed through the instrument an arrangement was adopted, in consequence of a doubt as to the zero-line value, which was not a good one. But although the second set of figures is somewhat better than the first the differences have not all disappeared. This is without doubt partly due to the *upper* zero-line having been used in the winter months, in consequence of which parts of the curves are often faint or quite lost, and the dry zero-line is out of the field on several curves in succession. At the same time the large distance between the zero and the curves magnifies any error of scale, and there is always a slight amount of distortion in both the trace and the zero-line.

Portions of the Aberdeen and Armagh curves have been reworked, with the result of confirming the values previously obtained.

I have to add that the Analyser readings are now being carefully examined in all cases where the difference between the Analyser and numerical means amounts to as much as 0·25 of a degree.

(Signed) R. H. CURTIS.

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

Read—A memorandum from Captain Toynbee reporting that since the last meeting 8 logs had been received, 6 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. Pelham Aldrich. Lieut. A. Havergal	H.M.S. "Sylvia"	May 26—Oct. 27, 1885.	St. Helena, Gibraltar, surveying Skerki Bank.	1885, p. 29.
Capt. James Buchan	Barque "Coppename."	Aug. 7, 1885—Jan. 6, 1886.	Surinam and home	1885, p. 29.
Capt. R. F. Hoskyn. Sub-Lieut. G. A. Heyman	H.M.S. "Myrmidon."	July 6—Oct. 31, 1885.	Surveying, &c.	1885, p. 46.
Capt. C. W. Pearson	S.S. "Strathleven."	Aug. 14, 1885—Jan. 11, 1886.	Yokohama, New York, Gibraltar.	1885, p. 74.
Capt. H. Plater	"Patriarch"	Mar. 9, 1885—Jan. 5, 1886.	London, Sydney, and home.	—
Capt. W. Rosseter	Barque "St. Kilda."	June 12, 1885—Jan. 17, 1886.	Liverpool, Demerara, and home.	1885, p. 10.

Mr. Scott was instructed to present the Charts (O. 27) to Captain Plater, and to convey the best thanks of the Council to the other observers.

Reported—That the following instruments were required to replenish stores:—

"B.T." LIST.	"A" LIST.
25 barometers.	25 aneroids.
25 sets thermometers.	25 sets thermometers.
25 sets hydrometers.	25 maximum thermometers.
25 screens.	25 minimum ditto.
	25 screens.

(Signed) R. STRACHAN,
January 27, 1886.

To the Secretary,
Meteorological Council.

—Approved.

Reported—That Mr. W. D. Penny, the reporter at Nairn, had died on the 6th instant, and that his daughter Miss Agnes Penny had been appointed to fill the vacancy. (P.C. 174, Letter 209).—Approved.

Submitted—The following statement of accounts for the nine months ending 31st December 1885:—

Income.	£ s. d.	£ s. d.
Balance from year 1884–85		1,265 9 8
Proportion of vote		11,475 0 0
Repayment of expenses charged under—		
(1.) Incidental expenses	4 8 9	
(2.) Special researches	25 1 0	
(3.) Observatories and stations	13 15 11	
		43 5 8
Supply of Weather Information:		
D.W. Charts and Forecasts	181 12 7	
6 p.m. Charts	18 15 0	
Information for Press Agencies, &c.	64 17 8	
Telegrams	202 0 8	
Miscellaneous data	7 15 0	
		475 0 11
Sale of Instruments, &c.:		
Royal Navy Account	1 7 6	
Mercantile Marine account	60 5 0	
		61 12 6
Commission charged on work done for Colonies, &c.		15 14 10
		£13,336 3 7

Expenditure.	£ s. d.	£ s. d.
Administration:		
Payment of Council	750 0 0	
Secretary	600 0 0	
Salaries and wages	577 5 6	
Rent, fuel, and lighting	508 5 11	
Furniture and fittings	70 12 4	
Incidental and contingent expenses	260 4 11	
Expenses incidental to International Meteorological Congress	17 13 4	
Pensions	32 2 3	
		2,816 4 3
Special Researches		*503 3 7
Land Meteorology:		
Observatories and stations	1,372 6 1	
Discussion and reduction of observations	989 2 1	
		2,361 8 2
Weather Information and Forecasts:		
Telegraphic reports and storm warnings	2,315 4 0	
Preparation and issue of reports and forecasts	1,190 1 2	
		3,505 5 2
Inspections:		
Salaries and travelling expenses		474 9 9
Ocean Meteorology:		
Discussion and reduction of observations	1,368 2 6	
Expenses incidental to the supply of instruments:		
Proportion for care and issue of instruments	150 0 0	
Royal Navy	317 8 5	
Mercantile Marine	315 7 4	
Distant island and coast stations	15 15 0	
		2,166 13 3
Balance		1,508 19 5
		£13,336 3 7

Liabilities.	£ s. d.
To Council	750 0 0
„ Post Office (partly estimated)	299 16 0
„ sundry creditors	381 6 1
„ balance	1,508 19 5
	£2,940 1 6

Assets.	£ s. d.
By cash at Bank	1,604 12 0
„ „ at Office	92 12 6
„ „ at Valencia	50 0 0
„ sundry debtors	217 17 0
„ H.M. Exchequer	975 0 0
	£2,940 1 6

* Some charges for Cloud Experiments, &c. at Kew, not yet brought to account.

116, *Victoria Street, February* 10, 1886.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN. | PROFESSOR STOKES.
MR. GALTON. | MR. STONE.
THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (January 27) were read and confirmed.

Submitted—The following Reports (Minutes, p. 18):—

REPORT on the WORKING of the PHOTO-NEPHOGRAPHS at the KEW OBSERVATORY.—July to September, 1885.

AFTER the date of receipt of the letter of the Meteorological Council (M.O. 1172, 4th June 1885), authorising a continuance of the cloud height measurements, and directing particular attention to the determination of the rates and directions of their motion, I undertook the necessary measures for carrying out the work.

Having obtained the permission in writing of Mr. Fuller, the lessee of the Old Deer Park, for the opening of the ground in the direction of the base line, *i.e.*, from the south-east corner of the Observatory to a point 800 yards distant in a south-south-easterly direction, I had a trench dug and the telegraphic cable buried in it and turfed over.

According to the agreement the sum of 1*l.* was paid to Mr. Fuller as compensation for the destruction of the grass covering the trench, as it was completely destroyed during the operation, owing to its having been performed in unusually dry weather. The ground is subject also to an annual rental of 3*l.*

Two similar wooden box stands, triangular in plan, 5 feet high, with bases 3 feet in each side, and tops 19 inches in the side, were made so as to just contain the cameras, switches, telephone, and signal flag. One of these stands was firmly screwed to the flat platform of the south leads of the Observatory roof, whilst the other was provided with long legs which were firmly sunk in the ground to a depth of 2 feet 6 inches over the distant end of the telegraph wire.

Gun-metal triangles were made by Munro to screw on the tops of the pedestals, and were provided with locking plates, so that the cameras might be removed and replaced exactly in the same position on the stands, as regards level and azimuth. New foot screws with lock nuts were also fitted to the cameras to adapt them to the locking plates.

Both cameras, being placed in position, levelled, and their foot screws locked, were carefully adjusted by solar observation to give identical azimuthal readings before the triangles were finally screwed down in their places.

A battery of 18 Leclanché cells (largest size) was then placed in the box room of the Observatory, and wires from its terminals led to the switch box on the roof in connexion with camera A; permanent attachment was there made with the one end of the telegraph cable which was led up the side of the building against one of the stack pipes, whilst the remote end of the cable was similarly connected up to the switch of the distant camera. This for convenience is always termed camera B.

Permanent connections were then made with the switches, telephones, and cameras at both stations.

Experiments were next instituted in order to determine the correct mutual bearings of the two stations. For this purpose the dark slides, marked severally A_1, A_2 . . . A_6 and B_1, B_2 . . . B_6, were taken to their respective cameras, and the exact circle readings, when the intersection of the cross lines in the dark slide of each camera was exactly over the opposite station, were duly noted for each one. They were determined to be as follows:—

From July 6th to September 8th.

Bearing of Station B from A.			Bearing of Station A from B.		
Slide.	Azimuth.	Zenith Distance.	Slide.	Azimuth.	Zenith Distance.
A_1 - -	241° 5′	90° 30′	B_1 - -	60° 45′	89° 0′
A_2 - -	241 10	90 40	B_2 - -	60 45	88 50
A_3 - -	241 10	90 35	B_3 - -	60 35	89 0
A_4 - -	241 0	91 45	B_4 - -	60 35	89 0
A_5 - -	241 10	91 45	B_5 - -	60 35	89 0
A_6 - -	241 0	91 50	B_6 - -	60 50	89 0

From September 15th to October 4th.

Bearing of Station B from A.			Bearing of Station A from B.		
Slide.	Azimuth.	Zenith Distance.	Slide.	Azimuth.	Zenith Distance.
A_3 - -	241° 10′	90° 35′	B_3 - -	60° 35′	87° 40′
A_4 - -	241 0	91 45	B_4 - -	60 35	87 30
A_5 - -	241 10	91 45	B_5 - -	60 35	87 30
A_6 - -	241 0	91 50	B_6 - -	60 50	87 30

From October 4th to end of series.

A_3 - -	241 20	90 40	B_3 - -	60 40	88 10
A_4 - -	241 0	91 50	B_4 - -	60 34	87 55
A_5 - -	241 15	91 40	B_5 - -	60 30	88 10
A_6 - -	240 55	91 50	B_6 - -	60 40	88 0

Having purchased 16 dozen photographic plates, $4\frac{3}{4}$ ins. × $4\frac{1}{4}$ ins., prepared in accordance with Captain Abney's formula (*see* Report Meteorological Council for 1881, p. 33) regular operations were commenced. Owing to the resignation of Mr. Nish, the assistant, who, previously, had had charge of the cloud photography, and consequent changes in the routine of the observatory, it became necessary to train Messrs. Hugo and Widdowson to the work, and then the vacations and the bad weather of September intervened, hence but few opportunities offered for successful nephography.

The frequent failure in action of the camera shutters caused also the loss of many otherwise favourable opportunities, since it is necessary to obtain four photographs of very nearly the same duration of exposure for a complete motion determination, and the hanging back or sudden slipping forward of any one shutter frequently vitiates the whole experiment.

Having prepared blank forms for the entry and reduction of the readings, kindly revised by Captain Abney, Professors Stokes and Grant, and Lieutenant Baillie, the measurement of the pictures was undertaken.

A framework was constructed, in which the four negatives composing a set could be viewed at once. Well-marked points on the clouds which could be easily and surely recognised in all four pictures were then indicated in red ink and lettered α, β, γ, δ, three or four being usually selected at a time.

