



MINUTES OF THE PROCEEDINGS

OF THE

METEOROLOGICAL COUNCIL.

1893—1894.



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1895.

1893-1894.

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Office

MINUTES OF THE PROCEEDINGS
OF THE
METEOROLOGICAL COUNCIL.

1893—94.

63, Victoria Street, April 5, 1893.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.

MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (March 8) were read and confirmed.

The subject of the Annual Report was discussed, and it was resolved to request Mr. Dines to supply an account of the anemometer now in operation on the roof of the Office, and also the Chairman to supply an abstract of his recent paper on the harmonic analysis of observations of air temperature, both these papers to be inserted as "Notes" in the Report.

Mr. Scott reported that on the 21st of February Mr. Kerr, the observer at Mullaghmore, had died (Letter 369), and that his daughter had carried on the observations until the end of March. As she was about to leave Mullaghmore, and as, in the opinion of Mr. Gaster, that station could be dispensed with, Mr. Scott had, by the Chairman's direction, written to the General Post Office (P.C. 586) giving three months' notice of the intention of the Council to discontinue the private wire from Cliffoney to Mullaghmore. That notice had been accepted (Letter 622).

Mr. Scott was instructed to inquire of Lloyd's if they had now a station at Barra Head, Hebrides (P.C. 686).

Submitted—Letter No. 581 from the Admiral Superintendent of Naval Reserves, forwarding an application from Coastguard Officer Brown of Mullaghmore for the appointment left vacant by the death of Mr. Kerr. Mr. Scott was instructed to inform the Admiral Superintendent of the action taken by the Council in giving notice to the Post Office of suppression of the private wire, and asking if the Admiralty wished to take any steps to maintain the connexion between Mullaghmore and Cliffoney.

Submitted the following :—

MEMORANDUM as to PROBABLE COST of RAIN TABLES. (Minutes, 1892, p. 80.)

I HAVE examined the tables referred to by Mr. Buchan in his Memorandum printed in last Minutes, and I find the number of stations proposed for the ten years 1881–90 to be as follows :—

| | | | | | |
|-------------------|---|---|---|---|-----|
| England and Wales | - | - | - | - | 294 |
| Scotland | - | - | - | - | 148 |
| Ireland | - | - | - | - | 55 |
| | | | | | 497 |

Of these the English and Irish returns would be almost entirely supplied by Mr. Symons, and they number 349. As to the Scotch stations, it is not quite clear which of these, if any, are to be obtained from Mr. Symons.

The cost of obtaining these 349 stations would be 261*l.* 15*s.* 0*d.*, on the scale of 7*s.* 6*d.* per lustrum, or 15*s.* per 10 years.

I presume that the data for the 148 stations from Scotland would be supplied at the cost of copying by the Scottish Meteorological Society.

I have not taken into consideration the obtaining of returns for years prior to 1881 from any of the stations which are not given in the former publication (1866-80).

The figures above given may be very slightly modified by supplying the data from this Office.

(Signed) ROBERT H. SCOTT.

Submitted the following :—

REPORT OF INSPECTION of the ENGLISH STATIONS, 1892.

TELEGRAPHIC REPORTING STATIONS.

Dungeness, inspected June 9th.—Levelling once more at this station with such accuracy as the state of the tide would permit, I concluded that the real height of the barometer cisterns above M.S.L. is between five and six feet greater than that previously estimated; but I will endeavour in 1893 to secure finality on this question. The instruments at the station were all in excellent order, and the observers at the time of inspection read them correctly, although I regret to say that the barometric readings as reported are by no means in all cases dependable.

The frequent low temperatures of Dungeness beach and Romney Marsh in winter, as contrasted with temperatures of most other parts of our southern coasts, have been alluded to in a former report, as has also been the excellent exposure of the station to winds from all points. I will mention here my impression that over this very level promontory there is a remarkable deficiency in the quantity of summer cumulus.

Hurst Castle, inspected June 13th.—The instruments were all in good condition and are carefully attended to. Although little more than instrumental observations can be expected from Mr. Appleton, it may be worth remarking that halos are more frequently reported from this station and from St. Aubins, Jersey, than from other telegraphic stations. This simply indicates that the observers at these two stations pay attention to the appearance of the sky; and any inference to the effect that the frequency of the report adequately represents the frequency of the occurrence, and, still more, any inference that the phenomena mentioned are commoner in the south than in the north of the British Isles, would, as I think, be totally inadmissible.

As formerly remarked, the force and direction of the wind at Hurst are considerably affected by the course of the Solent and by the elevations of adjacent land surfaces.

Prawle Point, inspected June 16th.—The barometers are very accurately read by Mr. Hewitt and by the assistant observer, Mr. Fenton. The wet bulb reading higher than the dry bulb when the two are fairly compared, it happens that occasionally when saturation is attained or closely approached the observer, in reading to whole degrees only, finds the wet bulb higher by a degree than the dry; in these cases he has habitually reported the dry bulb reading as that of both the thermometers, for the purpose of avoiding queries. The instruments were all well attended to. Estimations of wind and of sea disturbances are (if we adopt the usual standards for these estimations) very correctly made at this station.

Scilly, visited June 18th-19th.—Except that the ventilator of the thermometer screen required a cap, all the apparatus and instruments at this station were in good condition. The anemographic tracings have undergone no alteration. The observer, Mr. Hicks, on his rare occasions of absence, leaves the work of observation to his son, or now and then to young Mr. Thomas, the son of the former observer. Each of these is a fairly efficient substitute. I had thought the observer to have made progress in attention to the telegraphy of important pressure changes indicated by the self-registering aneroid, but I regret to find that this part of his work is still inadequately performed.

I again called the observer's attention at this as at some other stations to the importance of reporting the duration of gales, an element of some slight difficulty when gales occur at night. Direction and force of wind are reported from Scilly as accurately as from any other station, but sea disturbance cannot in every instance be quite as correctly estimated.

Cambridge, visited July 16th.—The instruments here were in good order. Some of the barometer readings had not, previously to my visit, been accurately taken. I have lately learned that Mr. Todd has resigned his post, and the work is now under the superintendence of Mr. Morris, the instruments being retained at the Observatory.

North Shields, inspected July 22nd.—The reports from this station are promptly transmitted, and are, in general, dependable. Some cases had occurred in which the reported barometer readings were apparently too low. This I found to be probably due to want of experience on the part of one of the Post Office clerks who had occasionally been deputed to read the instruments. A letter was sent by Mr. Scott to the observer soon after the receipt of my inspection notes calling attention to this matter, and the fault is not, I think, likely to recur.

The rain-gauge had again been repaired. The hygrometer was, as usual, somewhat foul.

York.—Up to the date of my visit, July 23rd, no change had been traceable in the character of the reports from this station. The observations are fairly well taken, although the observer is sometimes not sufficiently careful in taking his barometer readings. I have, as usual, to complain of want of punctuality at this station. The observations are still left almost entirely to the care of Mr. Wright, the head gardener of the Museum grounds, who refused to put himself to the inconvenience

of taking the 6.0 p.m. observations later than 5.30, a margin of time which is obviously too large. I laid a strong protest on this subject before Mr. Platnauer, the Curator of the Museum.

The hygrometer was this year found to be in a satisfactory state.

Liverpool (Bidston Observatory), inspected November 23rd.—The Council has, by the death of Mr. Hartnup, lost the services of an experienced observer. The observations are now under the superintendence of Mr. Plummer, while Mr. Skinner continues, as assistant, to conduct a great part of the work.

The hygrometer was not perfectly clean, but the other instruments were in excellent order. As in 1891, the corrections required for all the thermometers were found to be trivial.

STATIONS OF THE SECOND ORDER.

Eastbourne, June 11th and 12th.—The observations at this station continue to be most carefully conducted, and the observer, Mr. Sheward, is very painstaking. None of the thermometers require the application of corrections. The barometer is a good instrument, but it is somewhat difficult to adjust the vernier, some of the cogs of the pinion being worn out. The observer, in mounting the hygrometer, winds the thread round the bulb without the use of a piece of muslin, because he does not trust himself to fasten the muslin at the screen, and his house is in a different part of the town. As carried out by him the plan need not, I think, be interfered with.

The new rain-gauge, mentioned as in readiness in my report for 1891, was placed in position immediately after my visit in August of that year. The utility of its external iron case was shown by some dents in the latter, and by the fact that a few stones lay round the instrument.

Plymouth, June 21st and 22nd.—At the date of my visit the barometer stood in one of the upstairs rooms of the Biological Laboratory, on the roof of which building the sunshine recorder had been placed, having here a better exposure than that which it first had at the Navigation School, and subsequently at the house of the late Dr. Merrifield. The thermometer screen and rain-gauge had a very good exposure on land which is the property of the borough. Mr. Dickson, who had conducted the observations admirably, had, at the time of my visit, just sent in his resignation. I obtained a promise from Dr. Williams, the Medical Officer of Health, that the observations should be continued by the borough. The work is now under the superintendence of Mr. H. Victor Prigg, the Borough Surveyor, at whose residence the barometer is kept; and the record up to date is very good.

Sheffield, visited July 19th.—The observations at this station are conducted, as before, at the Museum at Weston Park, and are very satisfactory. The returns had been in arrear at the time of my visit, but this, owing to the duties of the Curator, is sometimes unavoidable. The records are admirably filled in. In the occasional absence of Mr. Howarth, his assistant takes the readings of the instruments, and does so with accuracy. Hitherto the 9 p.m. observations had not been entered, although I had repeatedly urged their importance. Arrangements were made that these observations should be commenced on January 1st, 1893. The barometer, as mentioned in previous reports, is a good one, on Fortin's principle, and requires no correction throughout the scale, but the surface of the mercury in the cistern has become dull, and the liquid might advisably be cleaned. The wet bulb was in a rather dirty condition, the water with which it is supplied containing salts, and the atmosphere of Sheffield being very smoky. I requested that it should be more frequently attended to. This promises to be a valuable station, and the returns will be published when the evening observations are reported.

Penrith, visited July 21st.—The evening observations at Newton Reigny, near Penrith, have been dropped, with the exception of the Weekly Weather Report value, a fact which is much to be regretted. All the instruments at this excellent observatory were in perfect condition, and the observer reads more accurately than any other with whom I am acquainted. His time is much occupied in other business.

York, visited July 23rd.—The returns from this station had not improved in quality since my inspection of 1891. No change has taken place with regard to the position of the sunshine recorder or in that of any of the other instruments. I still consider that greater accuracy in the reading of the thermometers would be obtained if the two sets of maxima and minima employed for the telegraphic reports and for the 9 o'clock readings respectively were kept in different screens, and this not merely on account of the difficulty of handling the instruments in their present crowded position. The growth of trees at this station, nearly imperceptible in the interval between annual visits, has caused the thermometer screen and the rain-gauges to be more sheltered at the present time than they were in 1879. But I do not at present think it advisable to urge any change in their position.

Tealby (Market Rasen), visited November 4th.—The returns from this Second Order station continue to be fairly good, but the observer's avocations prevent punctuality on some occasions; and occasional errors are also noticeable in the barometer reductions. I advised the removal of the rain-gauge to a site near the Stevenson's screen, but no really open place can be found for it. I called on Mr. Jevons, of Market Rasen, (who formerly began taking the observations), and asked him to undertake rainfall measurements, if written to, on behalf of the Council. To this he readily assented. Both his rain gauge and its position are very greatly better than those in the hands of Mr. Lewin. Since my visit Mr. Jevons has begun sending in rainfall returns.

Liverpool, November 24th.—No change of any importance is noticeable since last year in the instruments at this Second Order station. The returns continue to be good.

No corrections are required for the thermometers. Some corrections, which appear to be erroneous, had recently been used by the observers.

WEEKLY WEATHER REPORTING STATIONS.

Ketton Hall (Stamford), inspected November 3rd.—At this Weekly Weather Reporting station I found all the instruments in most satisfactory condition, and, as usual, carefully attended to. The thermometers require no corrections. Mr. Coventry had, since my inspection in 1891, again taken up his residence in Ketton, at a short distance from the Hall. The head gardener at the latter place, however, continues to take the majority of the observations.

STATIONS FROM WHICH RETURNS ARE NOT AT PRESENT PUBLISHED.

Epsom, visited June 8th.—My visit to this station was not satisfactory, for although I had in this case sent a notice of it beforehand, Mr. C. J. Gardiner, who was responsible for the observations, was absent, and had left neither his forms for their entry, nor lists of instrumental corrections to be examined, and I could find none of the tables which he employed. The barometer had been removed into the visitor's sitting-room since my visit in 1891, but the level of the cistern is unchanged. Two of the students are accustomed to take the observations, and one of these failed to read the barometer correctly, a fact which probably indicates the source of some of the errors in the returns. The measuring-glass for the rain gauge I found to be kept in the interior of the gauge; this habit, which I forbade, had probably been the cause of the breakage during frost of the glass employed in 1891. It is a pity that this station cannot yet be made serviceable.

St. Leonards, inspected June 10th.—Of this station I regret to have to give, as usual, a more unfavourable report than that which concerns Epsom. The observer and his family were absent at the date of my visit, and I did not learn who was responsible for those entries of the barometer readings which I find in the returns during the rather prolonged absence of Mr. Colborne. The head gardener at the Gensing Gardens had for a long period taken the readings of the thermometers, the observer being in ill health. He is an intelligent man, and can read the instruments with a fair amount of accuracy. The hygrometer was in a dirty condition.

There have been discrepancies between some of the entries in the weekly and those in the monthly returns for the same dates, and I can offer no account of them. There are now occasional omissions in the returns.

Totland Bay, visited June 14th.—The returns from this station are not likely to be of any great value. The observer, Mr. John Dover, is occasionally absent in the summer for a considerable period, during which he lets his house and grounds, and he has no assistant. There is a good set of instruments by Negretti and Zambra. The barometer was compared at Kew in April of 1892, but subsequently a portion of mercury was by an accident abstracted from the cistern. The tube, however, contained no air at the time of my inspection. It has since been sent to the makers to be refilled.

The gusty west winds of the Solent are often strongly felt at this place, as may be inferred from the state of the trees. But the observer prodigiously over-estimates the force of the wind, and I found several entries of force 12 made in his book during the short time that he has carried on the observations.

Chilworth, June 24th.—The observations at the time of my visit were carried on much as in the previous year, frequent gaps in the returns being noticeable, together with occasional errors due to the absence from time to time of the observer, and to the fact that he had not trained any assistant, while the probability of more prolonged absence from home rendered the likelihood of permanency in the maintenance of the station rather precarious. The barometer, which is well lighted by electricity, was conveniently situated and was well read, but incorrectly reduced, by the observer on the occasion of my inspection. Since my visit the station does not seem to have at all improved.

Seaham, visited July 22nd.—My inspection of this station was this year somewhat disappointing Mr. Aird being absent during the greater part of the time that I was there. Discrepancies occurred between the readings of the barometer as entered and reported and the same readings corrected and reduced in the month of January 1892, and no explanation of these errors was forthcoming.

The instruments, however, are good and are carefully attended to, while the exposure leaves little to be desired, and I may be permitted to express my opinion that the amount of error in the returns is scarcely sufficient to preclude, of itself, their publication.

St. Helens, inspected for the first time November 24th.—The observer at this new Second Order station is Dr. Robertson, M.D., B.Sc., Medical Officer of Health, who undertook to commence returns from January 1st, 1893. I have every reason to anticipate that these returns will prove to be of good quality. The out-door instruments have a perfect exposure in an open part of the public park. Young trees have been planted near the light iron railings which surround these instruments, but as trees can hardly be said to grow in the atmosphere of this place, no attempts at forestation are likely to produce shelter. White stone has, unfortunately, been laid down under the Stevenson's screen. Distilled water is used for the wet-bulb, which however becomes quickly coated with chemical deposits. The thermometers and rain-gauge were in good order, and the former were correctly read by the observer. The corrections needed for these are at present trivial. A good deal of time having been occupied in finding the observer, it was practically dark when I suspended my standard by the side of the reporting barometer, an Adie's Marine. I found the latter to contain air, the whole of which, as I think, I succeeded in expelling. After the completion, however, of this process, the reporting barometer, corrected for its index error and for

the difference of its temperature, the correction of its attached thermometer being employed, read somewhat lower than my standard, but the light was too bad for absolutely certain accuracy to be attained. The instrument is protected by a glass case, and stands in a shed at the back of one of the greenhouses in the park.

Returns have not yet reached the Meteorological Office from St. Helen's.

Manchester, inspected for the first time on November 25th.—The observations at this promising station are under the direction of the Medical Officer of Health for Manchester, Dr. J. Tatham, who devotes great attention to their supervision. All the instruments are at the observatory on the north-west side of the Oldham Road. This observatory, considering its position in the heart of a great city, occupies a very satisfactory site, the exposure of the outdoor instruments being good, and there being no prospect of the erection of any buildings likely to cause deterioration of this exposure, the ground being the property of the City Council. The equipment is very complete, there being, in addition to the necessary thermometers, a solar radiation thermometer and a grass minimum, also earth thermometers. These were in excellent condition, and the instrumental corrections are trivial. The Jordan's sunshine recorder has a very fair exposure, and it seemed most desirable to publish the records of bright sunshine derived from it, which it has been resolved to do.

STATIONS WHOLLY OR PARTIALLY DISCONTINUED.

I visited *Leeson*, near Swanage, in June, only to find that the station had just been dropped, which is to be regretted, as the observations promised well. The station of *Leighton Hall*, near Reading, has also, since my visit in June, been discontinued, a fact which I am sorry to have to report, since the locality was a favourable one and the instruments were satisfactory. At *Sudbury*, in Suffolk, Messrs. Ransome have again informed me by letter that they are not disposed to maintain observations necessary for a Second Order station. It is unsatisfactory to find that no station can at present be instituted in this district. At *Sutton Coldfield* the observer, confounding the Meteorological Office with the Royal Meteorological Society, had sent in a record of morning readings of the instruments to the Society. He is too much occupied to take evening observations, and my request made to the Mayor of the town that some clerical assistance should be given to him was not granted. The thermometer screen at this place has been shifted to an improved position.

GENERAL REMARKS.

I paid especial attention this year to the reports and entries of Mist, as made by different observers, with the unsatisfactory result which was to be anticipated. The observer at Jersey, who reported mist, for some years at all events, more frequently than any other of the observers at our Telegraphic Reporting stations, informs me that he regards the atmosphere as "misty" when objects at 20 miles distant are invisible in the daytime. On the other hand, some observers in inland localities report mist when objects at two miles' distance are obscured. Between these extremes indefinite variation occurs.