The co ordinates of these points as referred to the cross lines on the plate were then measured by means of a tenth-inch scale, and the values converted into arc. These, together with the observed altitudes, gave corrections, which applied to the readings of the circle of the cameras at the time of experiment, afforded the true altitudes and azimuths of the cloud-points. Combining the values obtained simultaneously at A and B, the heights and distances of the points were computed. Taking two pairs of pictures, with an interval of a minute or so of time between them, by another short calculation, the rate and direction of motion of the cloud in a horizontal plane is determined.

The negatives and the calculation of the values used in the tables which have been drawn up are forwarded to the Office herewith.

As regards the future employment of the apparatus :—

Before entering upon another series of experiments, I would call attention, in the first case, to the cameras, which possess still the serious defects I alluded to in my report of November 1883. The existing ebonite shutters are clumsy and uncertain in the extreme. I think one of the many instantaneous shutters now known capable of being set to a determinate time of exposure might be easily fitted, and if made lighter would materially reduce the second defect, want of balance.

At present when the camera is set to an altitude of 30° there is the unsupported overhanging weight of the lens, shutters, and electro-magnets, amounting to 9 lbs., which has to be sustained in place by a small friction clamp on a circle of $2\frac{1}{2}$ ins. radius, causing the accurate setting of the vertical circle to be a matter of considerable difficulty, especially as there are no tangent screws.

It would also be desirable to have cross levels fixed on the base plate of the instrument, for, occasionally, owing to the want of poise, it is found that the stand gets tilted, and hence the altitudes read off are incorrect.

One of the causes of uncertainty in the working of the cameras is the inability of controlling the duration of the time of exposure of the plate, for, owing to variation in the tension of the springs, it not unfrequently happens that one plate of a pair, say A, is under-exposed, while the other, B, is over-exposed, although the electrical arrangement is supposed to cause the two exposures to be exactly equal in duration. If the shutters were adjustable the observer could instruct his assistant as to the amount of exposure to set his shutter for by telephone, as he now orders him where to direct the camera.

I propose, in future, to use bells for calling attention to the telephone in place of flags; this will only require a small alteration in the existing switch apparatus.

The short interval of time, usually one minute, allowed to elapse between successive pairs of pictures taken for motion, causes great discrepancies to appear in the table of hourly velocities.

It is, however, undesirable to lengthen this interval, on account of the rapid nature of the changes of configuration constantly going on on the margins of cloud formations. (See 40th Report, Harvard College Observatory, p. 10.). It would therefore appear desirable to increase the number of points for measurement and calculation on each plate, but the additional cost of computer's time such a procedure would entail has hitherto prevented my selecting more than the three or four points already alluded to.

The outdoor and photographic work in these experiments has been performed by Messrs. Hugo, Boxall, and Widdowson. The reductions have been made by Messrs. Baker and McLaughlin. In nearly all cases I have personally selected the points of clouds for measurement.

The total amount of time expended by the assistants in prosecution of these experiments was as follows:—

	Hours.
Operators (2), 85 hours each	170
Computers	341
Total	511

And the total cost amounted to 81*l.* 9*s.* 2*d.*, made up as follows:—

	£	*s.*	*d.*
Instruments and stands	33	17	3
Chemicals, plates, and sundries	9	5	5
Time of assistants	38	6	6
	£81	9	2

The above sum has largely exceeded the amount estimated on June 2nd, 1885, principally in the cost of the installation, which was exceeded by 13*l.* 17*s.* 3*d.* This was in a great measure due to the plate holders, costing 10*l.* 12*s.* 6*d.* instead of 4*l.*, and the unlooked for necessity of providing locking plates (Munro, 9*l.* 12*s.* 6*d.*), which were not included in the estimate.

With regard to the working expenses, it was found that, owing to the repeatedly defective action of the apparatus, very considerable demands were unexpectedly made upon the time of the assistants, both in operating and computing, and hence the item of "time of assistants" figures at about three times the amount estimated. The experience now gained by the staff will, it is presumed, lessen this item materially, and it is believed that future cloud-motion experiments may be conducted at a cost of less than 10*s.* each.

(Signed) G. M. WHIPPLE,
Superintendent.

Kew Observatory,
January 29, 1886.

The tables accompanying this report are not printed here.

Professor Stokes was requested to consider the subject.

Submitted—The following Memorandum (Minutes, pp. 34 and 62):—

(M.O. 318.)

DESCRIPTION of the METHODS employed at the KEW OBSERVATORY in marking off the DIALS of TWO-MINUTE SAND-GLASS ANEMOMETERS by direct comparison with the KEW ANEMOMETER.

THE dial plates of the several instruments were covered by discs of white paper of the same size as the plates, and stuck on firmly with gum.

The sand glasses were tested by the standard clock, and found to be within a second more or less of the required two minutes. A mark was made on the paper to answer the purpose of a zero value. In making the observations two methods were used: In the first two assistants were necessary, one stationed at the sand-glass anemometer (which was placed on the experimental stand with its cups level with those of the Kew instrument), the other at the graduated dial wheel of the Kew anemometer. The zero mark was allowed to reach the pointer by a motion of the cups (this is necessary owing to considerable play in the gearing of the graduated dial), when the instrument was put out of action, and the sand glass allowed to run down. A signal was then given to the assistant at the dial of the Kew instrument to take a reading, and at the same time the sand glass anemometer was put in action. The sand glass was watched closely, in order to detect any cessation in its action, and immediately it ran down the instrument was put out of gear, while at the same time a signal was given to the assistant at the dial to take another reading. A mark was made on the paper dial at the end of the pointer, and a distinguishing letter or figure given it. The difference between the readings of the Kew instrument multiplied by 30 gave the velocity of the wind in miles per hour corresponding to the position on the dial of the mark obtained.

The instrument was then put out of gear, the zero point brought back to the pointer, and other observations taken in a similar manner. As any error in the reading of the divided circle of the Kew instrument would be multiplied 30 times, a second method was adopted in order to obtain greater accuracy. The second method required one assistant only, and was as follows:—

An electric bell was fixed in a permanent position just underneath the cups of the Kew anemometer.

A piece of wire was made fast to one of the arms which carried the cups, so that it just reached the bell, and so every revolution was signalled by a sound. The number of revolutions could thus be easily counted, and at the same time a sharp eye could be kept on the action of the sand glass. On the latter running down the instrument was put out of gear, a mark made on the dial at the end of the pointer, and the number of revolutions recorded in a book. These were afterwards reduced to miles per hour by a table prepared for the purpose, taking the length of radius of the Kew instrument as 2 feet, and that the wind travels three times the rate of the cups.

A sufficient number of observations having been obtained the velocities were marked in ink. Occasionally a certain velocity would take up a different position on the paper disc, and in such a case the mean position was marked.

(Signed) G. M. WHIPPLE,
Superintendent.

Kew Observatory.

Mr. Scott was instructed to submit a list of the stations to which these instruments should be issued.

Read—The following letter:—

(M.O. 317.) Kew Observatory, Richmond, Surrey,
February 3, 1886.

DEAR MR. SCOTT,

ON July 30 last you addressed a letter, No. 1,633, to me requesting a report on the results which I thought might be obtained from the electrograph curves in store at this Observatory.

Not feeling able to give a very decided reply on my own responsibility, I brought the matter before the Kew Committee at the last meeting, submitting the enclosed list of the curves.

I was instructed to inform the Meteorological Council that the Kew Committee are of opinion that the results obtained from the curves in question can only be seen after tabulations are made from them, and also that the Kew Observatory are willing to undertake such tabulations at the Observatory at the cost of 5*l.* per annum, that being the amount paid by the Council for the tabulation of the years 1880 and 1881, already accomplished, by grants previously made for the purpose.

Yours, &c.
(Signed) G. M. WHIPPLE,
Superintendent.

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

SELF-RECORDING ELECTROMETER. KEW OBSERVATORY.

REPORT on the NUMBER of DAYS available each MONTH for TABULATION, as derived from an EXAMINATION of the CURVES obtained since 1874.

——	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
January	—	23	16	29	31	29	25	31	31	31	31	Action unsatisfactory.
February	—	12	25	27	28	27	22	27	28	28	28	
March	—	—	26	29	29	30	26	31	29	30	31	
April	30	30	28	21	29	30	30	29	28	25	30	
May	24	30	27	29	30	30	31	30	30	29	8	
June	28	19	In bad	29	30	30	28	29	29	28	Dismounted and sent to Elliott.	
July	27	3	order.	22	30	31	31	30	28	29		Dismounted in July.
August	25	Out of order.	16	22	30	Out of order.	30	30	29	31		
September	26	18	Sent to	23	30	28	30	28	28	30		
October	23	24	Glas-	31	29	31	30	31	28	29		
November	22	26	gow.	30	30	30	31	28	28	30		
December	20	24	23	30	28	30	28	30	30	29	31	
Total	225	209	161	322	354	326	342	354	346	349	159	—

Scale value determined:—January 1876, December 1877, November 1883, February 1885.

Years 1880 and 1881 are tabulated, but only 1880 has been discussed.

1877–1883 are in good order, and the scale value was determined both at commencement and end of period.

Resolved—That the Kew Committee be requested to tabulate the electrograms, as proposed in the above letter, but only for the years for which the records are complete and satisfactory. (P.C. 397.)

Read—The following letter (Minutes, p. 63) :—

(M.O. 316.) Kew Observatory, Richmond, Surrey,
February 3, 1886.

DEAR SIR,

I HAVE to report that during the recent snowstorm the electrical anemometer became so rusted in its interior that we have since been unable to get it to work.

Mr. Kempe has offered to electroplate the contacts and otherwise prevent the recurrence of these faults, free of cost, if the instrument be returned to the General Post Office.

I have therefore to request permission of the Meteorological Council to forward the instrument to him for this purpose.

Yours, &c.
(Signed) G. M. WHIPPLE,
Superintendent.

R. H. Scott, Esq., F.R.S.,
Secretary, Meteorological Council.

Mr. Scott was instructed to authorise Mr. Whipple to forward the instrument to Mr. Kempe. (P.C. 372.)

Read—The following letter :—

(M.O. 241.) Office of Public Works, Dublin,
January 25, 1886.

DEAR MR. SCOTT,

OUR anemometer at Kingstown is nearly worn out. It was made on Dr. Robinson's pattern, and I applied for a new one with vertical cylinder instead of circular plate. The Board's Minute is :—

"It would be desirable before sanctioning a new anemometer, and indeed before continuing the observations to be assured that the Meteorological Department require to have, and will be prepared to reduce them, as without an assurance of some definite and useful result, it would be undesirable to proceed further in this direction."

Very truly, &c.
(Signed) ROB. MANNING.
Chief Engineer.

Rob. H. Scott, Esq.,
Meteorological Office,
116, Victoria Street, London, S.W.

Mr. Scott was instructed to reply that the Council was unable to undertake the reduction of the anemograms. (P.C. 455.)

Submitted—The following Memorandum (Minutes, p. 88) :—

ADDITIONAL MEMORANDUM on the HARMONIC ANALYSER RESULTS.

SIR, February 6, 1886.

IN continuation of my previous memoranda on the above subject, printed on pp. 88 and 95 of the Minutes, I have to report on the results of the re-tabulation of some of the earlier thermograms, which has been made in order to test the hypothesis that the faulty scale-values, as well as the method formerly adopted of setting the scales upon the curves, were to a large extent the cause of the differences observed between the published numerical means, and those more recently obtained by the use of the Harmonic Analyser.

In re-measuring the curves, the scale has been set to the zero lines; and the same scale-values and zero-line values have been used as were adopted in dealing with the analyser readings.

The first set of curves re-measured were those for Aberdeen, October 1872. The differences between the means got by the machine and those derived from the hourly tabulations were comparatively large for this station throughout the year, the former being uniformly lower than the latter. October was selected because the difference was greater for that month than for any other. The mean of the new measurements differs only 0°·12 from the machine result, instead of —0°·58 as before.

The mean given by the analyser for Aberdeen, August 1874, is 0°·35 lower than that of the tabulations,—a much larger difference than is shown for any other month of that year. As no satisfactory explanation was forthcoming from an examination of the machine readings, the curves were re-tabulated, and the difference between the analyser result and the new mean is only + 0°·04.

A large increase in the differences occurs in the Falmouth results for July 1873, where it suddenly rises to +0°·66, from +0°·05 and +0°·02 in May and June respectively. The cause of this change was not made apparent by a careful inspection of the analyser readings, and therefore the curves were re-measured. Very early in the month a small jump occurred in the trace, caused by a shift of the air-speck in the mercury, which permanently altered the value of the zero-line. A note was appended to the curve stating that the jump was "Probably caused by the air bubble "dividing into two parts, by a flaw in the bore of the tube; it afterwards seems to have righted "itself," and in consequence of this note the operator had taken no notice of the jump in passing the curve through the analyser. In this case, therefore, the analyser means are at fault, and for a few months they require a correction for the alteration of the zero-line value; this I have had applied. (See Table II.)

The Valencia curves for 1871 have been passed through the instrument twice, with practically the same results. The differences between the instrumental and numerical means were, however, large, varying from +0°·3 in January to —0°·5 in July. I therefore had the curves for February and July re-tabulated, and the differences between the new means and the analyser is now reduced to + 0°·08 and — 0°·19, from + 0°·17 and —0°·50 respectively. In both these months the

photography was very unsatisfactory, the zero-lines being often lost altogether. These were the last curves re-measured.

I beg to submit that these results sufficiently confirm the suggestion made in my previous memorandum (Minutes, p. 95), that the principal causes of the large differences observed in the comparison for the earlier years, are to be found partly in the method then adopted for tabulating the curves, and partly in the more or less faulty scale-values used.

I append two short tables, giving the above results in a more concise form.

I am, &c.

R. H. Scott, Esq., F.R.S. (Signed) R. H. Curtis.

Table I.

Observatory and Date.	Means obtained from			Differences.	
	A. Analyser.	B. Original Tabulations.	C. Re-tabulations.	A − B.	A − C.
Aberdeen:	°	°	°	°	°
October 1872 - - -	46·02	46·6	46·14	−0·58	−0·12
August 1874 - - -	54·95	55·3	54·91	−0·35	+0·04
Falmouth:					
July 1873 - - -	61·16	60·5	60·99	+0·66	+0·07
Valencia:					
*February 1871 - - -	47·87	47·7	47·79	+0·17	+0·08
*July 1871 - - -	57·90	58·4	58·09	−0·50	−0·19

* Photography very indifferent.

Table II.

Observatory.	Analyser Means.		C. Mean of Tabulations.	Differences.	
	A. Uncorrected for Error of Zero.	B. Corrected.		A − C.	B − C.
Falmouth:	°	°	°	°	°
July 1873 - - -	61·16	60·56	60·55	+0·61	+0·01
August „ - - -	61·34	60·74	*60·6	+0·74	+0·14
September „ - - -	56·60	56·00	†56·1	+0·50	−0·10
October „ - - -	51·35	51·05	51·1	+0·25	−0·05
November „ - - -	48·36	48·06	48·0	+0·36	+0·06
December „ - - -	47·80	47·50	47·5	+0·30	±0·00

* Mean for 29 days only. † Mean for 28 days only.

Read—A memorandum from Captain Toynbee, reporting that since the last meeting 8 logs had been received, 6 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. D. W. Barker	S.S. "Dacia" -	Oct. 9, 1885—Jan. 16, 1886.	Cable laying in Persian Gulf, &c.	1885, p. 40.
Capt. G. O. Hayward	S.S. "Dunrobin Castle."	Oct. 17, 1885—Jan 12, 1886.	Southampton and African Ports.	1872, p. 85.
Capt. J. F. L. P. Maclear, R.N. Sub-Lieut. W. O. Lyne, R.N.	H.M.S. "Flying Fish."	April 8—Nov. 17, 1885.	Surveying in China Seas	1885, p. 47.
Capt. W. Sangster -	S.S. "Dracona."	July 23, 1885—Jan. 22, 1886.	Two voyages to and from Montreal.	1885, p. 47.
Capt. W. Cummings			One voyage to and from Kurrachee.	——
Capt. W. H. Trant	S.S. "Venetian"	June 22, 1885—Jan. 19, 1886.	Liverpool and Boston. Five voyages.	1885, p. 29.
Capt. A. Watson -	Barque "Elvira"	July 20, 1884—Jan. 16, 1886.	South America, East and West Indies.	1884, p. 25.

Mr. Scott was instructed to present the Charts (O. 32) to Captain Cummings, and to convey the best thanks of the Council to the other observers.

SUBMITTED—The following STATEMENT respecting the RECORDS for October 1883, received from the SELF-RECORDING OBSERVATORIES (see Minutes, 21st December 1868 and 20th November 1876).

	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH:—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Action	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.	Good.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	21 hrs.	21 hrs.	0	0	0	0	0	0
,, ,, other causes	0	0	0	0	0	0	0	0	0	0	†2 hrs.	†2 hrs.	‡10 hrs.	0
Orientation verified	27th	—	31st	—	2nd	—	—	—	—	—	27th	—	10th	—
No. of errors discovered by subsidiaries	0	0	0	0	0	0	0	0	0	0	0	0	0	0
,, ,, irregular differences	0	0	1	1	1	0	0	3	14	0	9	7	1	12
Result of 40 *Remeasurements*:—														
Greatest difference	0·0	1·0	0·0	1·0	2·0	1·0	2·0	2·0	1·0	1·0	2·0	1·0	1·0	2·0
Mean difference irrespective of sign	0·0	0·4	0·0	0·2	0·1	0·3	0·1	0·4	0·1	0·3	0·1	0·2	0·0	0·6
Residual difference (— Meteorological Office)	0·0	0·0	0·0	+0·1	−0·1	0·0	+0·1	0·0	0·0	0·0	−0·1	0·0	0·0	+0·3
RAIN GAUGE:—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient, due to stoppage of clock	0		0		0		0		33 hrs.		0		0	
,, ,, other causes	0		0		0		0		*2 hrs.		0		0	
Errors in tabulation	0		0		1		0		1		0		0	

BAROGRAPH :—							
Action *	Good.	Good.	Good.	Good.	Good.	Good.	Good.
Photography	Do.	Do.	Do.	Indifferent.	Do.	Do.	Do.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0
„ „ failure of light	0	1	0	0	5 hrs.	0	0
„ „ other causes	0	0	0	0	‖7 hrs.	0	0
No. of errors discovered—							
In entry of standard	0	1	0	4	2	6	0
„ calculating residual correction	0	0	1	1	1	0	0
„ applying residual correction	1	1	0	12	2	4	0
„ subtraction in subsidiary tables	0	0	0	0	2	1	1
„ tabulation by subsidiaries	0	0	0	0	0	0	0
„ „ irregular differences	0	0	0	0	2	2	1
Result of 40 *Remeasurements :—*							
Greatest difference	·006	·006	·006	·007	·009	·008	·007
Mean difference irrespective of sign	·002	·002	·002	·002	·003	·002	·003
Residual difference (—Meteorological Office)	·000	—·001	+·001	—·001	+·001	·000	·000
Mean monthly difference between simultaneous barograph and barometer readings	·002	·002	·001	·002	·002	·001	·002

THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Do.		Do.		Do.		Indifferent.		Indifferent.		Do.		Do.	
	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ failure of light	0	0	1 hr.	1 hr.	0	0	0	0	0	0	0	0	3 hrs.	0
„ „ imperfectly moistened bulbs	—	1 hr.	—	0	—	5 hrs.	—	0	—	0	—	0	—	0
„ „ partially frozen bulbs	—	0	—	0	—	0	—	0	—	0	—	4	—	0
„ „ other causes	0	0	¶1 hr.	¶1 hr.	0	0	0	0	*7	*7	‖1 hr.	0	0	0
No. of errors discovered in entry of standard	0	0	0	0	0	0	0	0	0	2	0	3	1	0
„ „ by subsidiary measurements	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ of subtraction in do. tables	0	0	1	0	1	1	2	1	2	1	0	1	2	0
„ „ detected under glass scale	0	0	0	0	0	0	0	0	0	1	§49	§48	0	0
Result of 40 *Remeasurements :—*														
Greatest difference	0·2	0·2	0·4	0·4	0·2	0·3	0·2	0·3	0·3	0·3	0·2	0·3	0·3	0·2
Mean difference irrespective of sign	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1
Residual difference (—Meteorological Office)	0·0	0·0	+0·1	+0·1	0·0	+0·1	0·0	+0·1	0·0	—0·1	0·0	—0·1	+0·1	0·0
Mean monthly difference between simultaneous thermograph and thermometer readings	0·1	0·2	0·2	0·1	0·1	0·1	0·2	0·2	0·1	0·2	0·1	0·1	0·1	0·3
No. of errors in maxima and minima	0	—	2	—	0	—	0	—	1	—	5	—	2	—

The Standard values, supposed to be a check on the action of the instrument, and the accuracy of tabulation, *made to agree with* the incorrect values. Error repeated in B. col. of subsidiary sheet.

* Examining instrument. † Insufficient pressure of pencil. ‡ Trace faint. § Principally owing to the use of incorrect zero-line values. ‖ Imperfect action of light-stop. ¶ Instrument interfered with.