As regards the report or entry "squally," I notice considerable difference in the ideas entertained by observers, inland observers generally tending to regard the weather as squally when its condition would not be thought by seamen, or by those that live upon the coast, to merit the title, the wind being merely gusty or irregular.

A far more important matter is the estimation of wind force by Beaufort's scale. Observers on the west coasts in these Islands commonly estimate force somewhat lower than those on our eastern coasts, and both of these lower than the observers at inland localities, while I am justified in saying that there is a tendency amongst observers in general to overestimate wind-force in relation to actual wind velocities.

REMARKS ON INSTRUMENTS.

At no station, with the exception of St. Helens, did the barometer contain air.

In none of the minimum thermometers was the column of alcohol found to be broken. At the stations inspected this year an improvement was, generally speaking, noticeable in the condition of the hygrometers.

STATIONS NOT INSPECTED.

Of Telegraphic Reporting stations, Jersey, Loughborough, and Spurn Head were, by permission omitted. The last-mentioned station shall be visited in 1893, as soon as the inspection can be undertaken with safety to the instruments. North Foreland was omitted owing to a misunderstanding, and Yarmouth was, I regret to say, left until late in the year, when indisposition prevented my going there.

Of other stations, those in the Isle of Man were omitted by permission, but I must express my regret that I was this year unable to inspect Aysgarth, Stonyhurst, and, still more, Uppingham, which specially required re-visiting.

(Signed) W. CLEMENT LEY.

| NAME OF STATION. | BAROMETER. | | THERMOMETER. | | | | | | | | |
|------------------|---|---|-----------------------|---|---|----------------------------------|----------------------|---|---|---|--------------------|
| | Difference of Observers' from Inspector's Readings. | Difference of Check from Reporting Barometer. | Temperature of Water. | DRY BULB. | WET BULB. | Difference of Wet from Dry Bulb. | State of Hygrometer. | MAXIMUM. | MINIMUM. | SPARE ON GRASS. | General Condition. |
| | | | | Correction to reduce to Inspector's Standard. | Correction to reduce to Inspector's Standard. | | | Correction to reduce to Inspector's Standard. | Correction to reduce to Inspector's Standard. | Correction to reduce to Inspector's Standard. | |
| Cambridge - | + 003 | — | 58.3 | -0.6 | -0.6 | 0.0 | A | -0.9 | +0.2 | — | A |
| Chilworth - | 000 | — | 62.1 | +0.1 | 0.0 | +0.1 | A | +0.1 | +0.1 | — | B |
| Dungeness - | - 001 | - 004 | 54.4 | -0.4 | -0.2 | -0.2 | A | -0.5 | -0.5 | — | A |
| Eastbourne - | 000 | — | 59.1 | 0.0 | 0.0 | 0.0 | A | 0.0 | +0.1 | — | A |
| Epsom - | 000 | — | 56.7 | 0.0 | +0.1 | +0.1 | A | +0.1 | -0.3 | — | B |
| Hurst Castle - | - 002 | - 010 | 57. | -0.7 | -0.1 | -0.6 | A | -0.3 | -0.5 | — | A |
| Ketton - | — | — | 52.7 | 0.0 | -0.1 | +0.1 | A | -0.1 | +0.2 | +0.3 | A |
| Liverpool - | - 002 | + 001 | 48.2 | -0.1 | 0.0 | -0.1 | B | -0.2 | +0.2 | — | A |
| Manchester - | 0.0 | — | 46.4 | 0.0 | -0.1 | +0.1 | B | 0.0 | +0.1 | — | A |
| North Shields - | - 001 | - 003 | 58.2 | 0.0 | +0.2 | -0.2 | B | +0.1 | 0.0 | -0.3 | A |
| Penrith - | 000 | — | 53.8 | -0.1 | -0.1 | 0.0 | A | -0.1 | -0.2 | — | A |
| Plymouth - | 000 | — | 59.6 | +0.1 | -0.2 | +0.3 | A | +0.1 | -0.1 | 0.0 | A |
| Prawle Point - | - 001 | + 009 | 55.3 | -0.1 | -0.7 | +0.6 | A | -0.1 | -0.3 | 0.0 | A |
| St. Helens - | 000 | — | 49.2 | -0.2 | 0.0 | -0.2 | B | -0.3 | +0.2 | — | A |
| St. Leonards - | — | — | 64.1 | -0.8 | -0.8 | 0.0 | C | -0.2 | -0.2 | — | C |
| Scilly - | + 002 | + 004 | 58. | -0.6 | -0.4 | -0.2 | A | -0.7 | -0.1 | 0.0 | A |
| Seaham - | + 098 | — | 55.9 | -0.4 | -0.4 | -0.1 | A | -0.2 | -0.3 | — | A |
| Sheffield - | + 001 | — | 55. | -0.1 | -0.3 | +0.2 | B | 0.0 | -0.1 | — | A |
| Tealby - | - 001 | — | 49.6 | -0.1 | -0.1 | 0.0 | A | -0.9 | +0.6 | -0.2 | B |
| Totland Bay - | 000 | — | 56.5 | +0.3 | +0.1 | +0.2 | A | +0.1 | +0.3 | — | B |
| York - | - 002 | — | 58.9 | -0.3 | -0.4 | +0.1 | A | -0.7 | +0.2 | — | B |
| York - | - 002 | — | 58.9 | -0.3 | -0.4 | +0.1 | A | -0.2 | +0.2 | — | B |
| Liverpool - | - 002 | + 001 | 48.2 | -0.1 | 0.0 | +0.1 | B | 0.0 | +0.3 | — | A |

Read—Letter No. 580 from Dr. Doberck, of Hong Kong, requesting that the Office would lend to him any logs in its possession relating to the China Seas.

Mr. Scott submitted a memorandum from Mr. Baillie stating that there were in the Office about 45,000 days observations for the area indicated by Dr. Doberck, and that the cost of copying these would be about 470*l*.

Mr. Scott was instructed to reply (P.C. 684) that the Council could not allow logs to leave the Office, and to enclose the table accompanying Mr. Baillie's memorandum, stating the estimated cost of copying the data.

Read—Letter 667 from Mr. Eliot, stating that observations at Perim had now been organised (Minutes, 1883, p. 24).

Professor Darwin reported on Letter 433 from Professor J. Milne, F.R.S., of Tokio, which had been referred to him. He said that Professor Milne had proposed a form of instrument for the continuous registration of meteorological phenomena.

The Secretary was instructed to inform Professor Milne that the Council could not undertake the construction of such an apparatus, but would undertake to have one tested if they were supplied with it (P.C. 739).

Read—Letters Nos. 648 and 668 from Lloyd's agents in Samoa and Tahiti respectively (Minutes, 1892, p. 52), stating that observations could not be taken at the former place, but requesting the supply of instruments to Papeete, Tahiti.—Sanctioned.

Read—Letter 649 from Mr. S. C. Knott, Vice-consul at Mojanga, Madagascar (Minutes, 1891, p. 11), requesting a grant to defray cost of enclosing a plot of ground for his station.

Mr. Scott was instructed to reply that the Council regretted their inability to comply with his request (P.C. 687).

The proofs of sheets containing the gravity correction to the barometer for Stations of the Second Order (Minutes, 1892, p. 81) were submitted, revised, and finally approved.

Read—Letters Nos. 515, 590, and 680, from Mr. Cotton, explaining the temporary arrangement he had fitted to the bridled anemometer at Holyhead (Minutes, 1892, p. 80).

Read a memorandum from Mr. Baillie stating that since last meeting 12 logs had been received, 5 of them being "excellent." Mr. Scott was instructed to convey the best thanks of the Council to the observers.

Submitted—The following memorandum :—

Captain Wood has been appointed head master of the Navigation School at Dundee in the vacancy caused by the death of Mr. L. Allen, who was for some years agent for the office at that port, and performed the duties connected with the agency very satisfactorily. I have the honour to request that the Council will allow me to appoint Captain Wood our agent at Dundee.

C. W. BAILLIE,
Marine Superintendent.

5th April 1893.

—Approved.

Submitted—The following as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

1. WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|----------------|
| A + B (successful) | - | - | - | - | = 4 districts. |
| C (failures) | - | - | - | - | = 4 „ |

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

1 District.*

(Signed) FREDC. GASTER.

Telegraphic Branch.

* The gale, for which there was no warning, was one from the Westward felt over the NE. of Scotland and Moray Firth, on the morning of March 15th. The 6 p.m. map of previous day, on further examination, furnishes no reason for supposing that a disturbance of any great intensity was approaching. This absence of premonitory signs is probably due to the disturbance having advanced from about WNW., in which direction we have no outlying stations.

Submitted—The following reports of work during the month of March 1893 :—

MARINE BRANCH.

April 5, 1893.

Examined 13 new logs and 5 lighthouse registers.

Discussing the various elements for the district between the Cape of Good Hope and New Zealand, and preparing specimen charts for the month of February.

Preliminary work in connexion with arranging for the discussion of the meteorology of the area south of the Equator between longitudes 10° E. and 90° W. Commenced the preparation of logs for this new ocean district.

Charting currents in the Pacific Ocean from German ships. The total number of observations received from the Deutsche Seewarte is about 13,600, all of which have been transferred to the charts.

Information prepared for Dr. Doberck, Hong Kong, showing the number of observations in the Office logs between the Equator and 45° N., and from 100° to 180° E. (Letter, M.O. 580.)

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) C. W. BAILLIE.

TELEGRAPHIC (FORECAST AND STORM WARNING) DEPARTMENT.
(To 31st March, 1893.)

Quarterly Weather Report, 1881 :—

Second quarter, now ready for printer.
Tables, rough maps, &c., ready for whole year.

Weekly Weather Report, 1892 :—

Summary for February in printer's hands for revise,
Summary for March about half done.

Weekly Weather Report, 1893 :—

All numbers issued to date.
Appendix I, Part 1, well in hand.
Summaries for January and February, tables, rough maps, &c., prepared.

Daily Weather Report, 1893 :—

All numbers issued promptly to date.
Monthly correction sheet for February issued.

Primary Checking of Storm Warnings, 1893.—Done to date, and proper return handed in.

Final Checking of Storm Warnings, 1892.—About one third done. (This work prevents further progress being made at present with the Quarterly Weather Report, 1881.)

Rainfall Stations, 1881–90, in British Islands. Some further work done in modifying report sent in, and plotting fresh stations.

During the month Mr. Heinemann has been away for four days, sick, and part of the Easter holidays have been taken.

(Signed) FREDC. GASTER.

Telegraphic Branch,
5th April, 1893.

PANTAGRAPH ROOM.

April 1, 1893.

Hourly Means.—The reading of the proof sheets of the volume for 1890 is almost completed, only one sheet remaining unsigned, in consequence of delay on the part of the printer.

Tabulation of Sun Cards.—This work has been carried on steadily, and hourly measurements of the records for three of the seven observatories have been made for the years 1881–1892.

Miscellaneous.—Dines' pressure anemometer has been kept at work throughout the month. Several points have been noted in which some modification of the instrument will be required.

(Signed) R. H. CURTIS.

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

EXAMINATION BRANCH.

April 1, 1893.

Examinations.

October 1892.—Completed.

November and December 1892.—Proceeded with.

Weekly examination (on receipt) of curves and documents from all observatories.

Reports.

October 1892.—Copies of "Notes of Errors" to Aberdeen, Armagh, Falmouth, and Fort William.

Miscellaneous.

Examining rain gauge papers for printer.

General routine work.

Mr. Parsons was still absent acting as Office-keeper.

(Signed) T. E. ALLEN.

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|---|--------|----|----|
| Cash balance on 8th March - - - | 4,178 | 13 | 1 |
| Receipts from 8th March to 4th April - - | 70 | 19 | 1 |
| | 4,249 | 12 | 2 |
| Cheques drawn from 8th March to 4th April - | 2,864 | 11 | 11 |
| Balance on 4th April - - - | £1,385 | 0 | 3 |

Submitted—The following report on the 8.30 p.m. forecasts for March 1893 :—

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.

| DISTRICTS. | | Per-centages. | | | Per-centage of Success a + b. |
|------------------|---|---------------|----------|----------------------|-------------------------------------|
| | | Wind. | Weather. | Average Forecast. | |
| SCOTLAND, N. | a | 26 | 65 | 46 | 83 |
| " | b | 55 | 19 | 37 | |
| " | c | 16 | 10 | 13 | |
| " | d | 3 | 6 | 4 | |
| SCOTLAND, E. | a | 39 | 49 | 44 | 80 |
| " | b | 39 | 32 | 36 | |
| " | c | 16 | 13 | 14 | |
| " | d | 6 | 6 | 6 | |
| ENGLAND, N.E. | a | 39 | 61 | 50 | 86 |
| " | b | 48 | 23 | 36 | |
| " | c | 16 | 13 | 11 | |
| " | d | 3 | 3 | 3 | |
| ENGLAND, E. | a | 32 | 68 | 50 | 88 |
| " | b | 49 | 26 | 38 | |
| " | c | 16 | 3 | 9 | |
| " | d | 3 | 3 | 3 | |
| MIDLAND COUNTIES | a | 36 | 55 | 46 | 86 |
| " | b | 45 | 36 | 40 | |
| " | c | 13 | 6 | 10 | |
| " | d | 6 | 3 | 4 | |
| ENGLAND, S. | a | 29 | 52 | 41 | 86 |
| " | b | 52 | 39 | 45 | |
| " | c | 16 | 6 | 11 | |
| " | d | 3 | 3 | 3 | |
| SCOTLAND, W. | a | 39 | 42 | 41 | 78 |
| " | b | 39 | 36 | 37 | |
| " | c | 13 | 19 | 16 | |
| " | d | 9 | 3 | 6 | |
| ENGLAND, N.W. | a | 42 | 32 | 37 | 80 |
| " | b | 36 | 49 | 43 | |
| " | c | 6 | 6 | 6 | |
| " | d | 16 | 13 | 14 | |
| ENGLAND, S.W. | a | 36 | 55 | 46 | 78 |
| " | b | 35 | 29 | 32 | |
| " | c | 13 | 0 | 6 | |
| " | d | 16 | 16 | 16 | |
| IRELAND, N. | a | 29 | 55 | 42 | 82 |
| " | b | 45 | 35 | 40 | |
| " | c | 13 | 10 | 12 | |
| " | d | 13 | 0 | 6 | |
| IRELAND, S. | a | 29 | 42 | 36 | 66 |
| " | b | 32 | 29 | 30 | |
| " | c | 29 | 16 | 23 | |
| " | d | 10 | 13 | 11 | |
| SUMMARY. | | | | | |
| BRITISH ISLES | a | 34 | 53 | 44 | 81 |
| " | b | 43 | 32 | 37 | |
| " | c | 15 | 9 | 12 | |
| " | d | 8 | 6 | 7 | |

Reported—That the amount received for grazing from the Valencia observatory for the four months, November to February inclusive, had been 4*l.* 18*s.* 6*d.*

Submitted—The following list of publications which had been received since the last meeting :—

Milan, R. Osservatorio Astronomico di Brera.—Osservazioni meteorologiche eseguite nell' anno 1892.

Blakesley, T. II.—On a new barometer, called "the amphishœna."

Eastbourne.—Meteorological observations for the year 1892.

London, British Association for the Advancement of Science.—Report. Edinburgh, 1892.

Benn, T. G.—Observations in meteorology, being the result of a meteorological register kept for ten years (1883–1892) at Newton Reigny, Cumberland.

Paris, Bureau Central Météorologique de France.—Annales. 1890. i.–iii.

Waldo, F.—Modern meteorology : an outline of the growth and present condition of some of its phases.

Shanghai, Inspectorate General of Customs.—List of the Chinese lighthouses, light-vessels, buoys, and beacons for 1893.

Magdeburg.—Jahrbuch der meteorologischen Beobachtungen der Wetterwarte der Magdeburgischen Zeitung. 1891.

Walker, A. O.—The climate of the North Coast of Wales.

Cominelli, P. F.—Rivista meteorologica dell' anno 1891–92. Fasc. 1.

Washington, Signal Office.—Report of Mr. O. L. Fassig, bibliographer and librarian.

Tananarive, Observatoire Royal de Madagascar.—Observations météorologiques faites à Tananarive par E. Colin. Vol. iii., 1891.

Veeder, M. A.—Solar electro-magnetic induction.

Antigua, Government Laboratory.—Meteorological record for 1892.

Chwolson, O.—Actinometrische Untersuchungen zur Construction eines Pyrheliometers und eines Actinometers.

Kassner, C.—Ueber Kreisähnliche Cyklonen.

Marseilles, Commission de Météorologique du Département des Bouches-du-Rhone.—Bulletin annuel. 1891.

Paris, Comité International des Poids et Mesures.—Quinzième rapport aux Gouvernements Signataires de la Convention du Mètre sur l'exercice de 1891.

Prague, Technisches Bureau des Landesculturrathes für das Königreich Böhmen.—Ergebnisse der ombrometrischen Beobachtungen in Böhmen für das Jahr 1891.

——— Ergebnisse der Wasserstandsbeobachtungen an den Flüssen Böhmens für das Jahr 1891.

——— Die Einrichtung des Wasserstands-Prognosendienstes an der Elbe in Böhmen.

Vienna, K. K. Central-Anstalt für Meteorologie und Erdmagnetismus.—Jelinek's Anleitung zur Ausführung meteorologischer Beobachtungen nebst einer Sammlung von Hilfstafeln. Erster Theil. Anleitung zur Ausführung meteorologischer Beobachtungen an Stationen II. und III. Ordnung. Vierte umgearbeitete Auflage.

Adelaide Observatory.—Meteorological observations made at the Adelaide Observatory, and other places in South Australia and the Northern Territory, during the year 1890.

63, *Victoria Street*, April 19, 1893.

PRESENT :

PROFESSOR DARWIN IN THE CHAIR.

MR. BUCHAN.

| MR. STONE.
THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (April 5) were read and confirmed.

The first proof of the Report of the Office for the year just expired was submitted.

Read—Letter 704 from the Admiral Superintendent of Naval Reserves, stating that the wire to Mullaghmore from Cliffoney was not required by the Government. (Minutes, p. 1.)