Submitted—The following report on the forecasts for January 1886:—

The letters used have the following signification:—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

JANUARY.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	35	88	62	83
"	b	35	8	21	
"	c	23	4	14	
"	d	7	0	3	
Scotland, E.	a	50	62	56	85
"	b	27	31	29	
"	c	15	7	11	
"	d	8	0	4	
England, N.E.	a	46	58	52	79
"	b	31	23	27	
"	c	23	8	16	
"	d	0	11	5	
England, E.	a	42	46	44	85
"	b	46	35	41	
"	c	12	12	12	
"	d	0	7	3	
Midland Cos.	a	38	42	40	75
"	b	27	42	35	
"	c	35	8	21	
"	d	0	8	4	
England, S.	a	58	54	56	83
"	b	31	23	27	
"	c	7	12	10	
"	d	4	11	7	
Scotland, W.	a	38	58	48	79
"	b	31	31	31	
"	c	23	4	14	
"	d	8	7		
England, N.W.	a	35	58	47	74
"	b	31	23	27	
"	c	23	15	19	
"	d	11	4	7	
England, S.W.	a	23	65	44	79
"	b	46	23	35	
"	c	23	4	13	
"	d	8	8	8	
Ireland, N.	a	42	69	56	81
"	b	39	12	25	
"	c	19	8	14	
"	d	0	11	5	
Ireland, S.	a	35	69	52	79
"	b	42	12	27	
"	c	19	4	12	
"	d	4	15	9	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a. + b.
Scotland, N.	a	35	77	56	82
"	b	29	23	26	
"	c	23	0	12	
"	d	13	0	6	
Scotland, E.	a	42	45	44	89
"	b	26	45	45	
"	c	19	7	13	
"	d	13	3	8	
England, N.E.	a	55	61	58	89
"	b	32	29	31	
"	c	7	7	7	
"	d	6	3	4	
England, E.	a	32	45	39	79
"	b	42	39	40	
"	c	16	10	13	
"	d	10	6	8	
Midland Cos.	a	32	55	44	86
"	b	42	42	42	
"	c	16	0	8	
"	d	10	3	6	
England, S.	a	65	58	62	88
"	b	23	29	26	
"	c	6	7	6	
"	d	6	6	6	
Scotland, W.	a	42	55	49	73
"	b	26	23	24	
"	c	26	9	18	
"	d	6	13	9	
England, N.W.	a	39	61	50	78
"	b	32	23	28	
"	c	23	6	14	
"	d	6	10	8	
England, S.W.	a	40	65	53	80
"	b	33	22	27	
"	c	20	13	17	
"	d	7	0	3	
Ireland, N.	a	32	61	47	72
"	b	35	16	25	
"	c	23	16	20	
"	d	10	7	8	
Ireland, S.	a	52	52	52	75
"	b	23	22	23	
"	c	19	13	16	
"	d	6	13	9	

SUMMARY.

British Isles	a	40	61	51	80
"	b	35	24	29	
"	c	20	8	14	
"	d	5	7	6	
British Isles	a	43	58	51	80
"	b	31	28	29	
"	c	18	8	13	
"	d	8	6	7	

Submitted—The following statements of work for January, 1886 :—

MARINE ROOM.

February 10, 1886.

Examined 20 new logs and 1 lighthouse register.

North Atlantic Weather Charts.

Reduction of charts for September, October, and November, 1882, in progress.
Reduced charts to September 11, completed, and sent to lithographer for reproduction. Proofs of lithographed charts to August 21 received.
Obtaining lowest barometer reading in centre of disturbances for November and December 1882.
The female clerks engaged on reducing charts by eidograph.

General.

Discussion of Red Sea data for the month of July.
Copying observations from a rough-book into log No. 6,197.
Indexing data in ocean 10° squares.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

To 31st January 1886.

Monthly Weather Report.—1885, *September*, complete, and ready for publication. *October*, revise in hand. *November*, proof returned for revise. *December*, in hand, and partially completed.

Weekly and Daily Reports.—All issued to date. Quarterly Summary of Weekly Weather Report for fourth quarter, and annual summary for 1885, with title page and preface, all completed and published.

Since January 1, six new columns have been added to the summary on first page of the Weekly Weather Report, showing for each district the difference between the aggregate values for accumulated heat (above and below 42°), rainfall and bright sunshine from the commencement of the year, and the mean values for the corresponding period in former years. Mean weekly values already prepared for short time in advance.

Monthly Means of Rainfall for stations in Weekly Weather Report during the 20 years 1866–85. Complete, and ready for publication. Means already in use in the Daily and Weekly Reports.

Curves for same, showing weekly fall. Complete, and in use.

Report on Prevalence of Gales on British Coasts during years 1870–84. Done to end of 1876.

Checking Daily Forecasts.—(3.30 p.m. and 8.30 p.m.) Complete to date.

(Signed) F. J. BRODIE,
pro FREDC. GASTER.

PANTAGRAPH ROOM.

February 1, 1886.

Observatory Returns.—The calculation of the daily and other means, and of the hourly vapour tension values, and the copying of the Hourly Readings for October 1883, nearly completed. Most of the proof of the Hourly Readings for September 1883, signed for press.

Harmonic Analyser.—The Armagh barograms for 1872 have been passed through the instrument. Much time has been occupied in examining analyser readings, &c., in order to find the cause of some apparent discrepancies in mean temperature results; for this purpose the Falmouth thermogram for 1871 and 1872, as well as those for a few months for other observatories have been reworked.

Krakatoa Air-wave.—Some of the maps have been redrawn: the distances of the stations have been checked; and work has been done on the copper plate, and on the enlarged copies of the curves.

(Signed) R. H. CURTIS.

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

EXAMINATION ROOM.

SIR,

February 1, 1886.

THE following is a report of the work done during the month of January 1886:—

EXAMINATIONS.

October 1883:—Four *barograms* and seven *anemograms*, and partial examination of the Valencia thermograms and barograms for October to December 1885, for the Registrar General of Ireland.

REPORTS, &c.

Notes of errors to Valencia, Aberdeen, Falmouth, Stonyhurst, and Kew.
Determination of Falmouth dry-bulb scale and zero-line values.
Reports on errors, *re* Valencia rain and wind records; and Stonyhurst thermograms.
Special work for private persons, *re* Valencia anemograms, December 1885, and Kew thermograms, 1884.

MISCELLANEOUS.

The weekly examination, &c. of curves and documents.
Mr. Aldridge was absent for four days on sick leave.

I am, &c.

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

(Signed) T. E. ALLEN.

Reported—That the following cheques had been drawn during the month of January:—

1886.			£	s.	d.
Jan. 2nd.	For weekly salaries		15	1	0
„ 6th.	W. I. Fortescue, removal of Orkney anemometer		3	1	10
„ „	Deutsche Seewarte, synoptic charts		37	6	4
„ „	W. C. Ley, salary, 9 months		112	10	0
„ „	P. Adie, repairing instruments		15	19	3
„ 9th.	For weekly salaries		15	1	0
„ „	F. Hatchett, copying apparatus		2	4	0
„ „	Wightman & Co., printing and post cards		2	10	0
„ „	Royal Meteorological Society, weekly reports		4	16	4
„ „	Anglo-American Telegraph Company, telegrams		5	19	2
„ 13th.	Pall Mall Coal Company, coals		9	4	0
„ „	R. Rivière & Son, labels for charts		1	19	0
„ „	For weekly salaries		15	1	0
„ 23rd.	R. Jenkin, thermometer screens		4	0	0
„ „	Kew Committee, verifications		17	4	0
„ „	For weekly salaries		15	1	0
„ 30th.	„		15	1	0
„ „	R. H. Scott	Salaries	66	13	4
„ „	J. S. Harding, junr.		27	15	6
„ „	T. D. Bell		15	0	0
„ „	J. Sheerman		10	0	0
„ „	J. E. Cullum		16	13	4
„ „	R. H. Curtis		22	10	0
„ „	J. A. Curtis		17	10	0
„ „	T. E. Allen		16	5	0
„ „	C. H. Thompson		11	13	4
„ „	S. Call		10	16	8
„ „	E. G. Aldridge		8	15	0
„ „	R. G. Canham		6	13	4
„ „	A. H. Bell		6	13	4
„ „	F. Gaster		25	6	3
„ „	F. J. Brodie		17	6	10
„ „	G. G. Francis		16	17	6
„ „	A. J. Rigby		16	8	1
„ „	R. Sargeant		11	5	0
„ „	A. R. Simkins		9	7	6
„ „	H. J. Stevens		8	6	8
„ „	Capt. H. Toynbee		33	6	8
	Carried forward		£667	2	3

			£	s.	d.
		Brought forward - - -			
Jan. 30th.	Nav.-Lt. C. W. Baillie, R.N. -	Salaries - -	20	16	8
„ „	R. Strachan - - -		27	15	6
„ „	C. Harding - - -		22	10	0
„ „	H. Harries - - -		14	3	4
„ „	W. Allingham - - -		14	3	4
„ „	W. G. James - - -		19	8	8
„ „	F. T. Bullen - - -		8	15	0
„ „	R. F. Wallace - - -		7	18	4
„ „	Gas Light and Coke Company, gas - - - -		9	18	5
„ „	J. S. Harding, jun., petty cash - - - -		60	0	0
„ „	For late evening and Sunday attendance* - - -		16	11	4
			£880	2	10

* Amounts previously included with salaries for Telegraphic Branch.

116, *Victoria Street, February* 24, 1886.

PRESENT:

PROFESSOR STOKES IN THE CHAIR.

MR. GALTON. | MR. STONE.

The Secretary was in attendance.

The Minutes of the last meeting (February 10) were read and confirmed.

Reported—That on December 18th, 1885, the apparatus for rating chronometers, brought from the Seamen's General Register Office in 1858, namely:—

Chronometer oven
Oak top cover for ditto
Gas governor „
Gas meter „

were issued on loan to the Kew Observatory.—Approved.

Read—A memorandum from Captain Toynbee reporting that since the last meeting four logs had been received, two of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. P. J. Irving -	S.S. "Republic"	June 19, 1885—Jan. 30, 1886.	Liverpool to New York, six voyages.	1885, p. 27.
Capt. N. J. Wheaton	Barque "Eliza"	Sept. 6, 1885—Feb. 1, 1886.	Demerara, and home -	1885, p. 47.

Mr. Scott was instructed to convey the best thanks of the Council to the above observers.

Mr. Scott was instructed to prepare a draft of a paper on the results yielded by the Harmonic Analyser, submitted at last meeting (Minutes, p. 102), to be presented to the Royal Society.

Submitted—The following report:—

I HAVE the honour to submit the following report of the stations in England inspected by me in 1885:—

Jersey (Noirmont), September 14.—All the instruments at this station are in good order, and the observer is very careful and intelligent. He shows considerable aptitude for the taking of

upper current observations. There are no means of taking observations during Mr. Fisher's absence. A new block will be required for the rain-gauge next year.

Hurst Castle, inspected September 19.—The instruments at this station are all in perfect order. The observer's readings of the barometers are good, but his handling and reading of the thermometers are rough. The maximum temperatures recorded are sometimes much too high; the heat radiated from the white gravel near the instruments may perhaps cause rather high readings, but the errors of the maximum occasionally reported are probably due to carelessness in the setting of the instruments. The substitute who has occasionally taken the readings is inefficient.

On the day of my visit the observer estimated the wind force correctly, but over-estimated the sea disturbance by one figure. Both the wind force and sea disturbance appear to be occasionally over-estimated at this station.