Read—Letter 697 from Lloyd's, stating that no station had yet been organised at Barra Head. (Minutes, p. 1.)

Read—Letters 734 and 751 from Mr. J. Bolam, Secretary to the Shipmasters and Officers Federation, Glasgow, requesting the Council to publish recommended tracks for ships on their ocean charts, as, for instance, on those of atmospheric pressure and sea surface temperature.

Mr. Scott was instructed to send the following reply :—

DEAR SIR,

I AM instructed by the Council to inform you, in reply to yours of the 18th instant, that in their opinion the charts you mention, viz, those of barometrical pressure and of sea surface temperature, are not suitable for laying down recommended tracks for ships as you propose.

They are also of opinion that the supply of such information in the form suggested, if it be possible, is more for the Hydrographic Department of the Admiralty, which already publishes sailing directions in other forms, than for this Office, and they would suggest your making application to the Hydrographer.

Submitted—Specimen charts of the region from the Cape of Good Hope to New Zealand for the month of February (Minutes, 1891, p. 79). The charts were referred to the Hydrographer.

Read—A memorandum by Mr. R. Curtis (No. 723), as to certain modifications which were required in the anemometer now at work on the Office roof (Minutes, 1892, p. 80), and a letter from Mr. Munro (No. 755), stating that the cost of the proposed alterations would be 5*l.* 12*s.* 6*d.*

The work was sanctioned (P.C. 786).

Read—A memorandum from Mr. Baillie, stating that since last meeting five logs had been received, four of them being "excellent."

Mr. Scott was instructed to present the charts, O. 90, to Lieutenants H. E. P. Cust and A. E. H. Marescaux, both of H.M.S. "Dart," and to Mr. S. G. D. Andrews, first officer S.S. "Britannia," and to convey the best thanks of the Council to the other observers.

Submitted—The following as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

1. WARNINGS.

None issued.

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

(Signed) FREDC. GASTER

Telegraphic Branch,
April 19, 1893.

Permission was requested to order for stock six fishery barometers, cost 24*l.*—
Sanctioned.

The following increments to the Office staff were allowed :—

| | Salary in 1892-93. | Proposed for 1893-94. |
|---|--------------------|-----------------------|
| CLASS I.—MAXIMUM 275<i>l</i>. | | |
| J. A. Curtis (Minutes, 1884-5, p. 118) - - - - | £ s. d. 245 0 0 | £ s. d. 250 0 0 |
| J. E. Cullum („ 1886-7, p. 98) - - - - | 250 0 0 | 255 0 0 |
| CLASS IV.—MAXIMUM 110<i>l</i>. | | |
| F. W. Snell (Minutes, 1888-9, p. 107) - - - - | 95 0 0 | 100 0 0 |
| C. W. Heinemann (Minutes, 1886-7, p. 98) - - - - | 85 0 0 | 90 0 0 |
| L. H. Powers („ 1887-8, p. 120) - - - - | 75 0 0 | 80 0 0 |
| C. A. Bracey („ 1890-1, p. 76) - - - - | 65 0 0 | 70 0 0 |
| FEMALE CLERKS.—MAXIMUM 1<i>l</i>. 10<i>s</i>. 0<i>d</i>. Weekly. | | |
| Miss M. E. Anderson (Minutes, 1891-2, p. 7) - - - - | 1 4 0 | 1 6 0 |
| Miss R. E. Smith („ „) - - - - | 1 2 0 | 1 4 0 |
| BOY CLERKS.—MAXIMUM 1<i>l</i>. | | |
| F. E. Dash (Minutes, 1891-2, p. 7; 1890-1, p. 35) - - - - | 0 17 0 | 0 18 6 |
| H. A. Hewitt „ „ - - - - | 0 17 0 | 0 18 6 |
| A. H. Brown „ „ - - - - | 0 15 6 | 0 17 0 |
| A. H. Rigby „ „ - - - - | 0 14 0 | 0 15 6 |

C. E. Goad, messenger, to receive 17*s*. instead of 15*s*. as hitherto.

It was resolved that the salary of Miss A. E. Mansford (appointed, Minutes, 1891-92, p. 51), be allowed to rise from 1*l*. a week to a maximum of 1*l*. 10*s*. 0*d*., by annual increments of 2*s*. per week, to commence from 3rd April.

All weekly increments to date from 3rd April.

Mr. Scott reported that since the beginning of the year Mr. W. H. Parsons had been acting as Office-keeper in the room of Mr. Wall (Minutes, 1892, p. 66), and he recommended that Mr. Parsons be appointed to that place.

The Council appointed Mr. Parsons Office-keeper as from April 1 at a salary for the present year of 5*l*. per month, rising by increments of 5*l*. per annum to a maximum of 80*l*. per annum.

Submitted—A letter (No. 768) from C. Pycock (Minutes, 1892, p. 25), praying that he might be restored to his former wages of 1*l*. weekly, and a memorandum from Mr. Gaster stating that Pycock's conduct had been satisfactory for some months.

The request was granted, to take effect from the current week.

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|--|-------|----|----|
| Cash balance on 4th April - - - - | 1,385 | 0 | 3 |
| Receipts from 5th to 18th April - - - - | 3,654 | 16 | 10 |
| | 5,039 | 17 | 1 |
| Cheques drawn from 5th to 18th April - - - - | 39 | 0 | 2 |
| Balance on 18th April - - - - | 5,000 | 16 | 11 |

It was resolved that for the present the meetings be held on Thursdays at 2.15 p.m.

Submitted—The following list of publications which had been received since the last meeting :—

Hamburg, Deutsche Seewarte.—Deutsches meteorologisches Jahrbuch für 1891. Beobachtungssystem der Deutschen Seewarte.

Bucharest, Institutul Meteorologic al Romaniei.—Resumé des observations météorologiques de Bucarest (Fîlaret) pour l'année 1890 et pour la période de 1885 à 1890.

Chemnitz, K. Sächsisches meteorologisches Institut.—Deutsches meteorologisches Jahrbuch für 1891. Beobachtungssystem des Königreiches Sachsen.

Rome, Ufficio Centrale Meteorologico e Geodinamico Italiano.—Annali. Vol. xi. Parti i.-ii., 1889.

Adelaide Observatory.—Rainfall in South Australia and the Northern Territory during 1889 ; with weather characteristics of each month.

Clements, H.—Weather prediction No. 2 ; or the mistakes of the Greenwich Observers and the Washington International Meteorological Conference, &c., &c.

Liverpool Observatory.—Meteorological results, deduced from observations taken at the Liverpool Observatory, during the years 1889–90–91.

Hellmann, G.—Das älteste Berliner Wetter-Buch, 1700–1701, von G. Kirch und seiner Frau M.M. geb. Winkelmann.

Prince, C. L.—A record of the rainfall at Uckfield, from 1843 to 1892 inclusive ; also an account of the great snow storm which occurred in Sussex, December 25th, 1836.

63, Victoria Street, May 4, 1893.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.

|

MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (April 19) were read and confirmed.

Read—Letter 746 from Mr. Sugrue, assistant at Valencia Observatory, asking for an increase of salary, and a letter (No. 794) from Mr. Cullum on the subject. The Council declined to grant Mr. Sugrue's application (P.C. 903), and Mr. Scott was instructed to inform Mr. Cullum that if Mr. Sugrue does not wish to remain, he must look out for another assistant (P.C. 902).

Reported—That the three months for which Mr. Wall had been placed on half-pay (Minutes, 1891, p. 66) expired on the 29th ultimo, and that there was no improvement in his condition. It was resolved that his name be removed from the staff, and that a gratuity of 15*l.* be given to him.

Read—A memorandum from Mr. Baillie stating that since last meeting six logs had been received, four of them being "excellent." It was resolved that the charts O. 27 be presented to Captain D. C. Davidson, ship "Loch Rannoch," and that the best thanks of the Council be given to the other observers.

Submitted—The following as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

(1.) WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|-----------------|
| A + B (successful) | - | - | - | - | = 0 districts. |
| C (failures) | - | - | - | - | = 4 districts.* |

(2.) GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

FREDC. GASTER.

- * The depression which was the cause of our issuing these warnings began to be filled up as soon as it reached the Irish coast.
Telegraphic Branch,
May 4, 1893.

Submitted—The following reports of work during the month of April 1893 :—

MARINE BRANCH.

May 5, 1893.

Examined 11 new logs.

Preparing specimen charts showing the results of the discussion of the data for the month of February in the district between the Cape of Good Hope and New Zealand, and advancing the discussion of other months.

The preparation of the observations in the South Atlantic, and westward to longitude 90° W. is making steady progress.

The Marine Superintendent.

(Signed) CHAS. HARDING.

Forwarded for the information of the Council.

(Signed) C. W. BAILLIE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

May 4, 1893.

Weekly Weather Report, 1893.—Appendices, &c. well in hand. Appendix I., Part I. published*Daily Weather Report*, 1893.—Corrections and additions for March issued.*Checking of Storm Warnings issued in 1892*.—Nearly complete. Summary prepared.*Primary Checking Storm Warnings*, 1893.—Done to date.*Checking 8h. 30m. p.m. Forecasts*.—Done to date.*Preparing Rainfall Observations*, 1892, for Mr. Symons, with correspondence arising therefrom.

—Done.

Correspondence has been considerable.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

May 1, 1893.

Hourly Means.

The whole of the proof sheets of "Hourly Means for 1890" have now been revised and signed for press.

Tabulation of Sun Cards.

The hourly tabulation of sunshine for the 12 years 1881–92 has been steadily continued, and the work for six of the seven observatories is now almost finished.

Miscellaneous.

Some time was occupied with suggested modifications in the "Dines' Pressure Anemometer"; the instrument has been returned to Mr. Munro for him to make the necessary alterations.

Mr. Curtis is at present away from the Office on sick leave.

(Signed) C. H. THOMPSON.

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

EXAMINATION BRANCH.

May 1, 1893.

Examinations.

November 1892.—Completed.

December 1892.—Proceeded with.

January–March, 1893.—Valencia work.

Weekly examination (on receipt) of curves and documents from all observatories.

Reports.

November 1892.—Copies of "Notes of Errors" to Aberdeen, Armagh, Falmouth, and Fort William.

January–March 1893.—Copies of "Notes of Errors" to Valencia.

Miscellaneous.

Examining defective rain curves from Stonyhurst and Fort William.

Mr. Parsons having been appointed Office-keeper, the Branch has been short-handed throughout the month.

(Signed) T. E. ALLEN.

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|--|---|-------|-------|
| Cash balance on 18th April - - - | - | 5,000 | 16 11 |
| Receipts from 19th April to 3rd May - - | - | 20 | 12 3 |
| | | <hr/> | |
| | | 5,021 | 9 2 |
| Cheques drawn from 19th April to 3rd May - | - | 983 | 12 10 |
| | | <hr/> | |
| Balance on 3rd May - - - | - | 4,037 | 16 4 |
| | | <hr/> | |

Submitted—The following report on the 8.30 p.m. forecasts for April 1893 :—

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.

| DISTRICTS. | | Per-centages. | | | Fer-centage of Success. a + b. |
|------------------|---|---------------|----------|----------------------|--------------------------------------|
| | | Wind. | Weather. | Average Forecast. | |
| SCOTLAND, N. | a | 47 | 74 | 61 | 89 |
| " | b | 37 | 20 | 28 | |
| " | c | 10 | 3 | 7 | |
| " | d | 6 | 3 | 4 | |
| SCOTLAND, E. | a | 53 | 74 | 64 | 84 |
| " | b | 27 | 13 | 20 | |
| " | c | 17 | 3 | 10 | |
| " | d | 3 | 10 | 6 | |
| ENGLAND, N.E. | a | 53 | 63 | 58 | 87 |
| " | b | 30 | 27 | 29 | |
| " | c | 17 | 10 | 13 | |
| " | d | 0 | 0 | 0 | |
| ENGLAND, E. | a | 54 | 77 | 66 | 91 |
| " | b | 33 | 17 | 25 | |
| " | c | 13 | 0 | 6 | |
| " | d | 0 | 6 | 3 | |
| MIDLAND COUNTIES | a | 64 | 84 | 74 | 87 |
| " | b | 13 | 13 | 13 | |
| " | c | 20 | 0 | 10 | |
| " | d | 3 | 3 | 3 | |
| ENGLAND, S. | a | 70 | 84 | 77 | 92 |
| " | b | 17 | 13 | 15 | |
| " | c | 13 | 0 | 7 | |
| " | d | 0 | 3 | 1 | |
| SCOTLAND, W. | a | 67 | 70 | 69 | 89 |
| " | b | 17 | 23 | 20 | |
| " | c | 6 | 7 | 6 | |
| " | d | 10 | 0 | 5 | |
| ENGLAND, N.W. | a | 57 | 63 | 60 | 84 |
| " | b | 20 | 27 | 24 | |
| " | c | 20 | 7 | 13 | |
| " | d | 3 | 3 | 3 | |
| ENGLAND, S.W. | a | 70 | 70 | 70 | 84 |
| " | b | 10 | 17 | 14 | |
| " | c | 13 | 10 | 11 | |
| " | d | 7 | 3 | 5 | |
| IRELAND, N. | a | 57 | 80 | 69 | 92 |
| " | b | 30 | 17 | 23 | |
| " | c | 3 | 3 | 3 | |
| " | d | 10 | 0 | 5 | |
| IRELAND, S. | a | 57 | 83 | 70 | 87 |
| " | b | 23 | 10 | 17 | |
| " | c | 13 | 7 | 10 | |
| " | d | 7 | 0 | 3 | |
| SUMMARY. | | | | | |
| BRITISH ISLES | a | 59 | 75 | 67 | 88 |
| " | b | 23 | 18 | 21 | |
| " | c | 13 | 4 | 8 | |
| " | d | 5 | 3 | 4 | |

Submitted—The following list of publications which had been received since the last meeting :—

- Batavia, Magnetical and Meteorological Observatory.*—Observations. Vol. xiv., 1891.
 ——— Rainfall in the East Indian Archipelago. 1891.
London, Admiralty, Hydrographic Office.—Chart of the world, showing tracks followed by vessels with sail and auxiliary steam power.
 ——— Chart of the world, showing tracks followed by full-powered steam vessels.
 ——— Remarks on revolving storms. Third edition.
 ——— General instructions for the hydrographic surveyors of the Admiralty.
 ——— Information relating to currents, ice, and magnetism on the coast of Iceland. Also information relating to harbours, tides, and weather in the Færoe Islands.
 ——— Notes bearing on the navigation of Her Majesty's ships. Third edition.
 ——— The Færoe Islands pilot.
 ——— A new method of clearing the lunar distance. By Sir G. B. Airy.
 ——— Report on the movements of the ice, currents, and tidal streams on the coast of Newfoundland and in the Gulf of St. Lawrence. By Commr. G. Robinson.
 ——— Supplement (1891) to a report on the movements of the ice, &c. on the coast of Newfoundland, 1889, comprising the journey of the ice from Baffin Bay to the Banks of Newfoundland.
Trieste, Osservatorio Marittimo.—Rapporto annuale. 1890.
Denza, F.—Macchie solari, perturbazioni magnetiche ed aurore polari.
Nordenskiöld, G.—Preliminärt meddelande rörande en undersökning af snökristaller.
Rizzo, G. B.—Il clima di Torino.
Lang, C.—Ein Gang durch eine meteorologische Centralstation.
Bremen.—Ergebnisse der meteorologischen Beobachtungen. Jahrg ii.
Hazen, H. A.—Secrets of the atmosphere.
Chemnitz, Königl. Sächsisches Meteorologisches Institut.—Das Klima des Königreiches Sachsen. Heft i.-ii.
Oliver, F. W.—The effects of urban fog upon cultivated plants.
Greenwich, Royal Observatory.—Results of the magnetical and meteorological observations made at the Royal Observatory, Greenwich, in the year 1890.
Chree, C.—On vortex motion in a rotating fluid.
 ——— On vortices,

63, Victoria Street, May 18, 1893.

PRESENT :

MR. GALTON IN THE CHAIR.

MR. BUCHAN.

MR. STONE.

PROFESSOR DARWIN.

The Secretary was in attendance.

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

A revise of the Report of the Office was submitted.

Read—A memorandum from Mr. Baillie stating that since last meeting nine logs had been received, seven of them being “excellent.” Mr. Scott was instructed to convey the best thanks of the Council to the observers.

Submitted—The following summary as a result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

1. WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|-------------|
| A + B (successful) | - | - | - | = | 1 district. |
| C (failures) | - | - | - | = | 1 district. |

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

(Signed) FREDC. GASTER.

Telegraphic Branch,
18th May 1893.

Submitted—The following—

RETURN of the RESULT of the COMPARISON between the WARNINGS ISSUED and the WEATHER EXPERIENCED in 1892.

| COASTS. | Total Number 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. | STORMS FOR WHICH NO WARNING WAS ISSUED. |
|--------------------------|--|--|--|---|--|---|---|
| SCOTLAND, N.E. - - | 46 | 30 | 14 | 2 | — | — | Jan. 29–30, Mar. 16, April 22, Oct. 7. |
| Do. E. - - | 30 | 7 | 17 | 6 | — | — | Feb. 1. |
| Do. N.W. - - | 49 | 29 | 14 | 3 | — | 3 | Oct. 7. |
| Do. W. - - | 43 | 24 | 15 | 4 | — | — | |
| IRELAND, S.W. - - | 45 | 26 | 15 | 2 | 1 | 1 | |
| Do. N.W. - - | 49 | 36 | 10 | 2 | 1 | — | Mar. 16, Oct. 7. |
| IRISH SEA - - | 39 | 31 | 6 | 1 | — | 1 | Feb. 15, Aug. 14–15. |
| ST. GEORGE'S CHANNEL - - | 30 | 13 | 14 | 2 | 1 | — | |
| BRISTOL CHANNEL - - | 32 | 20 | 9 | 1 | 1 | 1 | Aug. 30, Oct. 29. |
| ENGLAND, S.W. - - | 32 | 22 | 8 | 1 | 1 | — | |
| Do. S. - - | 23 | 12 | 10 | — | — | 1 | Jan. 7. |
| Do. S.E. - - | 23 | 11 | 8 | 4 | — | — | Dec. 9. |
| Do. E. - - | 23 | 11 | 8 | 4 | — | — | |
| Do. N.E. - - | 24 | 18 | 4 | 1 | — | 1 | Jan. 29–30, Feb. 1, Oct. 23, Dec. 17. |
| TOTALS - - | 488 | 290 | 152 | 33 | 5 | 8 | |
| PER-CENTAGES - - | — | 59·4 | 31·2 | 6·8 | 1·0 | 1·6 | |

NOTES on the GALES EXPERIENCED in 1892, but for which there was no WARNING issued.