Dungeness, inspected September 29.—The instruments at this station were in good order, but the thermometer screen is not very well placed. The barometers are in a very small porch in the house of one of the lightkeepers, which is rather an inconvenient situation, and I think that it would be desirable that I should receive instructions to remove them into the lighthouse next year. Some errors have occurred in the barometrical report, and the lightkeepers, who take the readings in rotation as they are on duty, are not all equally accurate; but an improvement in this respect may be reasonably expected.

Yarmouth, inspected October 3.—The instruments were all in good order, and the observations are very carefully taken. I gave instructions for the adjustment of the self-registering aneroid.

Cambridge, October 4.—The barometer was in good order, and the observer reads with perfect correctness, but it may be noted that in winter, at times when the astronomical observations are being taken, the changes of temperature where the instrument is situated are very rapid and great. The minimum thermometer gives low readings, but the other thermometers read well together. Branches of trees slightly interfere, in November, December, and January, and again in June, with the records of the sunshine recorder. I have reason to hope that the obstruction, which is somewhat on the increase, may be removed.

Loughborough, October 6.—All the instruments at this station were in excellent order, and the observer is exceedingly careful and conscientious. Although Mr. Berridge has paid great attention to the subject of wind force, I continue to believe that the number of gales reported from this station is excessive.

York, October 7.—The instruments at this station were not in very good order. The barometer frame was extremely rusty, and required a thorough cleaning, the milled head of the vernier-pinion working with extreme difficulty. This I rectified. The observer read the instrument too high. The thermometer screen required a fresh coat of paint and the rain gauge was quite worn out. The latter instrument has been moved a few feet for better exposure, but the exposure is still unsatisfactory.

North Shields, October 10.—The thermometer screen and rain gauge have been shifted to the northward of their former position, but their exposure is still satisfactory. The instruments were all in good condition, and the observer is very painstaking. He estimated the sea disturbance one figure too low on the day of my visit.

I examined several sites for a self-registering anemometer, and have reported on this question in a letter to the Secretary.

Scilly (St. Mary's), October 24–30.—I found the instruments at this well-exposed station to be in good condition, excepting that the clock of the self-registering aneroid was out of order. The observer is very painstaking.

Prawle Point, November 2.—The observations at this station seem to be very carefully conducted. The instruments were in very good order, but the minimum thermometer reads a trifle too low. The 8 a.m. temperatures during calm summer weather appear to be occasionally somewhat too high, which I am inclined to attribute to the position of the screens.

Stations furnishing Weekly or Monthly Reports.

Southampton, inspected September 18.—The observations at this station continue to be very carefully made, and the records are very complete. It has been found necessary to surround the out-of-door instruments with a fence, which does not, however, as I think, affect the readings. The screen required to be repainted.

St. Leonard's, September 26.—Dr. Colburne had changed his residence a week before the date of my inspection, and a great improvement had just been made in the position of the outdoor instruments, which, as now placed in the Gensing Gardens, have a good exposure. The observer was absent at the time of my visit, and I was unable to ascertain the exact altitude of the barometer above sea-level. The instruments were all in good order, and the observations appear to be carefully conducted.

Uppingham, October 5.—The instruments at this station were in good order. The Kew corrections for the maximum appear to be now unreliable, and the readings of all the thermometers require no correction. The screen is a modification of Glaisher's, and is double louvred. The returns from this station are unexceptionable.

Leicester, October 6.—The observer was absent at the time of my visit. Both the dry and wet-bulb thermometers gave high readings. The instruments generally were in fairly good order, but the rim of the rain gauge was not horizontal.

Sheffield (*Weston Park*), October 7.—This is a good station, and the exposure of the instruments is excellent. The observations are accurately conducted. I hope that the Park Committee will, in accordance with my request, permit the screen to be painted white instead of green, as it is at present. A building is about to be erected on the west of the screen, and the latter will then be shifted further to the eastward, when the curator has promised that it shall open to the north, instead of to the east, as it now does. The exposure in the new position will be perfect. The minimum thermometer reads too low, and will be sent to Kew for new corrections. For the present, 9 p.m. observations cannot be taken at this station.

York, October 7.—The observations at this station appear to be fairly well conducted, but a well-situated vane is a desideratum. An examination of the sunshine recorder appeared to me to show that the meagre record of bright sunshine at York is not due to want of complete exposure of the instrument, but truly represents the climate of the place in this particular.

Durham, inspected October 8.—Mr. H. J. Carpenter had just commenced the observations here. The readings of the instruments were satisfactory. The cases of the thermometers in use are in bad condition. The observations taken here will in future be at 9 a.m. and 9 p.m.

Seaham, inspected October 9.—The thermometer screen had just been repainted, unfortunately of a dark colour. It is sheltered to some extent by shrubs. The maximum thermometer reads low. There was a considerable deposit of copper on the wet bulb. The rain-gauge required some slight repairs. I think that the observations at this station are more accurately made than was the case a few years ago.

Hawes Junction, inspected October 13.—The observer, Mr. Foster, continues to take the observations carefully. The instruments were in good order, but the dry-bulb read somewhat high. The barometer is in an inconvenient place, but no better site seems to be available.

Stonyhurst, October 15.—The instruments were all in good condition, except that the self-registering rain-gauge required some repairs.

Prestwich, October 16.—The instruments were in good order, and the work of observation appears to be carefully conducted. The barometer is still unfavourably placed.

Cirencester, October 20.—All the instruments were in a satisfactory condition, and the observer, Professor Ohm, appears to make careful returns.

Arlington Court, October 22.—A new screen has been erected for the convenience of the observer, gardener to Lady Chichester, near to his house, and the 9 p.m. observations of temperature are taken from new thermometers in this screen. It has not so good an exposure as the screen employed for the 9 a.m. readings. The observations are very roughly taken, and the returns made from this station are as yet very unsatisfactory. This is unfortunate, as the station is well situated.

Plymouth, October 23.—The instruments at this station were all, as usual, in good order, but the maximum thermometer reads high.

Helston, November 1.—The returns from this station have been greatly in arrears, the observer having been repeatedly ill. He expresses himself, however, as anxious to keep on the work. The position of none of the instruments has been altered. The thermometer screen was shaky. I requested Mr. Gill to remedy this at once. The minimum thermometer had 4°·5 of detached spirit, which, being colourless, was not very easily discernible. The other instruments were in good order.

Totnes, inspected November 2.—I found everything, as usual, in excellent order at this station. The observer, who has not been in very good health, will be grateful if the Meteorological Office will undertake some of the reduction work for him. This is a good station, and the observations are carefully conducted.

St. Aubin's, Jersey.—The returns from this station are admirable. I did not this year compare the thermometers with my own standards, as from time to time Mr. Vibert compares them with a Kew standard of his own.

The observer employs two black-bulb "in vacuo" thermometers, both somewhat recently verified at Kew. In gloomy weather, and also in bright sunshine, these appear to agree, but when the canopy of cloud is thin, they differ sometimes to the extent of 10°.

It is on account of discrepancies such as these, and others of an exceedingly unsatisfactory character, that I have this year reported the results of no comparisons of black-bulb in vacuo thermometers.

In the accompanying table the stations the names of which are printed in italics are those which furnish weekly or monthly reports. In the last column the letter A is employed to signify that the instruments were in perfect condition and well attended to; B that they were in moderately good condition; while C denotes that they were in an unsatisfactory state. These letters do not refer to the correctness or otherwise of the instrumental indications which are shown in the preceding columns, but to the amount of care apparently bestowed on the instruments themselves. The table is otherwise self-explanatory. The general result of the comparisons made is, I think, satisfactory.

(Signed) W. Clement Ley.

December 28, 1885.

Name of Station.	Barometer.	Thermometer.												Name o Station.
		Dry Bulb.			Wet Bulb.		Maximum.		Minimum.		Spare or Grass.			
	Difference of Observer's from Inspector's Readings.	Temp. of Water.	Correction to reduce to Inspector's Standard.	Correction hitherto applied.	Correction to reduce to Inspector's Standard.	Correction hitherto applied.	Correction to reduce to Inspector's Standard.	Correction hitherto applied.	Correction to reduce to Inspector's Standard.	Correction hitherto applied.	Correction to reduce to Inspector's Standard.	Correction hitherto applied.	General Condition.	
Arlington Court	−·005	49	+0·15	—	−0·05	—	+0·35	—	+0·35	—	—	—	C	*Arlington Court.*
Cambridge	·000	53	−0·1	−0·1	0·0	+0·2	−0·2	−0·8	+0·9	+0·4	—	—	A	Cambridge.
Cirencester	—	59	+0·1	—	0·0	—	−0·15	−0·1	0·0	0·0	+0·4	—	A	*Cirencester.*
Dungeness	−·003	57	−0·15	—	+0·25	—	+0·35	—	+0·35	—	—	—	A	Dungeness.
Durham	·000	50	−0·2	—	−0·2	—	−0·2	—	+0·5	—	—	—	A	*Durham.*
Hawes Junction	+·001	41	−0·55	—	−0·25	—	+0·05	—	+0·15	—	—	—	A	*Hawes Junction.*
Helston	−·002	51	0·0	−0·1	+0·2	−0·2	−0·05	−0·1	+0·6	+0·5	—	—	B	*Helston.*
Hurst Point	−·002	59	−0·05	—	−0·15	—	+0·05	—	+0·15	—	—	—	A	Hurst Point.
Jersey (Noirmont)	−·001	62	−0·35	—	−0·35	—	+0·15	—	+0·25	—	—	—	A	Jersey (Noirmont).
Leicester	—	53	−0·9	—	−0·9	—	0·0	0·0	+0·2	−0·2	+0·2	—	B	*Leicester.*
Loughborough	·000	50	−0·05	−0·2	−0·05	−0·2	0·0	−0·1	+0·05	—	+0·35	—	A	Loughborough.
Plymouth	—	49	—	—	—	—	−0·65	−0·7	+0·95	+0·5	−0·15	−0·3	A	*Plymouth.*
Prawle Point	·000	48	−0·1	—	−0·2	—	−0·2	—	+0·5	—	−0·3	—	A	Prawle Point.
Prestwich	—	50	+0·1	—	−0·1	—	−0·3	—	0·0	—	+1·7	—	A	*Prestwich.*
St. Aubin's	·000	42	—	0·0	—	0·0	—	−0·3	—	0·0	—	+0·1	A	*St. Aubin's.*
St. Leonard's	—	50	−0·2	—	−0·4	—	+0·1	—	0·0	—	—	—	A	*St. Leonard's.*
Scilly	·000	53	+0·05	—	+0·25	—	+0·05	—	+0·45	—	+0·05	—	A	Scilly.
Seaham	−·001	49	−0·3	—	0·0	—	+0·7	—	+0·2	—	—	—	B	*Seaham.*
Sheffield	−·002	55	0·0	0·0	−0·4	−0·2	+0·2	+0·1	+0·5	−0·2	—	—	A	*Sheffield.*
Shields	+·001	48	+0·4	—	0·0	—	0·0	—	+0·3	—	−7·0	—	A	Shields.
Southampton	−·001	62	−0·4	−0·3	−0·3	−0·1	−1·1	−0·6	0·0	−0·1	+0·3	0·0	A	*Southampton.*
Stonyhurst	−·001	46	−0·1	−0·1	+0·15	−0·35	+0·2	−0·3	−0·35	+0·25	—	—	A	*Stonyhurst.*
Totnes	—	48	−0·1	−0·1	−0·15	−0·1	−0·2	0·0	+0·1	−0·1	+0·6	+0·3	A	*Totnes.*
Uppingham	·000	52	0·0	—	−0·05	—	−0·15	—	0·0	—	—	—	A	*Uppingham.*
Yarmouth	+·002	53	−0·05	—	+0·45	—	+0·25	—	+0·15	—	—	—	A	Yarmouth.
York	+·004	50	−0·45	—	−0·35	—	−0·45	—	+0·35	—	—	—	B	York.
York	+·004	50	−0·45	—	−0·35	—	+0·25	—	+0·45	—	—	—	B	*York.*

116, *Victoria Street, March* 17, 1886.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR STOKES. | MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (February 24) were read and confirmed.

Mr. Scott reported (Minutes, p. 89) that after correspondence with Sir James Douglass, C.E., the engineer to the Trinity House (Letter 511, P.C. 554), it appeared that the anemograph formerly at Seaham could not be erected at Souter Point unless an expenditure of about 80*l.* were incurred for alteration of the ventilation of the lantern.

He was instructed to inquire if another site were to be found on the coasts of Durham or Northumberland.

Mr. Scott reported that the subject of a possible saving to the Office had been suggested to him, by the transfer to the Office of the work of preparation and transmission to the Continent of certain telegraphic information.

He had requested Mr. Gaster to draw up a Memorandum on the subject, which he submitted:—

REPORT on the PROPOSED TRANSFER from the CENTRAL TELEGRAPH DEPARTMENT of the POST OFFICE to the METEOROLOGICAL OFFICE of the DAILY WEATHER MESSAGES sent from this Country to certain Foreign Meteorological Offices.

1. The question having been raised as to whether the daily weather messages now sent to Paris, Brussels, Hamburg, Copenhagen, and Christiania by the Post Office authorities (acting on behalf of the Meteorological Office) could not be sent more economically and satisfactorily from the Meteorological Office *direct*, I beg to submit the following notes and recommendations for the consideration of the Council.

The telegrams sent are as follow:—

1. 8 A.M. REPORTS.

A. *For Paris*, addressed to the Observatoire, Paris.
All the figure groups of the 8 a.m. telegrams received from Stornoway,* Mullaghmore, Valencia,† Scilly, Yarmouth, and North Shields.
(Names of stations to be included. Despatch to begin with all available reports at 9 a.m.; later information to be sent at intervals of 15 minutes till message is completed.)

B. *For Brussels*, addressed to the Observatoire.
All the figure groups of the 8 a.m. reports from Dunrossness,‡ Aberdeen, Holyhead.
(Rules same as those for the Paris message, page 1.)

C. *For Hamburg*, addressed to the "Seewarte, Hamburg."
Groups 3, 4, and 5 only, of the 8 a.m. reports from Dunrossness,‡ North Shields, Mullaghmore, Holyhead, Scilly, Hurst Castle, Aberdeen, Roches Point.
(To be sent as a "collective" message, *as early as possible* after the arrival of the telegrams in London. *Names of stations* to be omitted, but in preparing message the order given above is to be maintained. Word "Missing" to be given in lieu of groups for any telegram which has not arrived when the collective message is sent off. *Name of "Wick"* to be sent if Dunrossness cable is broken.)

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* Wick, when the Stornoway cable is broken. † With 10 p.m. barometer reading.
‡ Or Wick, when the Shetland Islands cable is broken.

D. *For Copenhagen,* addressed to "Institute, Copenhagen.'
First to fifth groups of 8 a.m. reports from Stornoway,* Valencia, Yarmouth.
(Names of stations to be inserted in telegram. Messages go as "service" messages, viâ the Great Northern Telegraph Company.)

E. *For Christiania,* addressed to "Institute, Christiania."
All groups of 8 a.m. reports from Dunrossness,† Valencia, Yarmouth.
(Names of stations inserted. Messages go as "service" messages, viâ Great Northern Telegraph Company.)

It is desirable that all these messages should be out of hand by 10 a.m. *as a rule. Some* delay, however, is allowable if the telegrams on which they depend are coming to hand badly, and I have seen one case in which the Hamburg collective report was not sent away till nearly 11 a.m.

[The French messages are those which it would be most important to send from Meteorological Office, as for these we pay both for *copying* and for *cost of transmission.* In the case of Denmark and Norway, e.g., *copying only.*—J. S. H.]

2 P.M. REPORTS.

(Not sent on Sundays.)

A. *For Paris,* addressed same as 8 a.m. report.
All the groups of the 2 p.m. reports from Valencia,‡ Mullaghmore.
(To be sent by 3 p.m., if possible. Rules same as at 8 a.m.)

B. *For Hamburg,* addressed same as 8 a.m. message.
All groups of the 2 p.m. reports from Stornoway,§ Valencia, North Shields.
(To be sent off by 3 p.m., if possible. Rules same as for 8 a.m.)

6 P.M. REPORTS.

A. *For Hamburg,* addressed same as 8 a.m. telegram.
First and second groups only of the 6 p.m. reports from Valencia, Stornoway,§ North Shields, Yarmouth, Scilly, Mullaghmore.
(To be sent before 7 p.m., if possible, as a "collective" message. Rules same as for 8 a.m. messages.)
This message is not sent during summer time.

With regard to the preparation and despatch of these various messages, I beg to report as follows:—

1. Those for 2 p.m. and 6 p.m. present no difficulties at all.

2. With the 8 a.m. reports, matters are very different, and I would respectfully advise that their transfer to this Office should not be made, on the following grounds:—

A. *Promptitude.*—The Post Office can deal with the reports directly they arrive at the Central Station, whereas we cannot do so till they have been again transmitted over our private wire to this Office, and this might cause a loss of 10 minutes if the wire should be busily occupied at the time.

B. *Cost.*—In order to carry out the work regularly, it would be absolutely necessary that we should have a duplex telegraphic instrument, the rent of which would be 10*l.* higher than that in use. Such an instrument would necessitate the employment of an additional competent telegraphist from 8.30 a.m. to 11.30 a.m. daily (except on Sundays), whose duty it would be to make up and transmit the messages and keep the necessary *accounts* of them for checking errors and postal charges. In addition to these it would be necessary that another clerk should attend at the Central Telegraph Office on Sunday mornings, in order to prepare the telegrams, as the two who now attend have already quite as much as they can do in the limited time at their disposal; any additional work would be seriously detrimental to the issue of warnings, &c., for which the Sunday service was established.

I am aware that Mr. Stevens, our present telegraphist, has said he believed that without a duplex instrument he could, unaided, prepare and forward their messages daily. I am glad to be able to testify to Mr. Stevens's great value as our telegraphist, but a careful examination of the work convinces me—

(1.) That while this might be done in fine, quiet weather, when the telegrams come in early and well, it could not be done in bad weather, when telegrams arrive late, without serious delay to our own work of forecasting and issuing the storm warnings.

(2.) That if Mr. Stevens were ill, or away on a holiday, the work would break down, as it is only his complete mastery of the instrument, together with a full practical knowledge of our work, which could enable him to carry it out even under favourable circumstances.

Feeling that, if undertaken at all, the work *must* be carried out promptly at all times, I cannot recommend that the transfer be made unless the duplex instrument, second telegraphist, &c. referred to above be employed.

R. H. Scott, Esq.,
Secretary, Meterological Council.

(Signed) FREDC. GASTER.
16th March 1886.

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* Dunrossness, when the Stornoway cable is broken.
‡ Including Noon barometer reading.
† Or Wick, when the Shetland Island cable is broken.
§ Wick, when Stornoway cable is out of order.

Submitted—The following :—

STATEMENT showing the COST of TELEGRAPHIC REPORTS RECEIVED and WARNINGS ISSUED for October—December, 1885, as compared with the same Period in 1884.

——	Reports.	Warnings.
1884, 1*s.* Rates :—	£	£
October - - -	87	62
November - - -	83	55
December - - -	86	63
	256	180
1885, 6*d.* Rates :—		
October - - -	68	73
November - - -	45	42
December - - -	48	43
	161	158
Decrease - -	95	22

The total decrease on these two items in the three months is 117*l.* The 6*d.* rates were not applied to our telegrams until 16th October. The other items in the Post Office account are not referred to here, as their amounts remain nearly the same in both years, being chiefly for foreign messages.

R. H. Scott, Esq. J. S. HARDING, Junr.

Mr. Scott reported that Mr. F. C. Bayard, F.R. Met. Soc., had proposed to undertake certain discussions of the observatory records, and that, with the Chairman's sanction, a set of the Hourly Readings for 1877 had been supplied to him.—Approved.

Mr. Scott submitted the following extract from a paper recently published in the "Meteorologische Zeitschrift," for March, by Dr. Julius Hann :—

EXTRACT from a PAPER by DR. JULIUS HANN in the "METEOROLOGISCHE ZEITSCHRIFT" for March 1886.

"WE venture to address to the Meteorological Council in London a request which will certainly be supported by all our colleagues. The 'Abstracts of Meteorological Observations taken at the stations of the Royal Engineers 1853–59," published by Sir H. James, are well known to be a rich source of information as to the meteorology of the tropical and sub-tropical regions, although they only cover six years, and the discussion of the records is not carried out in the detail which is looked for at the present time.

"In March 1862 these stations were transferred to the Army Medical Department, and it appears that the observations were kept up at most of the stations until 1875 at least. The reports of the Army Medical Department give the results of these observations for some years in a short Appendix.

"I possess the reports for 1864–73, and I have frequently been able to extract valuable information from them.

"Unfortunately the publication of the meteorological results in this form, where they are only constructed as casual returns, is most defective and is not systematical. For many stations one or more years are wanting, and the stations then crop up again. In the year 1872 no Meteorological Appendix is given. The means are full of printer's errors. In short, it seems most desirable that this valuable store of observations, especially from stations for which hardly any other information for the period exists, should be worked up according to the modern requirements of the science, and then published. For several stations there ought to be 20 years records (1853–73). If we had for this period carefully reduced observations for such places as Barbadoes, Bermuda, the Bahamas, Jamaica, Hong-Kong, Gibraltar, Halifax, Quebec, St. John's, N.B., &c., the gain to meteorology in general would be great, and the information would be simply priceless for investigations of meteorological periodicity.