Gales of *Jan. 7th, Feb. 1st, Aug. 30th, Oct. 23rd, Dec. 9th, and Dec. 17th* were all caused by the extension to coasts, which were not considered threatened, of gales which had been properly warned for on the other coasts affected.

Jan. 29th–30th.—A W. to N.W. gale caused by a large depression over Scandinavia and shallow secondaries over our Northern districts. Wind rose very slowly; effect of secondaries was underestimated.

Feb. 15th.—An Easterly gale over the Irish Sea; felt in rear of a depression which, as it moved S.Eastwards over our N.Wn. districts grew much deeper than it was on first appearing. The 6 p.m. map of 14th was not of a threatening type; next morning it was too late to issue warnings.

March 16th.—Southerly to S.Westerly gales on our N. and N.W. coasts. A further examination of the charts fails to discover anything to give warning of this gale.

April 22nd.—W. to N.W. gale in Scotland, N.E., due to a large depression in the far north. Apparently caused by *rise* of barometer in far W.—in rear of the disturbance.

Aug. 14th to 15th.—Southerly to Westerly gale over Irish Sea prevailed round a very small depression which at 6 p.m., 14th, was not at all of a threatening character, and by 8 a.m., 15th, had disappeared entirely.

Oct. 7th.—Northerly and N.Westerly gale on our N. and N.W. coasts. The depression which caused this gale moved Northwards over the North Sea, and simultaneously pressure increased over our Western districts, the gale occurred, though not looked for.

Oct. 29th.—S.S.Westerly gale over the Bristol Channel. Very local; not felt either at Pembroke or Scilly.

Submitted—The following statement of accounts:—

| | £ | s. | d. |
|--|-------|----|----|
| Cash balance on 3rd May - - - | 4,037 | 16 | 4 |
| Receipts from 4th to 17th May - - - | 53 | 8 | 0 |
| | 4,091 | 4 | 4 |
| Cheques drawn from 4th to 17th May - - - | 159 | 16 | 7 |
| | 3,931 | 7 | 9 |
| Balance on 17th May - - - | | | |

Submitted—The following list of publications which had been received since the last meeting :—

- Perth, Meteorological Branch.*—Meteorological report for the years 1888 and 1889.
Sydney, Royal Society of New South Wales.—Journal and proceedings. Vol. xxvi., 1892.
Vaughan, J. D. W.—Meteorological observations taken at Suva, Fiji. 1886–92.
Bathurst, Gambia.—Meteorological statistics. 1892.
 ——— Comparative rainfall in the colony of the Gambia. 1887–1891.
Horn, F.—Die Gewitterforschung an der Kgl. Bayerischen meteorologischen Centralstation seit dem Jahre 1879.
Margate, Medical Officer of Health.—Annual report of the Medical Officer of Health, also the meteorological report for the year 1892.
Kew Observatory.—Report of the Kew Committee for the year ending December 31, 1892.
Ward, R. De C.—Recent foreign studies of thunderstorms. I. Great Britain.
Washington, Department of Agriculture.—Report of the Secretary of Agriculture. 1891.
Stockholm, Kongl. Svenska Vetenskaps-Akademie.—Meteorologiska Iakttagelser i Sverige. Bd. xxix., 1887.
Hann, J.—Einige Resultate der anemometrischen Aufzeichnungen in Wien, 1873–1892.
Hartl, H.—Vergleiche von Quecksilber-Barometern mit Siede-Thermometern.
Zenger, C. V.—Le système du monde électro-dynamique.
Upsala, Observatoire Météorologique de l'Université.—Bulletin mensuel. Vol. xxiv. 1892.
Buchan, A.—The temperature of London for 130 years, from 1763–1892.
 ——— The temperature of the North-East of Scotland for 129 years, from 1764–1892.
London, Admiralty, Hydrographic Office.—Further report on the bore of the Tsien-Tang-Kiang, by Capt. W. U. Moore, R.N., H.M.S. "Penguin." 1892.
Rugby School Natural History Society.—Report for the year 1892.
Washington, Department of Agriculture, Weather Bureau.—Report on the climatology of the cotton plant. By P. H. Mell. Bulletin No. 8.
Hong-Kong, Botanic Gardens.—Report on the effects of the late frosts on vegetation.

63, Victoria Street, June 1, 1893.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. GALTON.

|

MR. STONE.

The Secretary was in attendance.

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

Read—Letter 1040 from the Science and Art Department, requesting the Council to forward for exhibition in their Galleries the articles mentioned in the letter (P.C. 282) from the Council (Minutes, 1892, p. 74).

Mr. Scott was instructed to report on the probable cost of putting this apparatus in repair, so as to be fit for exhibition.

Read—Letter 992 from the Royal Cornwall Polytechnic Society, requesting the Council to lend instruments for a proposed Fishery Exhibition in Cornwall.

Mr. Scott was instructed to make further inquiries (P.C. 1112), and if the same resulted satisfactorily, was authorized to consent.

Submitted—A memorandum from Mr. Dines (M.O. 1054), as to the pressure-tube anemometer, and from Mr. R. Curtis as to the performance of the instrument at the Office (Minutes, p. 11). The Council directed the experiments to be continued.

Read—A memorandum from Mr. Baillie stating that since last meeting six logs had been received, four of them being "excellent."

Mr. Scott was instructed to present the Charts O. 27 to Captain R. Nicol, R.M.S. "Germanic," and to convey the best thanks of the Council to the other three observers.

Reported—That no storm warnings had been issued since last meeting.

Reported—That William Denniston had been engaged as a boy, at 12s. 6d. per week, commencing May 29.—Approved.

Submitted—The following reports of work during the month of May 1893:—

MARINE BRANCH.

June 1, 1893.

Examined 15 new logs and 2 lighthouse registers.

Discussion of the data for the district between the Cape of Good Hope and New Zealand. Re-arranging the winds for the month of February in equal areas of 3° of latitude by 10° of longitude, and drawing a chart showing the wind-roses thus obtained, the scale for the arrows being reduced to 3½ in. = 100 per cent.

Preparation and extraction of the data for the South Atlantic Ocean and to longitude 90° W.

Received from the lithographers, and examined, two proofs of the key chart of the Red Sea district.

Supplying the Board of Trade with extracts from Office logs, showing the state of the weather in the North Atlantic Ocean between February 11 and March 1, 1893, in connexion with the inquiry into the loss of the White Star steamer "Naronic."

(Signed) H. Y. HARRIES.
For
C. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) C. W. BAILLIE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

(To 31st May 1893.)

Weekly Weather Report, 1892.—Monthly Summaries:—

February.—Not yet delivered by printer, although "press" proof has been sent to him for nearly two months.

March, April, and May.—In type, and all gone forward "for press."

June, July, August.—"Copy" gone to printer; proof expected in about a week's time.

Daily Weather Report.—Issued promptly, with monthly correction and addition sheet for April.

Storm Warnings, 1892.—Checking completed and results handed in last meeting.

Storm Warnings, 1893.—Primary checking done to date.

(Signed) FREDC. GASTER.

Telegraphic Branch,

June 1, 1893.

PANTAGRAPH ROOM.

June 1, 1893.

Hourly Means.—Very little has been done to this work during the month beyond copying hourly readings prior to the calculation of the means.

Tabulation of Sun Cards.—The hourly measurements of the cards from the seven observatories are completed, and the measurements are now being checked.

Miscellaneous.—Dines' pressure-tube anemometer was re-erected on the 13th, since when it has been regularly at work. A comparison of its records with those of Kew has been made, and a report prepared for the Council.

(Signed) R. H. CURTIS.

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

EXAMINATION BRANCH.

June 1, 1893.

Examinations.

December, 1892.—Completed.

January, 1893.—Proceeded with.

Weekly examination (on receipt) of curves and documents from all observatories.

Reports.

July–December, 1892.—Reports on the work for each month and combined report for Council.

December, 1892.—Copies of "Notes of Errors" to Aberdeen, Armagh, Falmouth, and Fort William.

Miscellaneous.

Falmouth Barograph.—Investigations re the difference between the measurements at the observatory and the M.O.

(Signed) T. E. ALLEN.

Submitted:—The following statement respecting the Records for July to December, 1892, received from the Self-recording Observatories (see Minutes, 21st December, 1868; 20th November, 1876; 3rd January, 1883; and 6th March, 1889):—

| JULY-DECEMBER. | ABERDEEN. | | ARMAGH. | | FALMOUTH. | | FORT WILLIAM. | | KEW. | | VALENCIA. | |
|---|------------|-----------|----------------------|-----------|---------------|-----------|---------------|-----------|------------|-----------|------------|-----------|
| ANEMOGRAPH:— | Direction. | Velocity. | Direction. | Velocity. | Direction. | Velocity. | Direction. | Velocity. | Direction. | Velocity. | Direction. | Velocity. |
| <i>Action of Instrument</i> - | Good. | Good. | Good. | Good. | Good. | Good. | — | — | Good. | Good. | Good. | Good. |
| <i>Records deficient:—</i> | | | | | | | | | | | | |
| Due to stoppage of clock | 0 | 0 | 32 hrs. | 34 hrs. | 0 | 0 | — | — | 0 | 0 | 24 hrs. | 28 hrs. |
| " other causes - | 0 | 0 | 0 | 0 | 0 | 0 | — | — | 7 hrs. | 9 hrs. | 32 hrs. | 0 |
| <i>No. of errors discovered:—</i> | | | | | | | | | | | | |
| By general examination | 0 | 0 | 8 | 11 | 0 | 4 | — | — | 3 | 1 | 2 | 6 |
| <i>Results of 40 Remeasmts.:—</i> | | | | | | | | | | | | |
| Greatest difference - | 1·0 | 1·0 | 1·0 | 1·0 | 1·0 | 1·0 | — | — | 1·0 | 1·0 | 1·0 | 2·0 |
| Mn. diff. irrespectv. of sign | 0·2 | 0·3 | 0·3 | 0·3 | 0·2 | 0·3 | — | — | 0·2 | 0·4 | 0·2 | 0·5 |
| Residual diff. (— M. O.) - | 0·0 | 0·0 | 0·0 | 0·0 | +0·1 | 0·0 | — | — | 0·0 | 0·0 | 0·0 | 0·0 |
| <i>Orientation verified</i> - | Monthly | — | Monthly | — | Monthly | — | — | — | Monthly | — | Monthly | — |
| RAIN-GAUGE:— | | | | | | | | | | | | |
| <i>Action of Instrument</i> - | Good. | | Good to Indifferent. | | Good. | | Good to Fair. | | Good. | | Good. | |
| <i>Records deficient:—</i> | | | | | | | | | | | | |
| Due to stoppage of clock | 0 | | 0 | | 0 | | 0 | | 0 | | 17 hrs. | |
| " other causes - | 0 | | 0 | | 19 hrs. | | 0 | | 10 hrs. | | 16 hrs. | |
| <i>No. of errors discovered:—</i> | | | | | | | | | | | | |
| By general examination | 0 | | 7 | | 6 | | 26 | | 13 | | 10 | |
| — | ABERDEEN. | | FALMOUTH. | | FORT WILLIAM. | | KEW. | | VALENCIA. | | | |
| BAROGRAPH:— | | | | | | | | | | | | |
| <i>Action of Instrument</i> - | Good. | | Good. | | Good. | | Good. | | Good. | | Good. | |
| <i>Character of Photography</i> | Do. | | Do. | | Do. | | Do. | | Do. | | Do. | |
| <i>Records deficient:—</i> | | | | | | | | | | | | |
| Due to stoppage of clock | 0 | | 0 | | 0 | | 0 | | 0 | | 10 hrs. | |
| " failure of light - | 0 | | 0 | | 0 | | 1 hr. | | 1 hr. | | 11 hrs. | |
| " other causes - | 0 | | 0 | | 0 | | 0 | | 0 | | 3 hrs. | |
| <i>No. of errors discovered:—</i> | | | | | | | | | | | | |
| In entry of standards - | 0 | | 0 | | 9 | | 1 | | 2 | | 2 | |
| " calculating residuals - | 0 | | 0 | | 7 | | 1 | | 2 | | 2 | |
| " applying " - | 0 | | 1 | | 22 | | 0 | | 2 | | 2 | |
| " maxima and minima - | 0 | | 2 | | 8 | | 0 | | 2 | | 2 | |
| By general examination - | 22 | | 1 | | 117 | | 5 | | 36 | | 36 | |
| <i>Results of 40 Remeasmts.:—</i> | | | | | | | | | | | | |
| Greatest difference - | ·007 | | ·007 | | ·008 | | ·007 | | ·007 | | ·007 | |
| Mn. diff. irrespectv. of sign | ·002 | | ·002 | | ·003 | | ·002 | | ·002 | | ·003 | |
| Residual diff. (— M. O.) - | ·000 | | ·001 | | ·000 | | ·001 | | ·001 | | ·000 | |
| <i>Mean monthly diff. between simultaneous Baroph. and Stand. Bar. readings</i> - | ·002 | | ·002 | | ·002 | | ·002 | | ·002 | | ·002 | |
| THERMOGRAPH:— | | | | | | | | | | | | |
| <i>Action of Instrument</i> - | Good. | | Good. | | Good. | | Good. | | Good. | | Good. | |
| <i>Character of Photography</i> | Do. | | Do. | | Do. | | Do. | | Do. | | Do. | |
| <i>Records deficient:—</i> | | | | | | | | | | | | |
| Due to stoppage of clock | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. |
| " failure of light - | 1 hr. | 1 hr. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| " impfctly. moist. bulbs | 0 | 0 | 0 | 0 | 7 hrs. | 0 | 3 hrs. | 3 hrs. | 2 hrs. | 0 | 2 hrs. | 0 |
| " partly. frozen bulbs | — | 20 hrs. | — | 1 hr. | — | 22 hrs. | — | 8 hrs. | — | 1 hr. | — | 1 hr. |
| " other causes - | — | 91 hrs. | — | 0 | — | 29 hrs. | — | 30 hrs. | — | 0 | — | 0 |
| " other causes - | 0 | 4 hrs. | 0 | 0 | 1 hr. | 1 hr. | 11 hrs. | 16 hrs. | 0 | 0 | 0 | 0 |
| <i>No. of errors discovered:—</i> | | | | | | | | | | | | |
| In entry of standards - | 0 | 0 | 0 | 2 | 8 | 30 | 2 | 0 | 8 | 2 | 8 | 2 |
| " maxima and minima - | 4 | — | 1 | — | 14 | — | 2 | — | 5 | — | 5 | — |
| By general examination - | 3 | 0 | 4 | 5 | 34 | 22 | 5 | 4 | 22 | 12 | 22 | 12 |
| <i>Results of 40 Remeasmts.:—</i> | | | | | | | | | | | | |
| Greatest difference - | 0·2 | 0·2 | 0·2 | 0·2 | 0·4 | 0·3 | 0·3 | 0·2 | 0·5 | 0·3 | 0·5 | 0·3 |
| Mn. diff. irrespectv. 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 |
| Residual diff. (— M. O.) | 0·0 | 0·0 | 0·0 | 0·0 | +0·1 | 0·0 | 0·0 | 0·0 | 0·0 | 0·0 | 0·0 | 0·0 |
| <i>Mean monthly diff. between simultaneous Thergraph. and Stand. Ther. readings</i> | 0·2 | 0·2 | 0·2 | 0·2 | 0·1 | 0·2 | 0·1 | 0·2 | 0·2 | 0·2 | 0·2 | 0·2 |

ANEMOGRAPHS.

Aberdeen.—The bearings of the instrument were oiled on July 30th and November 11th and 12th.

Armagh.—Velocity traces intermittent at low rates, caused by a mechanical defect in the pencil.

Falmouth.—The bearings of the instrument were oiled monthly.

Kew.—A shield was fitted on July 21st to prevent the rain reaching the instrument which was cleaned and oiled, and the "Asbestoline" was found to be quite clean and fluid. The trouble with the pricker mentioned in previous reports still continued.

Valencia.—An examination of the instrument showed that the joint of the direction shaft was loose between the 27th–29th July. The bearings were frequently oiled.

RAIN-GAUGES.

Aberdeen.—The instrument worked satisfactorily throughout the period.

Armagh.—In December Dr. Dreyer wrote: "As the amounts of rain directly measured by the glass measure are much larger than the amount recorded this week (11th–18th) on the curves, it is evident that the receiver has not floated freely, but has been forced down by the screw above, so that the receiver did not begin to sink until a quantity of rain had fallen, sufficient to counteract the upward pressure of the mercury."

Falmouth.—During August the discharges were short in many instances, and doubt is thereby thrown upon the hourly values. On October 21st the discharge was again short, cause could not be ascertained; but on December 9th, "Found on examination that the siphon tube was holed through by corrosion near the bottom of the receiver, by which means the water escaped as accumulated." New siphon fixed on the same date.

Fort William.—Attention was drawn to the large differences existing between the amount of rain indicated by the traces and measured in the glass, the latter being usually higher than the former. On September 28th, "A slight resistance was noted when pressing down the receiving cistern, as if the float in discharger was sticking from some cause to side of discharger." During December the action of the gauge was at times doubtful, and the differences above mentioned still existed. Attention was again drawn thereto.

Kew.—The working of the instrument was satisfactory throughout, and the record on Willesden paper with the Richard aniline-ink pen, is a decided improvement on the former paper and pencil. Experiments are still in progress.

Valencia.—The working of the instrument was satisfactory. Attention was drawn to the great differences existing between the totals shown by the Beckley and the check-gauge (see M.O. 1903) during October, the total by the latter being no less than 21 per cent, less than by the former.

BAROGRAPHS.

Aberdeen.—Great trouble was experienced with the light-stop during July and beginning of August, otherwise the records are satisfactory.

Falmouth.—Records satisfactory throughout.

Fort William.—Records satisfactory throughout.

Kew.—The lower edge of the traces on many of the curves when pressure is above 30·000 ins. has a blurred appearance, probably due to excess of light.

Valencia.—Records satisfactory throughout.

THERMOGRAPHS.

Aberdeen.—Zero lines changed to winter positions on October 23rd. Records good.

Falmouth.—Zero lines changed to winter positions on October 25th. Records good.

Fort William.—Zero lines changed to winter positions on November 14th. Records good.

Kew.—The upper zero-line value ($74^{\circ}\cdot9$) used on and from July 11th. There was a marked penumbra to the dry-bulb zero-line which continued up to the afternoon of September 13th, when the zero dot was altered and a slight improvement followed, but it continued to a less degree during the remainder of the month, probably caused by intensity of light. The position of the dry-bulb gas-burner was altered on October 6th. The wet-bulb lower zero-line value was altered to $19^{\circ}\cdot8$ on October 5th, and again to $20^{\circ}\cdot1$ on the 17th of the same month. On November 3rd the wet-bulb mirror was found to have been tampered with, attributed to "inquisitive workmen." The dots were raised on December 27th in order to bring traces within focus, and on the 31st the instrument was thoroughly cleaned.

Valencia.—The zero lines were changed to winter positions on October 13th. The breadth of the traces varies considerably, and greater uniformity is desirable. Towards the latter end of the period the action of the light-stop was somewhat imperfect.

GENERAL.

Owing to the illness of Mr. Whipple the annual inspections did not all take place. The clerical work at Fort William and Valencia is not up to the required standard. (See Table.)

(Signed) T. E. ALLEN.

Submitted—The following report on the 8.30 p.m. forecasts for May 1893 :—

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 1893.

| DISTRICTS. | | Per-centages. | | | Per-centage of Success. a + b. |
|------------------|---|---------------|----------|----------------------|--------------------------------------|
| | | Wind. | Weather. | Average Forecast. | |
| SCOTLAND, N. | a | 65 | 58 | 62 | 87 |
| " | b | 22 | 29 | 25 | |
| " | c | 0 | 3 | 2 | |
| " | d | 13 | 10 | 11 | |
| SCOTLAND, E. | a | 68 | 78 | 73 | 93 |
| " | b | 20 | 19 | 20 | |
| " | c | 6 | 3 | 4 | |
| " | d | 6 | 0 | 3 | |
| ENGLAND, N.E. | a | 61 | 68 | 65 | 89 |
| " | b | 26 | 23 | 24 | |
| " | c | 10 | 6 | 8 | |
| " | d | 3 | 3 | 3 | |
| ENGLAND, E. | a | 36 | 61 | 49 | 74 |
| " | b | 35 | 16 | 25 | |
| " | c | 26 | 16 | 21 | |
| " | d | 3 | 7 | 5 | |
| MIDLAND COUNTIES | a | 61 | 74 | 68 | 84 |
| " | b | 20 | 13 | 16 | |
| " | c | 19 | 10 | 15 | |
| " | d | 0 | 3 | 1 | |
| ENGLAND, S. | a | 68 | 68 | 68 | 89 |
| " | b | 29 | 13 | 21 | |
| " | c | 3 | 10 | 7 | |
| " | d | 0 | 9 | 4 | |
| SCOTLAND, W. | a | 65 | 77 | 71 | 88 |
| " | b | 23 | 10 | 17 | |
| " | c | 6 | 10 | 8 | |
| " | d | 6 | 3 | 4 | |
| ENGLAND, N.W. | a | 68 | 74 | 71 | 89 |
| " | b | 23 | 13 | 18 | |
| " | c | 3 | 3 | 3 | |
| " | d | 6 | 10 | 8 | |
| ENGLAND, S.W. | a | 78 | 71 | 75 | 91 |
| " | b | 13 | 20 | 16 | |
| " | c | 3 | 6 | 5 | |
| " | d | 6 | 3 | 4 | |
| IRELAND, N. | a | 61 | 78 | 70 | 86 |
| " | b | 26 | 6 | 16 | |
| " | c | 3 | 13 | 8 | |
| " | d | 10 | 3 | 6 | |
| IRELAND, S. | a | 58 | 78 | 68 | 87 |
| " | b | 32 | 6 | 19 | |
| " | c | 3 | 16 | 10 | |
| " | d | 7 | 0 | 3 | |
| SUMMARY. | | | | | |
| BRITISH ISLES | a | 63 | 71 | 67 | 87 |
| " | b | 24 | 15 | 20 | |
| " | c | 8 | 9 | 8 | |
| " | d | 5 | 5 | 5 | |

Submitted the following statement of accounts :—

| | £ | s. | d. |
|---------------------------------------|-------|----|----|
| Cash balance on 17th May - - - | 3,931 | 7 | 9 |
| Receipts from 18th to 31st May - - | 3 | 4 | 9 |
| | <hr/> | | |
| Cheques drawn from 18th to 31st May - | 3,934 | 12 | 6 |
| | 670 | 12 | 10 |
| | <hr/> | | |
| Balance on 31st May - - - | 3,263 | 19 | 8 |
| | <hr/> | | |

Resolved—That the day of meeting be Wednesday, as formerly (Minutes, p. 13).

Submitted—The following list of publications which had been received since the last meeting :—

London, Admiralty, Hydrographic Office.—The West India Pilot. Vol. i. 5th edition.

— The Pacific Islands Pilot. Vol. i. Part 2.

Pouchet, G.—Sur les eaux vertes et bleues observées au cours du voyage de “La Manche.”

Stockholm, Kongl. Svenska Vetenskaps-Akademie.—Meteorologiska Jakttagelser i Sverige. Bd. xxx. 1888.

Utrecht, Koninklijk Nederlandsch Meteorologisch Instituut.—Waarnemingen in den Indischen Oceaen over de maanden Maart, April en Mei.

63, Victoria Street, June 15, 1893.

PRESENT :

MR. GALTON IN THE CHAIR.

MR. BUCHAN.

|

MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

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

Reported—That by the Chairman's authority the Report of the Office (Minutes, p. 18) had been forwarded to the Royal Society (P.C. 1172).

Reported—That the cost of setting in order the apparatus for exhibition at South Kensington (Minutes, p. 20) would be about 4*l.* 5*s.* 0*d.* Mr. Scott was instructed to have the repairs carried out and the apparatus forwarded for exhibition.

Reported (Minutes, p. 20)—That the proposed Fishery Exhibition for Cornwall was to be held at Truro. The list of instruments exhibited in 1881 at the similar exhibition at Norwich (Minutes, 1880, p. 122) was submitted. Mr. Scott was authorized to exhibit similar instruments.

Read—Letter No. 1123, from Capt. Pinheiro, of the Brazilian Navy, asking the advice of the Council on the establishment of a First-Class Observatory for Meteorology and Terrestrial Magnetism at Rio Janeiro. Mr. Scott submitted (Letter 1145) a letter from Mr. Chree, giving an estimate for a magnetic outfit, and he was authorized to forward this to Capt. Pinheiro, with an estimate for self-recording meteorological apparatus, similar to that at the observatories maintained by the Council (P.C. 1235).

Mr. Scott reported that Prof. Henrici, F.R.S., had inquired if the apparatus forwarded to Nuremberg for exhibition (Minutes, 1892, p. 52) could be again forwarded for the same purpose, as the exhibition had not taken place in 1892.—Sanctioned (P.C. 1214).

Read—A letter (No. 1130) from Mr. Marriott, forwarding an application from the Rev. E. Lewis for the loan of instruments for use at Hawaii. Mr. Scott was authorized to lend the instruments (P.C. 1197).

Mr. Buchan explained (Minutes, p. 1) that the cost of supplying the rain returns from Scotch stations would be the ordinary cost of copying, with a double charge for the cost of superintendence, when necessary.

Read—Letter 1154 from the Board of Agriculture, asking for certain statistics as to forecasts for harvest. Mr. Scott was instructed to prepare a report on the letter for the next meeting of Council.

Read—Letter 1146 from the Royal Meteorological Society, requesting a grant of 25*l.* towards the cost of inspections as in former years (Minutes, 1892, p. 21).—Sanctioned (P.C. 1236).

Read—A memorandum stating that since last meeting four logs had been received, three of them being “excellent.” Mr. Scott was instructed to convey the best thanks of the Council to the three observers.

Reported—That no storm warnings had been issued since last meeting.

Reported (Letters 1067 and 1118)—That Miss Mansford had been obliged to go to the Hospital on the 3rd instant, and would probably be unfit to resume work for about two months.—Resolved that Miss Mansford, while on sick leave, be allowed full pay for one month from the date of her leaving office, and subsequently half pay for six weeks. To report further in the month of July.

Submitted—The following statement of accounts:—

| | £ | s. | d. |
|---|-------|----|----|
| Cash balance on 31st May - - - | 3,263 | 19 | 8 |
| Receipts from 1st to 14th June - - - | 8 | 16 | 2 |
| | 3,272 | 15 | 10 |
| Cheques drawn from 1st to 14th June - - - | 32 | 2 | 0 |
| | 3,240 | 13 | 10 |
| Balance on 14th June - - - | | | |

Submitted—The following list of publications which had been received since the last meeting:—

- Mohn, H.*—Irisirende Wolken.
Rome, Specola Vaticana.—Pubblicazioni. Fasc. iii.
Carlsruhe, Centralbureau für Meteorologie und Hydrographie.—Jahres-Bericht . . . mit den Ergebnissen der meteorologischen Beobachtungen . . . für das Jahr 1892.
Christiania, Norwegisches Meteorologisches Institut.—Jahrbuch. 1891.
Dove, K.—Ueber meteorologische und verwandte Beobachtungen in Südwestafrika.
Calcutta, Meteorological Office.—Rainfall data of India. 1891.
Schoenrock, A.—Ein merkwürdiger Temperatursprung in St. Petersburg und seiner Umgegend am 11 Februar 1893.
Toronto, Magnetical Observatory.—General meteorological register for the year 1892.
Greenwich, Royal Observatory.—Report of the Astronomer Royal to the Board of Visitors 1893.
London, Meteorological Office.—Hourly Means of the readings obtained from the self-recording instruments at the four observatories under the Meteorological Council. 1890.

63, Victoria Street, June 28, 1893.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

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

The Secretary was in attendance.

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

A report was submitted (Minutes, p. 25) showing the number of occasions on which the forecasts last summer had indicated a probable marked change of weather.

Mr. Scott was instructed to forward the return to the Board of Agriculture (P.C. 1324).

Read—Letter 1,197 from Dr. Pettersson of Stockholm, suggesting that arrangements should be made to carry out a hydrographic survey of the North Sea off the east coast of Scotland during the present summer.

A draft reply pointing out that the Council could not organize such a survey, and that the Hydrographer was the proper official to be addressed on the subject, was approved (P.C. 1332).

The Hydrographer reported as to the charts of the South Indian Ocean, that in his opinion the principle of equal areas for the windroses should be adopted.

The scale of the charts should, he thought, be reduced. Entries of the amount of fog should be given (the latter being an amendment to the order, Minutes, 1889, p. 73).

The suggestions of the Hydrographer were approved.

Read—An application (Letter 1,188) from Dr. Becker of Glasgow Observatory, for a grant of money to remove the anemometer from the dome of the observatory and erect it elsewhere.

Mr. Scott was instructed to reply that the Council were unable to authorise any alteration of the observatory building, and regretting their inability to supply funds for such a purpose (P.C. 1352).

Read—Letter 1,182 from the Crown Agents requesting the supply of instruments to Bathurst, River Gambia.—Granted.

Read—A memorandum stating that since last meeting, nine logs had been received, three of them being “excellent.” Mr. Scott was instructed to convey the best thanks of the Council to the three observers.

Reported—That no warnings had been issued since last meeting.

Submitted—The following :—

MEMORANDUM.

Permission is requested to order for stock. “B.T.” account :—

| | | | | £ | s. | d. |
|---------------------------------------|---|---|---|----|----|----|
| 6 rain-gauges, estimated cost | - | - | - | 12 | 0 | 0 |
| 2 Stevenson's screens, estimated cost | - | - | - | 4 | 4 | 0 |
| 6 maximum thermometers | „ | - | - | 6 | 0 | 0 |
| 6 minimum | „ | - | - | 6 | 0 | 0 |

These are required to replace instruments sold.

(Signed) R. STRACHAN,
29th June 1893.

—Authorised.

Submitted—The following statement of accounts :—

| | | | | £ | s. | d. |
|--------------------------------------|---|---|---|-------|----|----|
| Cash balance on 14th June | - | - | - | 3,240 | 13 | 10 |
| Receipts from 15th to 27th June | - | - | - | 27 | 1 | 7 |
| | | | | 3,267 | 15 | 5 |
| Cheques drawn from 15th to 27th June | - | - | - | 283 | 7 | 4 |
| Balance on 27th June | . | . | . | 2,984 | 8 | 1 |

Submitted—The following list of publications which had been received since the last meeting :—

Strassburg, Meteorologisches Landesdienst.—Ergebnisse der meteorologischen Beobachtungen im Reichsland Elsass-Lothringen im Jahre 1891.

Clark, J. E.—Notes on York Meteorology for 1892.

Jamaica Rainfall for the year 1892.

Boedl, W.—Die Schneedecke in Bayern im Winter, 1891-92.

Lang, C.—Bericht über die Thätigkeit der kgl. bayerischen meteorologischen Centralstation und der ihr angeschlossenen Stationen im Jahre 1892.

— Durchschnittliche Häufigkeit und Wahrscheinlichkeit des Niederschlages in Bayern.

Strachey, R.—Harmonic analysis of hourly observations of air temperature and pressure at British observatories. Part i. Temperature from R.S. Proceedings.

Fox, W. L.—Meteorological tables for Falmouth and the Scilly Islands for the year 1892.

Carlsruhe, Centralbureau für Meteorologie und Hydrographie.—Die Ergebnisse der meteorologischen Beobachtungen im Jahre 1892.

Falmouth, Royal Cornwall Polytechnic Society.—Annual Report, 1892.

Madrid, Observatorio.—Resumen de las observaciones meteorológicas efectuadas en la Peninsula y algunas de sus islas adyacentes durante el año de 1890.

Bucharest, Institutul Meteorologic.—Analele. Tom. vi. 1890.

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

Madras Observatory.—Hourly meteorological observations made at the Madras Observatory from January 1856 to February 1861.

63, Victoria Street, July 12, 1893.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.

PROFESSOR DARWIN.

MR. GALTON.

MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (June 28) were read and confirmed.

Submitted—The following Memorandum as to the Rainfall Tables (Minutes, p. 1).
(The lists, &c. are not printed here) :—

SIR,

Meteorological Office, July 12th, 1893.

I BEG to submit herewith tables containing the names of the stations in each of the counties in England, Scotland, and Ireland for which rainfall observations are required for the 10 years 1881-90.

I also submit the draft of a form in which it will be convenient to publish the information. Copies of this form, if approved, may be sent to Dr. Buchan and Mr. Symons. They can have the particulars as to position and character of gauge, name of observer, &c. filled in, together with values for the ten years 1881-90 and means of the two lustra; but the values for the earlier lustra can be filled in at this Office from the "*Rainfall Tables*," published by this Office in 1883. It will be necessary to explain this by letter when sending the lists and forms to Mr. Symons and Dr. Buchan.

The stations are :—

| | | | | | | |
|----------------------|---|---|---|---|---|-----|
| In England and Wales | - | - | - | - | - | 261 |
| „ Scotland | - | - | - | - | - | 138 |
| „ Ireland | - | - | - | - | - | 42 |

Total 441

Data for other stations can be supplied from information existing in the Office.

Your, &c.
(Signed) FREDC. GASTER.

R. H. Scott, Esq.,

Secretary, Meteorological Office.

The Memorandum was approved. The stations on the list which had appeared in the former publication to be marked.

Dr. Buchan to be asked for how many stations, not appearing in that publication, he could supply similar data for the previous 15 years, and also for how many stations he could supply data for long periods, and what are those stations.

Submitted—The following report on the 8.30 p.m. forecasts for June 1893 :—

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.

| DISTRICTS. | | Per-centages. | | | Per-centage of Success. a + b. |
|------------------|---|---------------|----------|----------------------|--------------------------------------|
| | | Wind. | Weather. | Average Forecast. | |
| SCOTLAND, N. | a | 64 | 57 | 61 | 89 |
| " | b | 30 | 27 | 28 | |
| " | c | 3 | 16 | 10 | |
| " | d | 3 | 0 | 1 | |
| SCOTLAND, E. | a | 73 | 60 | 67 | 91 |
| " | b | 24 | 24 | 24 | |
| " | c | 3 | 13 | 8 | |
| " | d | 0 | 3 | 1 | |
| ENGLAND, N.E. | a | 50 | 70 | 60 | 81 |
| " | b | 34 | 7 | 21 | |
| " | c | 13 | 17 | 15 | |
| " | d | 3 | 6 | 4 | |
| ENGLAND, E. | a | 57 | 79 | 68 | 85 |
| " | b | 20 | 14 | 17 | |
| " | c | 13 | 4 | 9 | |
| " | d | 10 | 3 | 6 | |
| MIDLAND COUNTIES | a | 53 | 70 | 62 | 83 |
| " | b | 23 | 20 | 21 | |
| " | c | 17 | 10 | 14 | |
| " | d | 7 | 0 | 4 | |
| ENGLAND, S. | a | 60 | 72 | 66 | 87 |
| " | b | 20 | 21 | 21 | |
| " | c | 13 | 7 | 10 | |
| " | d | 7 | 0 | 3 | |
| SCOTLAND, W. | a | 63 | 63 | 63 | 78 |
| " | b | 17 | 13 | 15 | |
| " | c | 20 | 17 | 19 | |
| " | d | 0 | 7 | 3 | |
| ENGLAND, N.W. | a | 70 | 60 | 65 | 89 |
| " | b | 20 | 27 | 24 | |
| " | c | 7 | 7 | 7 | |
| " | d | 3 | 6 | 4 | |
| ENGLAND, S.W. | a | 53 | 63 | 58 | 82 |
| " | b | 30 | 17 | 24 | |
| " | c | 10 | 10 | 10 | |
| " | d | 7 | 10 | 8 | |
| IRELAND, N. | a | 63 | 54 | 59 | 87 |
| " | b | 27 | 30 | 28 | |
| " | c | 3 | 13 | 8 | |
| " | d | 7 | 3 | 5 | |
| IRELAND, S. | a | 60 | 60 | 60 | 87 |
| " | b | 23 | 30 | 27 | |
| " | c | 7 | 7 | 7 | |
| " | d | 10 | 3 | 6 | |
| SUMMARY. | | | | | |
| BRITISH ISLES | a | 61 | 64 | 63 | 85 |
| " | b | 24 | 21 | 22 | |
| " | c | 10 | 11 | 11 | |
| " | d | 5 | 4 | 4 | |

Submitted—The following reports of work during the month of June 1893 :—

MARINE BRANCH.