"We therefore, in the name of all our colleagues, address to the Meteorological Council the request that they will, if they find it at all possible, undertake the discussion of the records of the stations of the Royal Engineers and Army Medical Department.

"The Council has already gained the warm gratitude of meteorologists by collecting, carefully discussing, and publishing the meteorological observations from the Arctic regions of America. A rich mine of information has been opened by this discussion, and its contents made accessible, or at least available, for calculations.

"We may perhaps hope that the store of information contained in the Royal Engineers and Army Medical Department records may be similarly placed within the reach of meteorologists."

Mr. Scott stated that the list of the returns forwarded from the Ordnance Survey Office in 1879 was given, Minutes, 1879, p. 79.

SUBMITTED—The following STATEMENT respecting the RECORDS for November 1883, received from the SELF-RECORDING OBSERVATORIES (see Minutes, 21st December 1868 and 20th November 1876).

——	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :— Action	Direction. Good.	Velocity. Good.	Direction. Indifferent	Velocity. Indifferent	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.	Direction. Good	Velocity. Good.	Direction. Indifferent	Velocity. Good.
Records deficient, due to stoppage of clock	0	0	29 hrs.	31 hrs.	0	0	0	0	1 hr.	1 hr.	0	0	0	0
„ „ other causes	0	0	0	0	0	0	0	0	*13	*13	†13	0	‡31 hrs.	0
Orientation verified	24th	—	29th	—	7th	—	2nd	—	30th	—	11th,15th	—	6th	—
No. of errors discovered by subsidiaries	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ irregular differences	0	0	3	0	8	1	0	2	9	1	3	24	5	11
Result of 40 *Remeasurements* :—														
Greatest difference	0·0	1·0	1·0	1·0	0·0	1·0	0·0	2·0	1·0	2·0	0·0	1·0	1·0	3·0
Mean difference irrespective of sign	0·0	0·3	0·0	0·5	0·0	0·4	0·0	0·4	0·1	0·5	0·0	0·2	0·0	0·6
Residual difference (— Meteorological Office)	0·0	0·0	0·0	−0·1	0·0	−0·2	0·0	+0·1	+0·1	−0·1	0·0	0·0	0·0	+0·2

RAIN GAUGE :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient, due to stoppage of clock	17 hrs.		0		0		0		0		0		0	
„ „ other causes	0		0		0		0		0		0		0	
Errors in tabulation	0		3		0		5		5		7		0	

BAROGRAPH :—

Action	Good.	Good.	Good.	Good.	Good.	Good.	Good.
Photography	Do.	Indifferent.	Do.	Bad.	Do.	Do.	Do.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0
„ „ failure of light	0	0	0	0	0	0	0
„ „ other causes	0	0	0	0	‖16 hrs.	0	0
No. of errors discovered—							
In entry of standard	0	0	0	2	0	3	0
„ calculating residual correction	0	1	2	0	1	1	0
„ applying residual correction	0	1	0	4	0	0	0
„ subtraction in subsidiary tables	0	0	0	1	2	3	1
„ tabulation by subsidiaries	0	0	0	0	0	0	0
„ „ irregular differences	0	2	1	2	2	1	3
Result of 40 *Remeasurements :—*							
Greatest difference	·006	·005	·007	·006	·005	·005	·010
Mean difference irrespective of sign	·002	·002	·003	·003	·002	·002	·003
Residual difference (— Meteorological Office)	+·001	+·001	·000	·000	·000	—·001	+·002
Mean monthly difference between simultaneous barograph and barometer readings	·002	·003	·001	·002	·002	·001	·002

THERMOGRAPH :—

Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Do.		Do.		Do.		Indifferent.		Do.		Do.		Indifferent.	
	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Records deficient, due to stoppage of clock	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ failure of light	0	0	0	0	0	0	0	0	0	0	0	0	1	0
„ „ imperfectly moistened bulbs	—	0	—	0	—	0	—	1 hr.	—	0	—	0	—	0
„ „ partially frozen bulbs	—	0	—	7 hrs.	—	0	—	10 hrs.	—	8 hrs.	—	9 hrs.	—	0
„ „ other causes	0	0	¶6	0	0	0	0	0	0	††5	0	0	0	0
No. of errors discovered in entry of standard	0	0	3	0	0	0	0	**0	2	2	1	0	0	0
„ „ by subsidiary measurements	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ „ of subtraction in do. tables	0	0	3	1	0	0	0	4	1	0	4	4	0	2
„ „ detected under glass scale	0	0	0	0	0	0	0	0	0	0	2	1	1	0
Result of 40 *Remeasurements :—*														
Greatest difference	0·2	0·2	0·3	0·3	0·3	0·3	0·3	0·4	0·2	0·2	0·2	0·3	0·3	0·4
Mean difference irrespective of sign	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·2	0·1
Residual difference (— Meteorological Office)	+0·1	0·0	0·0	—0·1	—0·1	0·0	0·0	+0·1	0·0	—0·1	—0·1	0·0	—0·1	—0·1
Mean monthly difference between simultaneous thermograph and thermometer readings	0·1	0·2	0·2	0·2	0·1	0·1	0·2	0·2	0·2	0·1	0·1	0·1	0·2	0·2
No. of errors in maxima and minima	0	—	2	—	4	—	2	—	5	—	4	—	3	—

* Clamping-pin broke. † Defective working of pencil. ‡ No trace. ‖ Paper wrongly put on cylinder. ¶ Funnel displaced, obscuring light.
** 40 per cent. of wet standards rejected during the month through want of care. †† Gas chimney choked.

Submitted—The following report on the forecasts for February 1886 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

FEBRUARY.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	50	79	65	96
"	b	42	21	31	
"	c	8	0	4	
"	d	0	0	0	
Scotland, E.	a	38	54	46	88
"	b	41	42	42	
"	c	21	0	10	
"	d	0	4	2	
England, N.E.	a	59	54	57	92
"	b	33	38	35	
"	c	4	4	4	
"	d	4	4	4	
England, E.	a	50	63	57	90
"	b	38	29	33	
"	c	8	8	8	
"	d	4	0	2	
Midland Cos.	a	75	54	65	88
"	b	13	34	23	
"	c	8	8	8	
"	d	4	4	4	
England, S.	a	67	46	57	90
"	b	21	46	33	
"	c	8	8	8	
"	d	4	0	2	
Scotland, W.	a	38	54	46	77
"	b	33	29	31	
"	c	17	9	13	
"	d	12	8	10	
England, N.W.	a	46	67	57	82
"	b	29	21	25	
"	c	21	4	12	
"	d	4	8	6	
England, S.W.	a	46	63	55	82
"	b	33	21	27	
"	c	8	0	4	
"	d	13	16	14	
Ireland, N.	a	38	58	48	75
"	b	37	17	27	
"	c	17	4	11	
"	d	8	21	14	
Ireland, S.	a	13	58	36	71
"	b	50	21	35	
"	c	25	17	21	
"	d	12	4	8	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	54	57	56	86
"	b	29	32	30	
"	c	14	7	11	
"	d	3	4	3	
Scotland, E.	a	54	46	50	80
"	b	21	39	30	
"	c	25	4	15	
"	d	0	11	5	
England, N.E.	a	72	46	59	88
"	b	14	43	29	
"	c	14	7	10	
"	d	0	4	2	
England, E.	a	64	71	68	86
"	b	18	18	18	
"	c	18	7	12	
"	d	0	4	2	
Midland Cos.	a	68	54	61	86
"	b	11	39	25	
"	c	21	7	14	
"	d	0	0	0	
England, S.	a	57	57	57	86
"	b	22	36	29	
"	c	21	7	14	
"	d	0	0	0	
Scotland, W.	a	50	47	49	74
"	b	25	25	25	
"	c	18	14	16	
"	d	7	14	10	
England, N.W.	a	46	50	48	74
"	b	29	22	26	
"	c	18	7	12	
"	d	7	21	14	
England, S.W.	a	37	57	47	74
"	b	33	21	27	
"	c	11	4	8	
"	d	19	18	18	
Ireland, N.	a	39	43	41	75
"	b	36	32	34	
"	c	4	11	8	
"	d	21	14	17	
Ireland, S.	a	22	36	29	61
"	b	32	32	32	
"	c	21	14	18	
"	d	25	18	21	

SUMMARY.

British Isles	a	47	59	53	85
"	b	34	29	32	
"	c	13	6	9	
"	d	6	6	6	
British Isles	a	51	51	51	79
"	b	25	31	28	
"	c	17	8	13	
"	d	7	10	8	

Mr. Scott submitted the following list of stations to be supplied with hand anemometers (Minutes, p. 101):—

Sumburgh Head.	Loughborough.
North Shields.	Holyhead.
Yarmouth.	London.

—Approved.

The Hydrographer reported that in the month of January he had received from the Office certain Track charts of cyclones for the Indian Ocean, forwarded by Dr. Meldrum to the British Association, with the following paper, and by the Association forwarded at Dr. Meldrum's request, to the Office, and he submitted the subjoined memorandum on the subject:—

MEMORANDUM by the HYDROGRAPHER.

CYCLONE CHARTS by Mr. C. MELDRUM.

THIS collection of graphic statistics has been drawn up by Mr. Meldrum to support the theory of the connexion suspected to exist between cyclones and sunspots.

They are given for the two successive years following the years in which sunspots were at their maximum and minimum, from 1856 to 1884.

Assuming that the statistics for these years are fairly complete, *i.e.*, that all the cyclones occurring in the year have been recorded, these charts are a valuable record, and must be in any case the result of a great deal of labour.

Containing, however, the data for selected years only, they cannot be looked upon as more than showing that there is a *primâ facie* ground for further investigation in this direction.

I have had two curves drawn for comparison. One of Wolf's sunspot numbers, the other of the numbers of days on which cyclones were raging in each year dealt with in these charts.

Another point indicated is, that in the years when cyclones are comparatively rare, they are nearly entirely confined to the western part of the ocean, and the vicinity of the Mascarene Islands.

This is new to me, though it has always been recognised that, speaking generally, the greater number of revolving gales occur in this area.

I have had the information in these charts re-arranged, according to the months. Looked at in this way the well-known cyclone season is plainly shown.

So far nothing is new, nor can I find anything in the direction of the progressive motion of the storms, nor in their positions in the ocean which suggests an indication of law in connexion with the period of the season at which the cyclones may occur, with one exception.

Of 13 storms traced in April, and eight in May, *i.e.*, towards the close of the season, nine of the former, and six of the latter are shown as stationary, or with little motion.

This would be very interesting scientifically and practically, if further observations should confirm it, but unfortunately these storms are said to be "either stationary or not traced." This ambiguity detracts from the value of the evidence very considerably.

These charts are in my opinion valuable as indicating the direction in which to search for evidence that may lead to the discovery of the laws governing the genesis of these dangerous storms, when meteorological statistics permit us to study in sufficient detail the conditions of the surrounding regions.