July 11th, 1893.

Examined 13 new logs.

Preparing a specimen chart of the district between the Cape of Good Hope and New Zealand, showing the February wind-roses for equal areas of 3° of latitude by 10° of longitude. Also advancing the discussion of atmospheric pressure, air and sea temperatures, and currents.

Preparation and extraction of observations in Office logs for the South Atlantic and South Pacific Oceans as far as longitude 90° W.

Examined lithographed proofs of wind and current charts for the Red Sea and Gulf of Aden for the month of April.

Charting observations in a cyclone off the north-west of Australia, February 9 to 14, 1856.

Extracting from logs information relating to the Mauritius hurricane of April 1892, for Mr. Meldrum.

(Signed) CHAS. HARDING.

The Marine Superintendent.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.
(To 30th June 1893.)

Telegraphic Branch,
July, 1893.

Weekly Weather Report, 1893.—All numbers issued to date

Monthly Summaries.—In hand.

Appendices.—I, Part 2.—Issued. II.—Well in hand.

Weekly Weather Report, 1892.—*Monthly Summaries*.—April—August all issued. September, in type.

Daily Weather Report, 1893.—All numbers issued, with correction sheet for May.

Storm Warning Signals, 1893.—Primary checking done to date, and all necessary reports handed in.

Daily (8.30 p.m.) Forecasts.—Checking done to date.

Hay Harvest Forecasts 1893.—Distribution of stations somewhat modified ; issue now in action. Report made as to number of important "changes" forecasted at 3.30 p.m., in period July to September 1892.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

July 1st, 1893.

Hourly Means.—Only preliminary copying of the values of working sheets has been done during the month.

Tabulation of Sun Cards.—The work of checking the measurements made from the cards is not yet completed. Several differences found have necessitated more extended examination of the cards, in many instances, than was at first anticipated.

Miscellaneous.—The experiments with Dines' Pressure-tube Anemometer have been continued throughout the month, and a further comparison made of the results with those obtained from the Kew Robinson instruments.

(Signed) R. H. CURTIS.

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

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|---|---|--------|-------|
| Cash balance on 27th June - - - | - | 2,984 | 8 1 |
| Receipts from 28th June to 11th July - | - | 3,533 | 1 6 |
| | | <hr/> | <hr/> |
| | | 6,517 | 9 7 |
| Cheques drawn from 28th June to 11th July - | - | 1,314 | 15 8 |
| | | <hr/> | <hr/> |
| | | £5,202 | 13 11 |

Reported—That the cash accounts for the six months ended the 31st March 1893 had been audited this day by the Chairman and Professor Darwin, and would be sent in due course to the Treasury for the Audit Office. The receipts for the six months amounted to 8,877*l.* 15*s.* 5*d.*, the payments amounted to 8,980*l.* 8*s.* 2*d.*, leaving a balance of 1,500*l.* 8*s.* 2*d.* in hand and at the Bank on the 1st April 1893, as against 1,703*l.* 7*s.* 10*d.* on the 1st April 1892.

* Some expenses under this head not yet brought to account.

Read—Letters 1263 and 1290 from the Post Office and P.C. 1364 to the Post Office, relating to the new regulation that the name of the sender of the telegram be inserted in all messages sent by private wire.

Mr. Scott was instructed to say (P.C. 1434) that the Council suppose that no charge will be made for the additional words.

Read—A Memorandum stating that since last meeting six logs had been received, two of them being "excellent." Mr. Scott was instructed to convey the marked thanks of the Council to the two observers.

Reported—That no storm warnings had been issued since last meeting.

Submitted—A Memorandum from Mr. R. Curtis (Letter 1320), which was approved, as to the publication of the results of the sunshine tabulation (Minutes, 1892, p. 75).

Read—A letter from Mrs. Mansford (Minutes, p. 25) stating that her daughter would be obliged to apply for further sick leave for a month after the expiration of the leave granted June 15.—Leave granted without pay.

Submitted—The following list of publications which had been received since the last meeting:—

Pembrey, M. S.—Comparative experiments with the dry and wet-bulb psychrometer and an improved chemical hygrometer.

Southport, Fernley Observatory.—Report and results of observations for the year 1892.

Davis, W. M.—The general winds of the Atlantic Ocean.

Vienna, Sonnblick-Verein.—Erster Jahres-Bericht des Sonnblick-Vereines für das Jahr 1892.

York, Yorkshire Philosophical Society.—Annual report. 1892.

Cambridge (Mass.), Astronomical Observatory of Harvard College.—Annals. Vol. xix., Part ii Researches on the zodiacal light and on a photographic determination of the atmospheric absorption.

Symons, G. J.—The spring drought of 1893.

Calcutta, Meteorological Office.—Summary of the meteorology of Bengal for the year 1892.

San Luis Potosi, Observatorio Meteorológico del Colegio Seminario.—Resumen de las observaciones efectuadas durante el año de 1892.

Sundell, A. F.—Åskvädren i Finland. 1891, 1892.

— Snötäckets höjd i Finland Januari—Maj 1891.

— Berättelse öfver komparationen af Justeringskommissionens hufvudlikare för vigt med Finksa statens urtyp för kilogrammet.

Wild, H.—Über Unsicherheiten in den Regnault'schen Spannkraften des Wasserdampfes unterhalb 100° und daraus entspringende Differenzen der Correctionen von Siedethermometern je nach ihrer Verificationsart.

63, *Victoria Street*, October 18, 1893.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.

PROFESSOR DARWIN.

MR. GALTON.

MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (July 12) were read and confirmed.

Mr. Scott reported that the arbitration between the Council and the Knight of Kerry as to the amount to be paid for dilapidations at the old observatory on Valencia Island had been concluded.

The letter to Mr. Healy, the arbitrator, as agreed (Minutes, 1892, p. 59), had been despatched December 21, 1892. Inasmuch as up to the date of Mr. Scott's inspection in Ireland nothing had been heard as to the award, he (Mr. Scott) had called at Mr. Healy's office in Tralee, on the 26th of August, to inquire the reason of the protracted delay. On the 31st of that month the subjoined award had been received at the Office:—

Sir MAURICE FITZGERALD, Knight of Kerry, of Glanleam, in the Island of Valencia,
Co. Kerry, Ireland.

(M.O. 1612.)

GENTLEMEN,

Tralee, August 28, 1893.

HAVING been appointed umpire to assess the cost of dilapidation at Revenue House, Valencia, I have visited the place, and, having regard to the terms of the letting and the items in Mr. Fitzgerald's claim, I have come to the conclusion that the sum of ninety-three pounds (93*l.*) is fair compensation in this case to be paid to Sir Maurice Fitzgerald, also that Mr. Scott is to pay the entire expense of the umpire, which expense had been set down at 10*l.* on the umpire consenting to act. Herewith is copy of Mr. Fitzgerald's claim, amended according to the foregoing award.

I am, &c.

(Signed) JOHN B. HEALY.

Robert Henry Scott, Esq.,

Director of the Meteorological Office, London.

The amount of the award was paid on the 7th of September.

Reported—That on the 28th of July the following letter had been received:—

From the METEOROLOGICAL REPORTER TO THE GOVERNMENT OF INDIA to the SECRETARY TO THE
METEOROLOGICAL OFFICE, 63, Victoria Street, London, S.W.

(M.O. 1396.)

(No. 474/S.)

SIR,

Simla, the 30th June 1893.

I HAVE the honour to forward daily weather charts of the month of January 1893 for the Indian sea and land areas prepared from the data collected from the logs of ships entering the ports of Calcutta and Bombay, and from the observations taken at the various observatories maintained by the Indian Meteorological Department, together with a memorandum explaining the objects, &c. of these charts.

I shall be glad to learn if you would wish to receive these charts during the next two years. If they contain information that is likely to be of any use for reference in your Office, or for the information of the captains of vessels in the service of your Company, I shall be glad to forward you one or more sets. They will be sent in weekly instalments. I should be glad to receive any suggestions for the improvement of these charts if you would desire to suggest any.

I have, &c.

(Signed) JOHN ELIOT,

Meteorological Reporter to the Government of India.

The charts from January 1st to May 4th, 1893, had up to the present date been received.

On the 5th September the following letter had been received:—

(M.O. 1649.)

Board of Trade (Marine Department), London, S.W.,

SIR,

September 5, 1893.

I AM directed by the Board of Trade to transmit to you, for the information of the Meteorological Council, the accompanying copy of a letter which has been received from the India

Office, forwarding a copy of a letter from the Government of India with accompanying series of daily weather charts prepared in the Meteorological Department in that country. With reference to Lord Kimberley's suggestion, the Board of Trade would be glad if the Council would be good enough to inform them whether they could furnish a list of such persons as desire to receive copies of charts of this nature.

I am to request that the letters and memorandum which accompany the charts may be returned to this Department.

The Secretary to the Meteorological Council.

(M.O. 1649.)

I am, &c.
(Signed) INGRAM B. WALKER.

India Office, Whitehall, S.W.,
August 31, 1893.

SIR,

I AM directed by the Secretary of State for India in Council to forward herewith copy of a letter from the Government of India in the Revenue and Agricultural Department, No. 46, dated 25th July last, with accompanying series of daily weather charts prepared in the Meteorological Department in that country, and I am to state that the Earl of Kimberley would be glad to receive a list of such persons as desire to be furnished with copies of charts of this nature.

I am, &c.
(Signed) HORACE WALPOLE.

The Assistant Secretary,
Board of Trade.

Mr. Scott was instructed to forward the following reply :—

(M.O. 1649.)

Meteorological Office,
October 27, 1893.

SIR,

IN reply to your letter (M. 13,838) of September 5th, I am instructed by the Council to say that they have learned from Mr. Eliot that he has already, from Simla, communicated to scientific institutions generally the announcement of the new issue of charts authorised by the Government of India.

It does not, therefore, appear necessary to take any further steps as regards this class of possible demand for the charts.

As, however, it appears from your letter that 10 copies of the charts for February have reached the Board of Trade, I am to suggest that if these were handed over to the Meteorological Office, the Council will undertake to supply them to persons or institutions where they would be valued.

I may say, in conclusion, that the Council consider that the value of the charts will be much increased by their being prepared for some considerable period, and they hope that they may be continued beyond the two years now sanctioned.

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

The Assistant Secretary,
Marine Department, Board of Trade, S.W.

Read—The following letter (Minutes, p. 25) :—

(M.O. 1450.)
(No. 23,113.)

Board of Agriculture, 4, Whitehall Place,
London, S.W., August 3, 1893.

SIR,

WITH reference to your letter of the 29th June last, I am directed by the Board of Agriculture to acquaint you, for the information of the Meteorological Council, that the Lords Commissioners of Her Majesty's Treasury have now assented to the experimental transmission of weather forecasts to the rural post offices in Essex and Northumberland during the period of harvest. The Board would, therefore, be glad if your Council would make arrangements to communicate daily, from and including to-morrow, to the General Post Office, the afternoon forecasts relating to the districts named above.

I am, &c.
(Signed) C. HARRY TENNANT,
For Secretary.

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

The forecasts had commenced August 3rd, and been discontinued from September 29th (Letter 1814).

Submitted—The following reports :—

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

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

TELEGRAPHIC REPORTING STATIONS.

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

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

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

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

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

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

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

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

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

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

STATIONS OF THE SECOND ORDER.

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

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

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

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

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

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

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

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

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

Arley Cottage, visited August 21st.—Major Maxwell was again absent. The instruments were in fairly good order. The station possesses a small anemometer, the reducing action of which is out of order, recording ten times too much.

Parsonstown.—See report on Telegraphic Stations.

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

WEEKLY WEATHER REPORT STATIONS.

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

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

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

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

(Signed) ROBERT H. SCOTT.

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

| STATIONS. | Dry Bulb. | Wet Bulb. | Max. | Min. | Spare. | REMARKS. |
|---------------------------------|-----------|-----------|------|------|--------|--|
| TELEGRAPHIC REPORTING STATIONS. | | | | | | |
| Holyhead - - | 0°0 | -0°3 | -0°3 | +0°3 | -0°4 | No spare Ther. |
| Malin Head - - | -0°4 | -0°4 | 0°0 | -0°7 | -0°6 | |
| Belmullet - - | -0°2 | -0°1 | -0°1 | +0°1 | — | |
| Donaghadee - - | -0°4 | -0°5 | -0°1 | 0°0 | -0°1 | Dry Bulb (corrected) used as standard. No. 3580 do. do. Dry Bulb do. do. |
| Parsonstown - - | -0°7 | +0°1 | -0°2 | +0°1 | — | |
| Valencia (Cahiriveen) | -0°3 | -0°3 | -0°2 | +0°2 | -0°1 | |
| Roche's Point - - | -0°4 | -0°4 | 0°0 | +0°6 | — | |
| St. Ann's Head - - | -0°4 | 0°1 | +0°9 | +0°1 | -0°1 | |
| WEEKLY WEATHER REPORT STATIONS. | | | | | | |
| Londonderry - - | -0°2 | -0°2 | 0°0 | +0°4 | — | Max. Ther. is new (bought in May). |
| Edenfell - - | — | — | +0°4 | -0°3 | — | |
| Waterford - - | -0°1 | -0°1 | 0°0 | +0°5 | — | Dry Bulb (corrected) used as standard. Not graduated on stem. |
| Killarney - - | -0°4 | -0°4 | -0°3 | -0°1 | — | |
| Llandoverly - - | — | — | -0°3 | +0°5 | — | |
| STATIONS OF THE SECOND ORDER. | | | | | | |
| Armagh - - | -0°3 | -0°4 | -1°7 | — | -0°2 | Grass min. +1°1 { Air Min. therm. of Casella's mercurial pattern. |
| Brookeborough - - | -0°8 | -0°7 | -0°1 | 0°0 | — | |
| Dublin (City) - - | -0°6 | -0°6 | -1°0 | 0°0 | — | |
| Dublin (Phoenix Park) | -0°4 | -0°4 | -0°4 | +0°1 | 0°0 | |
| Edgeworthstown - - | -0°5 | -0°5 | -0°3 | +0°1 | — | Do. +0°5. |
| Glasnevin - - | -0°3 | -0°3 | -0°1 | +0°5 | — | |
| Lissau - - | -0°2 | -0°4 | -0°8 | +0°3 | — | Dry Bulb, corrected, used as standard. " " " |
| Londonderry - - | -0°2 | -0°2 | 0°0 | +0°4 | — | |
| Markree Castle - - | -0°4 | -0°3 | 0°0 | 0°0 | — | |
| Mount Nugent - - | -0°1 | -0°1 | +0°9 | 0°0 | — | |
| Parsonstown - - | -0°7 | +0°1 | -0°3 | +0°1 | — | |
| St. David's - - | -0°2 | -0°3 | 0°0 | +0°2 | — | |

REPORT of INSPECTION of SCOTTISH STATIONS for Year 1893.

BAROMETERS.

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

TABLE I.

| STATIONS. | Inspector's Standard No. 690 corrected. | Reporting Barometer uncorrected. | Check Barometer uncorrected. | REMARKS. |
|-----------------|---|----------------------------------|------------------------------|---------------------------------|
| | Inches. | Inches. | Inches. | |
| Ochertyre - | 29·696 | 29·684 | — | Check barometer at lower level. |
| Dundee - | 29·762 | 29·760 | — | |
| Braemar - | 28·972 | 28·972 | — | |
| Aberdeen - | 30·160 | 30·160 | — | |
| Nairn - | 30·050 | 30·047 | 30·050 | |
| Lairg - | 29·904 | 29·890 | — | |
| Dunrobin - | 30·156 | 30·158 | — | |
| Wick - | 29·960 | 29·956 | 30·022 | |
| Deerness - | 29·476 | 29·460 | — | |
| Stornoway - | 29·498 | 29·494 | 29·494 | |
| Fort Augustus - | 30·113 | 30·106 | — | Check barometer in flat above. |
| Fort William - | 29·393 | 29·396 | — | |
| Laudale - | 30·414 | 30·416 | 30·410 | |
| Callton Mor - | 30·074 | 30·040 | — | |
| Rothsay - | 29·934 | 29·936 | — | |
| Ardrossan - | 30·002 | 30·004 | — | |
| Pinmore - | 29·935 | 29·934 | — | |
| Edinburgh - | 28·757 | 28·730 | — | |
| Leith - | 29·161 | 29·161 | 29·164 | |
| Glasgow - | 29·619 | 29·619 | — | |
| Cargen - | 29·690 | 29·650 | — | |

THERMOMETERS

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

TABLE II.

| STATIONS. | Standard Thermo- meter, No. 4433. | Dry Bulb. | Wet Bulb. | Spare Thermo- meter. | Max. Thermo- meter. | Min. Thermo- meter. | Time in Water in Minutes. | Change of Tempera- ture. | REMARKS. |
|--------------------------------|--|--------------|--------------|----------------------------|---------------------------|---------------------------|------------------------------------|-----------------------------------|---|
| Ochertyre - | 60.2 | 0.0 | -0.1 | — | 0.0 | -0.1 | 180 | +0.4 | Ther. on grass 0°.0. New hygrometer. |
| Dundee - | 58.2 | -0.6 | -0.6 | — | +1.4 | -0.3 | 80 | +0.5 | |
| Braemar - | 59.1 | +0.3 | +0.4 | — | 0.0 | -0.2 | 140 | Uniform. | |
| Aberdeen - | 61.2 | +0.3 | +0.3 | — | +0.1 | +0.3 | 90 | Do. | |
| Nairn - | 64.0 | +0.7 | +0.8 | — | 0.0 | -0.2 | 75 | +0.5 | |
| Lairg - | 65.4 | +0.3 | +0.2 | — | -0.2 | +0.1 | 100 | Uniform. | |
| Dunrobin - | 64.0 | -0.5 | -0.5 | — | 0.0 | -0.4 | 55 | Do. | |
| Wick - | 60.8 | +0.4 | +0.5 | — | 0.0 | 0.0 | 90 | Do. | |
| Deerness - | 64.8 | 0.0 | 0.0 | +0.2 | -0.9 | -0.2 | 70 | +0.2 | |
| Stornoway - | 57.8 | +0.5 | +0.5 | — | -0.6 | -0.6 | 120 | +0.2 | |
| Fort Augustus - | 59.0 | +0.1 | +0.1 | — | +0.2 | -0.4 | 80 | Uniform. | |
| Fort William - | 59.1 | +0.1 | +0.1 | — | +0.2 | 0.0 | 120 | Do. | |
| Fort William Ob- servatory. | 59.1 | — | — | — | 0.0 | -0.7 | 120 | Do. | |
| Laudale - | 58.1 | +0.2 | +0.2 | — | +0.1 | +0.2 | 100 | Do. | |
| Callton Mor - | 64.2 | +0.1 | 0.0 | — | +0.8 | -0.4 | 85 | +0.2 | |
| Rothesay - | 59.9 | +0.1 | +0.1 | — | +0.1 | -0.1 | 80 | +0.3 | |
| Ardrrossan - | 60.1 | +0.2 | +0.2 | — | -0.2 | -0.2 | 110 | Uniform. | |
| Pinmore - | 60.0 | 0.0 | -0.1 | — | -0.2 | 0.0 | 95 | Do. | |
| Edinburgh - | 52.2 | +0.1 | 0.0 | — | 0.0 | -0.1 | 90 | Do. | |
| Leith - | 52.8 | 0.0 | +0.1 | — | -0.1 | -0.5 | 60 | +0.2 | |
| Glasgow - | 48.3 | — | — | — | -0.1 | -0.1 | 100 | -0.4 | Ther. on grass -0°.2. |
| Cargen - | 52.7 | -0.1 | -0.1 | — | 0.0 | -0.2 | 135 | +0.3 | |

HYGROMETERS.

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

NOTES OF INSPECTION OF THE STATIONS.

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

Dundee, August 7th.—The instruments are in good order and the observations were made carefully and correctly by the assistant who was temporarily in charge. A new hygrometer had recently been added to replace the old one which had been accidentally broken. Mr. John Carnochan was appointed curator of the cemeteries after the death of Mr. McKelvie, who was so long in charge of this station. Mr. C. evinces much interest in the observations and is desirous of giving all assistance in his power.

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

Aberdeen, August 9th.—Instruments and observations at this place are all that can be desired. With regard to the Sunday weather telegrams, Mr. Boswell assured me that nothing would be wanting on his part to see that they be delivered in London in good time.

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

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

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

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

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

Stornoway, August 22nd.—The instruments are in good order, and the observations appear to be made with care. The omission recently to enter in the daily telegram a barometric fluctuation shown by the barograph was pointed out, and the necessity of attending to the notification of these fluctuations in future. The observer informed me that he had shortly before the time of inspection been observing the direction of the wind to 16 points. Considerable additions have been made to the school buildings, and other changes and additions to the present grounds are in contemplation. Meanwhile, instruments remain in their present position till a decision is come to, when they will be shifted to the positions I pointed out in accordance with the decision arrived at.

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

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

TIMES OF HOURS SUNSHINE.

| — | | Theoretic. | Observed. | Difference. |
|-----------|-----|------------|-----------|-------------|
| January | - - | 231 | 151 | 80 |
| February | - - | 275 | 193 | 82 |
| March | - - | 365 | 295 | 70 |
| April | - - | 426 | 357 | 69 |
| May | - - | 508 | 413 | 95 |
| June | - - | 529 | 438 | 91 |
| July | - - | 528 | 429 | 99 |
| August | - - | 467 | 380 | 87 |
| September | - - | 381 | 315 | 66 |
| October | - - | 319 | 241 | 78 |
| November | - - | 242 | 167 | 75 |
| December | - - | 210 | 125 | 85 |
| Year | - - | 4,481 | 3,497 | 984 |

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

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

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

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

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

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

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

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

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

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

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

INSPECTION of the ANEMOMETER at SCILLY.

(M.O. 1703.)

SIR,

September 6, 1893.

I BEG to report that I was engaged upon the inspection of the anemometer at St. Mary's, Scilly, on the 29th and 30th of August.

I found the instrument in a very unsatisfactory condition. Many parts had not been properly cleaned for years; some important bearings were quite dry; others were imperfectly oiled; and most were to a greater or less extent clogged with gummed oil and dirt.

The observer informed me that the construction of the instrument had never been explained to him, and I found him to be quite unacquainted with those portions of it which were not open to view, and very nervous about touching other parts whose functions were not quite apparent to him.

In his presence I took the anemometer entirely to pieces and thoroughly cleaned it in every part, explaining at the same time its construction, and how it should be oiled to keep it in good order.

I gave special attention to the recording portion, and before I left succeeded in getting the pencils to mark excellently. Instructions were also given as to the attachment of the papers and other points to which I had been asked to give attention.

I directed that as far as possible the old paint should be removed from the caps and exterior portions of the instrument, and that they should be repainted with enamel paint; also for the wood and iron-work of the stand to be repainted with ordinary paint.

Finding that the thermometer-screen would shortly require repainting, I requested Mr. Hicks to have that done at the same time.

I am, &c.
(Signed) R. H. CURTIS.

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

P.S.—I should like to add that the observer appeared to me to be anxious to do his part well and that the state in which I found the instrument was due to his want of knowledge rather than to neglect.

R. H. C.

Mr. Galton reported to the Council that on his recent visit to Holyhead he had examined the bridled anemometer with Mr. Cotton, and he recommended that, if feasible, an arrangement should be introduced for shifting the motion from "fast" to "slow" and *vice versa*, without having to take the works to pieces and change wheels on each occasion.

Mr. Scott was instructed to ascertain from Mr. Munro if this could be done, and also to report by next meeting as to the dates at which the several anemometers belonging to the Council had last been inspected by Mr. Whipple or Mr. Baker.

Reported—That at the end of August the cable between Lisbon and the Azores had been opened, and that since that date telegrams had been received from the Azores, gratuitously (Letters 1572, 1585, 1655, 1662, P.C. 1754, 1790).

Mr. Scott was instructed to prepare a report on the results of this experiment.

Submitted—The following as the result of the primary checking of Storm Warnings issued to the coasts of the British Islands since the last meeting of the Council.

(1.) WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|-----------------|
| A + B (successful) | - | - | - | - | = 40 districts. |
| C (failures) | - | - | - | - | = 15 districts. |

(2.) GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

FREDC. GASTER.

Telegraphic Branch,
18 October 1893.

Read—Letters 1472 and 1482 from Aberdeen observatory, reporting breakage of a thermograph thermometer, and Letter 1486, from Glasgow, reporting breakage of a standard thermometer.

Mr. Scott was instructed to replace the instruments at the cost of the Office, and to see that at all the observatories the thermographs were protected by open wire netting.

Submitted—The following report on the forecasts issued at 8.30 p.m. daily during the month of July 1893 :—

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 1893.

| DISTRICTS. | | Per-centages. | | | Per-centage of Success. a + b. |
|------------------|---|---------------|----------|----------------------|--------------------------------------|
| | | Wind. | Weather. | Average Forecast. | |
| SCOTLAND, N. | a | 48 | 65 | 57 | 81 |
| " | b | 23 | 26 | 24 | |
| " | c | 26 | 9 | 18 | |
| " | d | 3 | 0 | 1 | |
| SCOTLAND, E. | a | 65 | 52 | 59 | 86 |
| " | b | 26 | 29 | 27 | |
| " | c | 6 | 13 | 10 | |
| " | d | 3 | 6 | 4 | |
| ENGLAND, N.E. | a | 49 | 68 | 59 | 84 |
| " | b | 35 | 16 | 25 | |
| " | c | 10 | 16 | 13 | |
| " | d | 6 | 0 | 3 | |
| ENGLAND, E. | a | 61 | 65 | 63 | 91 |
| " | b | 29 | 26 | 28 | |
| " | c | 7 | 9 | 8 | |
| " | d | 3 | 0 | 1 | |
| MIDLAND COUNTIES | a | 55 | 64 | 60 | 84 |
| " | b | 26 | 23 | 24 | |
| " | c | 13 | 13 | 13 | |
| " | d | 6 | 0 | 3 | |
| ENGLAND, S. | a | 68 | 77 | 73 | 91 |
| " | b | 23 | 13 | 18 | |
| " | c | 3 | 3 | 3 | |
| " | d | 6 | 7 | 6 | |
| SCOTLAND, W. | a | 55 | 48 | 52 | 75 |
| " | b | 23 | 23 | 23 | |
| " | c | 13 | 29 | 21 | |
| " | d | 9 | 0 | 4 | |
| ENGLAND, N.W. | a | 61 | 65 | 63 | 79 |
| " | b | 16 | 16 | 16 | |
| " | c | 20 | 16 | 18 | |
| " | d | 3 | 3 | 3 | |
| ENGLAND, S.W. | a | 55 | 68 | 62 | 80 |
| " | b | 16 | 20 | 18 | |
| " | c | 23 | 6 | 14 | |
| " | d | 6 | 6 | 6 | |
| IRELAND, N. | a | 42 | 65 | 54 | 78 |
| " | b | 29 | 19 | 24 | |
| " | c | 6 | 10 | 8 | |
| " | d | 23 | 6 | 14 | |
| IRELAND, S. | a | 42 | 42 | 42 | 76 |
| " | b | 26 | 42 | 34 | |
| " | c | 13 | 6 | 10 | |
| " | d | 19 | 10 | 14 | |
| SUMMARY. | | | | | |
| BRITISH ISLES | a | 54 | 62 | 58 | 82 |
| " | b | 25 | 23 | 24 | |
| " | c | 13 | 12 | 13 | |
| " | d | 8 | 3 | 5 | |

Submitted—The following report on the forecasts issued at 8.30 p.m. daily during the month of August 1893 :—

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.

| DISTRICTS. | | Per-centages. | | | Per-centage of Success. a + b. |
|------------------|---|---------------|----------|----------------------|--------------------------------------|
| | | Wind. | Weather. | Average Forecast. | |
| SCOTLAND, N. | a | 61 | 71 | 66 | 84 |
| " | b | 20 | 16 | 18 | |
| " | c | 16 | 7 | 12 | |
| " | d | 3 | 6 | 4 | |
| SCOTLAND, E. | a | 65 | 52 | 59 | 82 |
| " | b | 23 | 23 | 23 | |
| " | c | 9 | 16 | 12 | |
| " | d | 3 | 9 | 6 | |
| ENGLAND, N.E. | a | 58 | 61 | 60 | 82 |
| " | b | 16 | 29 | 22 | |
| " | c | 23 | 10 | 17 | |
| " | d | 3 | 0 | 1 | |
| ENGLAND, E. | a | 61 | 68 | 65 | 86 |
| " | b | 20 | 23 | 21 | |
| " | c | 13 | 6 | 10 | |
| " | d | 6 | 3 | 4 | |
| MIDLAND COUNTIES | a | 71 | 68 | 70 | 86 |
| " | b | 16 | 16 | 16 | |
| " | c | 13 | 13 | 13 | |
| " | d | 0 | 3 | 1 | |
| ENGLAND, S. | a | 65 | 65 | 65 | 86 |
| " | b | 19 | 23 | 21 | |
| " | c | 16 | 6 | 11 | |
| " | d | 0 | 6 | 3 | |
| SCOTLAND, W. | a | 68 | 55 | 62 | 85 |
| " | b | 23 | 23 | 23 | |
| " | c | 0 | 16 | 8 | |
| " | d | 9 | 6 | 7 | |
| ENGLAND, N.W. | a | 65 | 58 | 62 | 86 |
| " | b | 19 | 29 | 24 | |
| " | c | 6 | 10 | 8 | |
| " | d | 10 | 3 | 6 | |
| ENGLAND, S.W. | a | 45 | 60 | 53 | 76 |
| " | b | 29 | 17 | 23 | |
| " | c | 16 | 10 | 13 | |
| " | d | 10 | 13 | 11 | |
| IRELAND, N. | a | 45 | 90 | 68 | 94 |
| " | b | 45 | 7 | 26 | |
| " | c | 3 | 0 | 1 | |
| " | d | 7 | 3 | 5 | |
| IRELAND, S. | a | 49 | 70 | 60 | 84 |
| " | b | 35 | 14 | 24 | |
| " | c | 13 | 3 | 8 | |
| " | d | 3 | 13 | 8 | |
| SUMMARY. | | | | | |
| BRITISH ISLES | a | 59 | 65 | 62 | 84 |
| " | b | 24 | 20 | 22 | |
| " | c | 12 | 9 | 11 | |
| " | d | 5 | 6 | 5 | |

Submitted—The following report on the forecasts issued at 8.30 p.m. daily during the month of September 1893 :—

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.

| DISTRICTS. | | Per-centages. | | | Per-centage of Success a + b. |
|------------------|---|---------------|----------|----------------------|-------------------------------------|
| | | Wind. | Weather. | Average Forecast. | |
| SCOTLAND, N. | a | 59 | 67 | 63 | 89 |
| " | b | 24 | 27 | 26 | |
| " | c | 3 | 6 | 4 | |
| " | d | 14 | 0 | 7 | |
| SCOTLAND, E. | a | 45 | 57 | 51 | 87 |
| " | b | 31 | 40 | 36 | |
| " | c | 17 | 3 | 10 | |
| " | d | 7 | 0 | 3 | |
| ENGLAND, N.E. | a | 47 | 60 | 54 | 82 |
| " | b | 30 | 27 | 28 | |
| " | c | 17 | 7 | 12 | |
| " | d | 6 | 6 | 6 | |
| ENGLAND, E. | a | 57 | 70 | 64 | 92 |
| " | b | 30 | 27 | 28 | |
| " | c | 10 | 0 | 5 | |
| " | d | 3 | 3 | 3 | |
| MIDLAND COUNTIES | a | 37 | 67 | 52 | 87 |
| " | b | 40 | 30 | 35 | |
| " | c | 10 | 0 | 5 | |
| " | d | 13 | 3 | 8 | |
| ENGLAND, S. | a | 54 | 80 | 67 | 91 |
| " | b | 33 | 14 | 24 | |
| " | c | 13 | 3 | 8 | |
| " | d | 0 | 3 | 1 | |
| SCOTLAND, W. | a | 35 | 63 | 49 | 82 |
| " | b | 38 | 27 | 33 | |
| " | c | 17 | 0 | 8 | |
| " | d | 10 | 10 | 10 | |
| ENGLAND, N.W. | a | 50 | 67 | 59 | 85 |
| " | b | 30 | 23 | 26 | |
| " | c | 7 | 3 | 5 | |
| " | d | 13 | 7 | 10 | |
| ENGLAND, S.W. | a | 50 | 73 | 62 | 89 |
| " | b | 30 | 24 | 27 | |
| " | c | 10 | 3 | 6 | |
| " | d | 10 | 0 | 5 | |
| IRELAND, N. | a | 40 | 57 | 49 | 80 |
| " | b | 30 | 33 | 31 | |
| " | c | 7 | 7 | 7 | |
| " | d | 23 | 3 | 13 | |
| IRELAND, S. | a | 30 | 60 | 45 | 77 |
| " | b | 37 | 27 | 32 | |
| " | c | 13 | 7 | 10 | |
| " | d | 20 | 6 | 13 | |
| SUMMARY. | | | | | |
| BRITISH ISLES | a | 46 | 66 | 56 | 86 |
| " | b | 32 | 27 | 30 | |
| " | c | 11 | 3 | 7 | |
| " | d | 11 | 4 | 7 | |

| LIABILITIES. | | | | ASSETS. | | | | | | | | | |
|---------------------------|---|---|---|---------|----|----|------------------|---|---|---|--------|----|----|
| To Council | - | - | - | £ | s. | d. | By cash at Bank | - | - | - | £ | s. | d. |
| | | | | 500 | 0 | 0 | | | | | 1,746 | 0 | 3 |
| „ Post Office (estimated) | - | - | | 275 | 0 | 0 | „ „ at Office | - | - | - | 66 | 12 | 8 |
| „ sundry creditors | - | - | | 667 | 14 | 5 | „ H.M. Exchequer | - | - | - | 650 | 0 | 0 |
| „ balance | - | - | | 1,167 | 14 | 2 | „ sundry debtors | - | - | - | 147 | 15 | 8 |
| | | | | £2,610 | 8 | 7 | | | | | £2,610 | 8 | 7 |

* Some expenses under this head not yet brought to account.

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|--|--------|----|----|
| Cash balance on 11th July - - - | 5,202 | 13 | 11 |
| Receipts from 12th July to 17th October - | 3,643 | 3 | 0 |
| | 8,845 | 16 | 11 |
| Cheques drawn from 12th July to 17th October - | 3,611 | 9 | 11 |
| Balance on 17th October - | £5,234 | 7 | 0 |

Read—A memorandum from the Marine Superintendent, stating that since last meeting 44 logs had been received, 21 of them being excellent.

Mr. Scott was instructed to forward a copy of O. 76 to Captains Davidson and Robertson, and Lieutenant Margesson, O. 59 to Surgeon J. W. Campbell, and O. 90 to Captain James Smith, and to convey the marked thanks of the Council to the other observers.

Submitted—The following reports of work during the three months to September 30, 1893 :—

MARINE BRANCH.

October 17, 1893.

Examined 48 new logs and six lighthouse registers.

Discussion of the district between the Cape of Good Hope and New Zealand. Grouping the winds in equal areas; drawing wind roses; generalizing the ocean currents; obtaining barometer, and air and sea temperature results; and preparing specimen charts of all data for the month of February.

Preparation of the data contained in Office logs for the district south of the Equator from the west coast of Africa in longitude 90° W.

The lithographed wind and current charts for the Red Sea area for the month of April passed for press.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) C. W. BAILLIE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

September 30, 1893.

Weekly Weather Report, 1892.—Monthly summaries for all months passed through press; title-page and preface in type and partially revised.

Weekly Weather Report, 1893.—All numbers issued promptly to date. Monthly summaries—January—in type. February in hand.

Appendix I., part 3, well in hand.

Appendix II. well in hand.

Daily Weather Report, 1893.—All issued up to date with corrections for all months up to and including August.

Primary Checking of Storm Signals, 1893.—Done to date.

Checking of 8h. 30m. p.m. Forecasts.—Also done to date.

Hay Harvest Forecasts, 1893.—All issued; results will be checked as soon as vacations are finished.