I have written to Mr. Meldrum asking if he can furnish me with further charts for other years which it appears he has compiled, and when I have heard from him I shall consider the advisability of publishing, in connexion with the Admiralty wind charts. This would be in the monthly form.

I do not see that at present the Meteorological Office can make any further use of these documents.

(Signed) W. J. L. WHARTON.

March 16, 1883.

The following is Dr. Meldrum's communication to the British Association:—

On a supposed PERIODICITY of the CYCLONES of the INDIAN OCEAN South of the EQUATOR.
By CHARLES MELDRUM, F.R.S., from the REPORT of the BRITISH ASSOCIATION for 1885.

IN papers printed in the Reports for 1872, 1873, 1874, and 1876, I endeavoured to show that there were grounds for supposing that the cyclones of the Indian Ocean, south of the equator increased in number, extent, and intensity from a minimum in one year to a maximum in another, and then decreased to a minimum, the period or cycle apparently corresponding with the eleven-year period of solar activity.

From the data given in the last of those papers (Report for 1876, page 267) it would appear that from 1856 to 1875 the years of minimum cyclone-activity were 1856 and 1867, and the years of maximum activity 1861 and 1872, but that the results for each of those years did not differ much from the results for the year immediately preceding or following it, the variation near the turning points being small.

Before giving a brief outline of the results which have been obtained since 1875, it may be well to mention that the sources of information were the same as in former years. Two clerks were constantly occupied in tabulating the meteorological observations contained in the log-books of vessels that arrived in the harbour of Port Louis from different places. The number of days' observations tabulated in each year, that is, observations extending over 24 hours, and made in different parts of the ocean, was as follows:—

Years.	Days' Observations.	Years.	Days' Observations.
1876	17,017	1881	16,473
1877	17,005	1882	15,089
1878	17,050	1883	16,930
1879	15,889	1884	15,697
1880	17,306		

The tables give an average of 46 observations of 24 hours each for every day of the nine years over the frequented parts of the ocean.

All details and reports respecting hurricanes, storms, or gales were recorded in separate registers.

For each day on which there was a gale in any part of the ocean between the equator and the parallel of 34° S. a chart was prepared, showing as nearly as possible the positions of the vessels, the direction and force of the wind, &c. at a certain hour, viz., noon, on the meridian of 60° E.

From these synoptic charts the details given from hour to hour in the log books and all the information obtained from other sources, the positions of the centres of cyclones at noon on each day were determined, and the tracks laid down on separate charts.

Nine cyclone track-charts have thus been prepared since 1875, namely, one for each of the years 1876–84.

These track-charts, together with the 20 that had previously been prepared for the years 1856–75, show, as far as has yet been ascertained, the tracks of the cyclones of the Indian Ocean south of the equator in each of the years 1856–84, and the tracks for the years 1848–55 are nearly ready.

With respect to the period 1876–84, the *areas* of the cyclones and the *distances* traversed have not yet been determined, but upon the whole the *number* and *duration* of the cyclones decreased to a minimum in 1880, and then increased till, in 1884, they were more than double of what they were in 1880.

From the accompanying track-charts for the 11 years 1856, 1857, 1860, 1861, 1867, 1868, 1871, 1872, 1879, 1880, and 1884, it will be seen that the number and duration of the cyclones of 1856 and 1857 were much less than those of the cyclones of 1860 and 1861; that the number and duration of the cyclones of 1867 and 1868 were much less than those of 1860 and 1861, on the one hand, and also than those of 1871 and 1872, on the other; and that the number and duration of the cyclones of 1879 and 1880 were much less than those of the cyclones of 1871, 1872, and 1884.

It would appear, however, that in 1884 there was less cyclone-activity than in 1861 and 1872.

Reported—That the tables on the relative prevalence of gales on the coasts of the United Kingdom. (Minutes, p. 62) had been completed up to the end of 1880.

Read—A memorandum from Captain Toynbee reporting that since the last meeting seven logs had been received, six of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. B. J. Barlow, R.N.R.	S.S. "Tainui"	Nov. 7, 1885—Mar. 2, 1886.	Plymouth to New Zealand, viâ Cape of Good Hope, and home.	1885, p. 46.
Capt. Alex. Becket	"Amana"	May 26, 1885—Mar. 4, 1886.	Cardiff, Colombo, Cochin, and home.	1885, p. 10.
Capt. Jas. Clarke, R.N.R.	S.S. "Olbers"	Aug. 28, 1885—Feb. 12, 1886.	Liverpool, Rio, New York, and home.	1885, p. 46.
Capt. Malcolm Nicholson.	Barque "St. Vincent."	May 2, 1885—Feb. 22, 1886.	London to Adelaide, and home.	1883, p. 78.
Capt. A. W. Adamson. Mr. H. M. Lambert, Sub-Lieut., R.N.R.	S.S. "Brindisi"	Dec. 3, 1885—Mar. 3, 1886.	London, Calcutta, and home.	—
Capt. Elijah Brown	Barque "Moorhill."	July 28, 1885—Feb. 25, 1886.	Liverpool, Aspinwall, and home.	—

Mr. Scott was instructed to present the Charts (O. 27) to Captain Brown and (O. 32) to Captain Adamson and Mr. Lambert, and to convey the best thanks of the Council to the other observers.

Submitted—The following statements of work during February 1886 :—

MARINE ROOM.

March 16, 1886.

Examined 10 new logs.

North Atlantic Weather Charts.

Charts for September and October 1882 reduced by eidograph, and the reduction of November in progress.

Reduced charts to September 17 completed, and sent to lithographer. Proofs received of lithographed charts to September 5.

Obtaining the lowest barometer reading in centre of disturbances from December 1882 to February 1883.

The female clerks engaged on the reduction of the charts by eidograph.

General.

Indexing data in ocean 10-degree squares.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE,
Marine Superintendent.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

(To 28th February 1886.)

Monthly Weather Report :—

1885 : September, October, and November; all published.
December; nearly ready for press.

1886 : January; tables and rough maps prepared.

Weekly and Daily Reports.—All issued promptly, to date.

Report on Gales experienced on British Coasts.—In progress. Grouping, &c. done to end of 1880 from January 1, 1870.

Checking Daily Forecasts (3.30 p.m. and 8 p.m.).—Complete up to date.

Calculation of Mean Aggregate Values for Accumulated Heat (above and below 42°), *Rainfall and Bright Sunshine from the beginning of the Year to the end of each Week.*—This work is kept up to date, but some additional progress is now being made with a view to getting it all done before the autumn.

During this month Mr. Gaster was absent for a fortnight, owing to an attack of bronchitis.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

March 1, 1886.

Observatory Returns.—The daily, five-daily, and monthly means of pressure and temperature, the calculation of the hourly vapour tension values, and the copying of the hourly values for October 1883, completed and sent to printer. The work for November is well advanced. The proof of the "Hourly Readings" for September 1883 finally revised, and Part III., 1883, sent to press.

Harmonic Analyser.—The barograms for 1872 for five observatories have been passed through the instrument.

Krakatoa Air Wave.—The revise of the maps completed, and progress made with tables, &c.

Miscellaneous.—The Bunhill Row sunshine cards for the last three months of 1885 tabulated for the Royal Meteorological Society.

(Signed) R. H. CURTIS.

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

EXAMINATION ROOM.

SIR, March 1, 1886.

THE following is a report of the work done during the month of February 1886 :—

Examinations.

November (1883).—Six *barograms*, six *thermograms*, seven *anemograms*.

Reports, &c.

Completion of the determination of the Falmouth dry-bulb scale and zero-line values.

Collecting, &c. curves in connexion with the wind squall of the 13th January 1886.

Miscellaneous.

The weekly examination, &c. of curves and documents.

I am, &c.

R. H. Scott, Esq., F.R.S. (Signed) T. E. ALLEN.

Read—Letter 564 from J. Fisher, reporter in Jersey, requesting an increase of pay, in consideration of his distance from the telegraph station.—An increase of his pay to 7*s.* 6*d.* a week was granted to date from April 1st.

Reported—That the following cheques had been drawn during the month of February:—

1886.					£	*s.*	*d.*
Feb. 6.	For weekly salaries				14	19	4
„ „	G. A. Gillett, wood, oil, &c.				1	18	3
„ „	Bank of England. Sale of Stationery Office forms				5	16	9
„ „	J. J. Hicks. Sling thermometers				7	16	0
„ „	Capt. G. Rung. Rotators for do.				12	2	0
„ „	Johnson, Matthey, & Co. Chemicals				2	16	8
„ „	Scottish Meteorological Society. Observations				22	10	0
„ „	J. Green. Care of Bermuda anemometer				4	12	0
„ „	Spottiswoode & Co. Prawle Point wire				17	0	0
„ „	Anglo-American Telegraph Co. Telegrams				4	4	9
„ 10.	Kew Committee. Postages, porterages, &c.				5	14	9
„ „	Postmaster-General. Office wire and telegrams				206	16	0
„ „	Bank of England. Admiralty account for barometers purchased				5	0	8
„ 13.	For weekly salaries				15	1	0
„ 20.	„ „				15	1	0
„ 27.	„ „				15	1	0
„ „	R. H. Scott			Salaries	66	13	4
„ „	J. S. Harding, junr.				27	15	6
„ „	T. D. Bell				15	0	0
„ „	J. Sheerman				10	0	0
„ „	J. E. Cullum				16	13	4
„ „	R. H. Curtis				22	10	0
„ „	J. A. Curtis				17	10	0
„ „	T. E. Allen				16	5	0
„ „	C. H. Thompson				11	13	4
„ „	S. Call				10	16	8
„ „	E. G. Aldridge				8	15	0
„ „	R. G. Canham				6	13	4
„ „	A. H. Bell				6	13	4
„ „	Capt. H. Toynbee				33	6	8
„ „	Nav.-Lieut. C. W. Baillie, R.N.				20	16	8
„ „	R. Strachan				27	15	6
„ „	C. Harding				22	10	0
„ „	H. Harries				14	3	4
„ „	W. Allingham				14	3	4
„ „	W. G. James				10	8	8
„ „	F. T. Bullen				8	15	0
„ „	R. F. Wallace				7	18	4
„ „	F. Gaster				25	6	3
„ „	F. J. Brodie				17	6	10
„ „	G. G. Francis				16	17	6
„ „	A. J. Rigby				16	8	1
„ „	R. Sergeant				11	5	0
„ „	A. R. Simpkins				9	7	6
„ „	H. J. Stevens				8	6	8
„ „	A. J. Hodges. Council income tax				33	6	8
„ „	J. A. Curtis. Tables for Historical instruments				2	0	0
„ „	Royal Meteorological Society. Observations				28	11	0
„ „	R. H. Curtis. Falmouth thermogram scales				3	3	0
„ „	Pall Mall Coal Co. Coals				5	10	0
„ „	J. S. Harding, junr. Petty cash				50	0	0
					£980	15	0

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