Forecasts for Northumberland and Essex for Board of Agriculture.—Issued daily throughout August and September.

Rainfall Investigation, 1881–90.—The necessary forms have been prepared and sent to Mr. Synons and Dr. Buchan, who are having the information copied.

During this period two or more of the staff have been almost continually absent on leave (summer vacation).

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

October 1, 1893.

Hourly Means.

The calculation of the various means required for the volume of "Hourly Values" for 1891 is about half completed.

A good deal of preliminary copying has been done for the year 1892.

Tabulation of Sun Cards.

The checking of the tabulation has been completed, and the values have been summed and meaned for the seven observatories for the years 1881–1892 inclusive.

Miscellaneous.

The experiments with Dines' pressure-tube anemometer have been continued; a new pen has been devised and fitted, with very good results; and a continuous record has been secured since the last alteration to the instrument made at the end of July. A new form of the instrument for giving the maximum pressure has also been tested.

The ordinary routine work of the room has been kept up to date.

During the period covered by this report the summer vacation has been taken.

(Signed) R. H. CURTIS.

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

EXAMINATION BRANCH.

October 18, 1893.

Examinations.

January-April 1893.—Completed.

May-June, 1893.—Kew work completed, and Valencia work partly done for the Quarterly Report of the Registrar General of Ireland.

July-September, 1893.—Valencia work completed.

Weekly examination (on receipt) of curves and documents from all observatories.

Reports.

January-March 1893.—Copies of "Notes of Errors" to all observatories except Valencia.

April-June 1893.—Copies of "Notes of Errors" to Kew.

July-September 1893.—Copies of "Notes of Errors" to Valencia.

Miscellaneous.

Kew Dry Bulb trace, July 1893.—Making tracing thereof, and scale for measurement.

Diurnal Range of Rainfall, 1871-90.—Examination and correction of the hourly values, &c., proceeded with.

Kew Barograph Scale Values.—Measurements, &c., re the checking of (see M.O. 1787 and 1818).

Preparing and copying inspector's notes for the annual inspection, and interviews with inspectors.

General routine work and the annual vacation has occupied considerable time, and the reduction of the staff consequent upon Mr. Parsons' promotion has a material effect on the output.

(Signed) T. E. ALLEN.

Reported—That new bookcases were required. Estimate (Letter 1688), 1*l.* 16*s.* 0*d.*
—Authorised.

Reported—That Miss Mansford had returned to work on the 25th ultimo (Minutes, p. 25).

Mr. Scott reported that C. Pycock had again misconducted himself (Minutes, 1892, p. 25), and that he had been dismissed, July 31, 1893. Mr. B. G. C. Sawyer had been engaged as messenger in his place at a salary of 1*l.* weekly.—Approved.

Read—Letter 1912 from Mr. Baillie, applying for a fortnight's sick leave.—Granted.

Submitted—The following list of publications which had been received since the last meeting :—

Adelaide Observatory.—Meteorological observations made at the Adelaide Observatory, and other places in South Australia and the Northern Territory, during the years 1884-85.

— — — Rainfall in South Australia and the Northern Territory during 1892; with weather characteristics of each month.

Aitken, John.—On some observations made without a dust counter on the hazing effect of atmospheric dust.

— — — On the particles in fogs and clouds.

Allahabad, Meteorological Office.—Brief sketch of the meteorology of the North-Western Provinces and Oudh and adjacent parts of Rajputana and the Panjab for the year 1892.

Bayard, F. C.—The direction of the wind over the British Isles, 1876-80.

Berlin, Königlich Preussisches Meteorologisches Institut.—Bericht über die Thätigkeit. 1891, 1892.

— — — — — Ergebnisse der Niederschlags-Beobachtungen im Jahre. 1891.

Bremen, Meteorologische Station I. Ordnung.—Ergebnisse der meteorologischen Beobachtungen. Jahrg. iii., 1892.

British Guiana.—Report on the Botanic Gardens and their work, for the year 1891-92.

Calcutta, Meteorological Office.—Cyclone memoirs, No. V. Account of three cyclones in the Bay of Bengal and Arabian Sea during the month of November 1891.

— — — Memorandum on the snow-fall in the mountain districts bordering Northern India and the abnormal features of the weather in India during the past five months, with a forecast of the probable character of the south-west monsoon rains of 1893.

Calcutta, Meteorological Office.—Meteorological observations recorded at seven stations in India in the year 1892.

— Report on the administration of the Meteorological Department of the Government of India in 1892–93.

— *Surveyor-General's Office.*—General report on the operations of the Survey of India Department. 1891–92.

Cape Town, Meteorological Commission.—Report. 1892.

Chevalier, S.—The Bokhara typhoon, October 1892.

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THE Third Annual General Meeting of the Meteorological Council was held at 63, Victoria Street, S.W., on Wednesday, November 1st, 1893, at the hour of 2h. 30m. p.m.

The following Members were present :—

Lieut.-General R. STRACHEY in the Chair.

Professor DARWIN.

Mr. GALTON.

Mr. STONE.

The HYDROGRAPHER.

Mr. ROBERT H. SCOTT (Secretary).

The Secretary read the notice convening the meeting as follows :—

Meteorological Office, 63, Victoria Street,
London, October 23, 1893.

SIR,

I BEG to inform you that the third ordinary general meeting of the Meteorological Council will be held on Wednesday, the 1st proximo, at 2h. 30m. p.m., for the consideration of the expenditure of the year 1892-93, the appointment of auditors for the current year, the preparation of the estimates for the year 1894-95, and for the transaction of other ordinary business.

A draft copy of the proposed estimates is enclosed.

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

The Secretary reported that in accordance with the Articles :—

1. The Council had submitted a Report of its proceedings to the Royal Society for presentation to Parliament.

2. That the annual estimates for 1893-94 had been prepared, submitted to the Treasury and approved; and that the accounts up to March 31, 1893, had been examined by two members of the Council, and had been submitted for audit in the usual course.

3. That ordinary meetings of the Council had been held on the following days :—

| | | | | | | | | |
|------|---|-------------|------|---|-------------|------|---|------------|
| 1892 | - | November 16 | 1893 | - | February 22 | 1893 | - | June 1 |
| " | - | " 30 | " | - | March 8 | " | - | " 15 |
| " | - | December 14 | " | - | April 5 | " | - | " 28 |
| 1893 | - | January 11 | " | - | " 19 | " | - | July 12 |
| " | - | " 25 | " | - | May 4 | " | - | October 18 |
| " | - | February 8 | " | - | " 18 | | | |

4. That the proceedings had been regularly recorded and printed.

The meeting then adjourned.

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

Mr. Buchan was appointed auditor of the accounts, with the Chairman, for the year commencing April 1, 1893.

Mr. Scott submitted a memorandum, as directed at last meeting, showing that all the anemometers in Great Britain, except that at Scilly, had been overhauled by the inspectors from Kew in 1893, and those in Ireland in 1892. The anemometer at Alnwick Castle, which is the property of the Duke of Northumberland, had not been dismounted. At Oxford a new anemometer had been erected in the summer, at the cost of the observatory. Mr. Scott was instructed to see that Scilly was regularly inspected in future by the assistant from Kew.

Submitted—The following reports forwarded by Mr. Chree, Superintendent, Kew Observatory :—

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

Kew Observatory, October 27, 1893.

DEAR SIR,

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

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

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

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

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

I was informed that the *first* curves from the barograph, as well as from the thermograph, were always sent up to the Meteorological Office.

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

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

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

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

This appears to have always been done, but I requested Mr. Connell to send in for the future facsimiles of the curves. After oiling and cleaning the friction rollers of the rain-gauge, I found by experiment that the pencil, when lightly pressing against the paper, descended to the full extent of the scale, although it did not return again to the zero-line, but this gauge is *not provided* with a Stonyhurst discharger, neither is there a glass measure for checking the amount of rain left in the receiver as against the trace.

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

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

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

| | | | | | | | | | |
|----------------|---|---|---|---|---|---|---|---|--------|
| Dry bulb, 2847 | - | - | - | - | - | - | - | - | - 0° 5 |
| Wet „ | - | - | - | - | - | - | - | - | - 0° 5 |

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

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

A new glass scale will have to be constructed for tabulating the wet trace as soon as a sufficient number of standard eye observations shall have been taken.

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

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

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

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

I had the exterior parts entirely dismantled, and found that the various bearings were all well oiled, and the instrument carefully looked after. The curve taken off the cylinder on the morning of my visit was not altogether satisfactory, but this, I think, was owing to the assistant not having clamped the clock sufficiently tight to the cylinder when starting the instrument on the previous day.

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

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

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

The sun recorder was in good order.

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

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

| | | | | | | | |
|---|---|---|---|---|---|---|------|
| Dry bulb 671 | - | - | - | - | - | - | 0·0 |
| Wet „ 672 | - | - | - | - | - | - | -0·2 |
| Barograph thermometer, K.O. 6-90 | - | - | - | - | - | - | -2·2 |
| Standard barometer, att. therm. No. 72222 | - | - | - | - | - | - | -0·1 |
| Maximum 1092 | - | - | - | - | - | - | +0·1 |
| Minimum 1322 | - | - | - | - | - | - | +0·7 |

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

| | | | | | | | |
|--------------|---|---|---|---|---|---|------|
| Minimum 1322 | - | - | - | - | - | - | +0·3 |
|--------------|---|---|---|---|---|---|------|

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

After cleaning the clock we again tested the capacity of the receiver, which was found to agree with the original value given of 0·18 inch.

Experiments were then made with the Stonyhurst discharger, when it was discovered that the float did not exert sufficient lifting power to push the pencil up to the zero-line after a discharge of 0·18 inch. We found that the position of the float in the discharger was adjusted for a fall of 0·20 inch, so that the amount of rain (0·18) passing in from the receiver did not rise to a sufficiently high level.

As a ready way of getting over the difficulty, we put a number of pebbles of suitable size into the bottom of the discharger, thereby raising the level of the water, and the float was then found to act perfectly in forcing the pencil up to the zero-line, as will be seen by the experimental paper of September 15 accompanying this report.

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

The Beckley gauge was quite level, but the spare one was a trifle out. Squeezes of both funnels were taken.

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

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

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

on testing the four principal points it registered satisfactorily, as shown on the sheet which is forwarded herewith.

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

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

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

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

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

Captain Harrison complained that the last quantity of asbestoline sent to him was of very inferior quality, and that he had experienced considerable trouble at the beginning of last winter in keeping the instrument free, as the asbestoline in the cold weather congealed and became hard. At times the cups were stationary before the sun had sufficient power to melt the oil. Captain Harrison therefore decided to free the instrument altogether from the asbestoline and use sperm oil (which he obtained from a local chemist) for the rest of the winter. He never experienced any difficulty afterwards, and is of opinion that good sperm oil is by far the best lubricant.

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

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

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

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

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

Afterwards the various thermometers were compared by means of Kew standard 682 and found to have the following corrections at 52° Faht. :—

| | | | | | | | |
|--------------|---|---|---|---|---|---|------|
| Dry bulb 619 | - | - | - | - | - | - | -0.1 |
| Wet „ 382 | - | - | - | - | - | - | -0.4 |
| Maximum 1525 | - | - | - | - | - | - | 0.0 |
| Minimum 501 | - | - | - | - | - | - | +0.2 |

I also tested the maximum and minimum thermometers fitted up in the Glaisher stand, and found the correction to be—

| | | | | | | | |
|--------------------|---------------|---|---|---|---|---|-------------------|
| For Maximum | 7310 - | - | - | - | - | - | - ^o .4 |
| " Minimum | 48587- | - | - | - | - | - | 0.0 |

The extreme temperature values supplied to the Registrar-General are derived from the readings of these latter instruments, and it is evident from this comparison that the large differences shown in April, May, and June between the extreme readings as published in the Registrar-General's report and those by the Meteorological Council are not due to instrumental errors, but rather to the different exposures.

The Glaisher stand is erected on the lawn and is fully exposed to the sun's rays for the greater part of the day, so that the effects of radiation must be very considerable, whereas the thermograph screen is fixed to the north side of the observatory, and is almost entirely protected from the sun and the readings sent to the Meteorological Office are derived from the thermometers placed in this screen.

The anemometer was dismantled and cleaned and the various bearings renewed with fresh oil. The observer was instructed to send up an orientation sheet once a month, and his attention was called to the entry of the times of changing the papers. The defect in the recording-pencils noted from time to time in marking, I think, must be due to an irregularity in the surface of the cylinder, though Father Sidgreaves rather inclines to the belief that the pencils are faulty.

After cleaning and oiling the recording parts, I put a fresh sheet on the cylinder, lowered the pencils, and slowly revolved the drum by hand through the 24 hours, this was repeated some 14 times taking care to have a fresh position at starting, and from an inspection of the experimental sheet marked A there is a general tendency of the pencil failing to mark during the midnight hours. If the records are still defective I would respectfully suggest that the cylinder and pencils be dismounted and sent to the makers, who could readily examine the cylinder in a lathe.

As regards the rain-gauge pencil failing to rise to the zero-line, this is mainly due to the fact that the discharger is nearly all to pieces. It was the first one made, and was only roughly put

together at the College. It has now been in use for over 20 years, and is practically worn out. I would therefore recommend that a new one be supplied, and also a glass measure for checking the amount of rain left in the receiver as against the trace.

Holyhead, September 28th–29th.—At the date of my visit here the weather was very stormy, a strong Westerly gale having set in with heavy rain, but fortunately Mr. Cotton had re-erected the anemometer (which had been under repair) on the previous afternoon, and the curve which came off on the morning of the 28th appeared fairly satisfactory.

Notwithstanding the high wind, I managed to examine the exterior parts of the instrument, and found that the bearings were all well oiled, but the direction-fans were working rather stiffly; this was owing to the bearings being screwed up too tightly. The interior recording parts were cleaned and the orientation was tested and found correct, and the observer instructed to make a mark with the pricker at the time of starting.

(Signed) T. W. BAKER.

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

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

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

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

Sheet showing the oriented direction-traces accompanies this report.

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

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

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

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

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

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

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

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

The zero values regularly used are:—

| | | | | | | |
|---------------------------|---|---|---|---|---|--------|
| Upper zero-line, dry bulb | - | - | - | - | - | = 82.5 |
| " " wet " | - | - | - | - | - | = 81.0 |
| Lower " dry " | - | - | - | - | - | = 16.0 |
| " " wet " | - | - | - | - | - | = 17.8 |

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

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

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

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

Note.—There is a duplicate thermograph tube stored here, but nothing else, and a spare standard thermometer similar to those at present in use would be a decided advantage in case of accidental damage.

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

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

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

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

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

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

(Signed) E. G. CONSTABLE.

C. Chree, Esq.,
Kew Observatory,
October 1893.

Submitted—The following reports of work during the month of October 1893 :—

MARINE BRANCH.

November 1, 1893.

Examined 8 new logs and 2 lighthouse registers.

For the district between the Cape of Good Hope and New Zealand tabulating the winds, and drawing wind-roses for equal spaces of 3° of latitude by 10° of longitude; arranging for the discussion of fog observations in the same areas, and obtaining generalized current results.

Preparing data in Office logs for the South Atlantic and South Pacific to longitude 90° W.

Lithographed Red Sea wind-charts for January, May, June, and July received, examined, and passed for press. Proof of the February wind chart received.

Copying into log No. 9030 the observations for the greater part of the voyages, contained in the Rough Book.

(Signed) CHAS. HARDING.

The Marine Superintendent.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

(To 31st October 1893.)

November 1, 1893.

Weekly Weather Report, 1892.—All numbers, appendices, summaries, &c. issued.

Weekly Weather Report, 1893.—All numbers issued promptly. Appendix I., Part 3, issued.

Monthly Summaries.—*January* completed; *February*, in proof.

Daily Weather Report, 1893.—All numbers issued to date, and monthly correction and addition sheet for September ready.

Primary Checking of Storm Warnings, 1893.—Done to date.

Checking of 8.30 p.m. Daily Forecasts.—Slightly in arrears. (See note below.)

Hay Harvest Forecasts, 1893.—Checking is in hand.

Rainfall Investigation.—Letters from Mr. Symons and Dr. Buchan have been received, referring to the records which are available for the lustra 1871–5 and 1876–80.

During this month some of the staff have continued taking their annual vacation (now all but finished), and owing to an accident Mr. Brodie has been unable to do any writing for about 10 days.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

November 1, 1893.

Hourly Means.—The calculation of the mean values for 1891 is still in hand.

Miscellaneous.—The testing of Dines' pressure-tube anemometer has been continued, and a good deal of time has been occupied upon experiments as to the best form of pen for it. The routine work of the room has been kept up to date.

(Signed) R. H. CURTIS.

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

EXAMINATION BRANCH.

November 1, 1893.

Examinations.

May and June, 1893.—Proceeded with.

Weekly examination (on receipt) of curves and documents from all observatories.

Miscellaneous.

Diurnal Range of Rainfall, 1871–90.—Examination and correction of the hourly values, &c. proceeded with.

General routine work

(Signed) T. E. ALLEN.

Submitted—The following memoranda :—

MATERIALS for preparing ESTIMATES for 1894-95.

| | Actual Expenditure 1892-93. | Estimated Expenditure 1894-95. | Proposed for 1894-95. | Voted for 1893-94. |
|---|-----------------------------------|--------------------------------------|-----------------------------|--------------------------|
| Administration : | £ | £ | £ | £ |
| (1.) Council - - - - - | 994 | 994 | 1,000 | 1,000 |
| (2.) Secretary - - - - - | 800 | 800 | 800 | 800 |
| (3.) Salaries : | | | | |
| Chief Clerk - - - - - | 333 | | | |
| 2 Junior Clerks - - - - - | 211 | | | |
| 2 unclassified clerks - - - - - | 83 | | | |
| Office Keeper - - - - - | 101 | | | |
| Messenger - - - - - | 65 | | | |
| | 793 | | | |
| Deduct for estimated reduction or increments of salaries - - - - - | 13 | 780 | 780 | 800 |
| (4.) Rent, fuel, and lighting : | | | | |
| Rent - - - - - | 635 | | | |
| Fuel - - - - - | 68 | | | |
| Gas - - - - - | 28 | | | |
| | 731 | 731 | 710 | 710 |
| (5.) Incidental and contingent expenses : | | | | |
| Office Keeper's contingent account, including porter's allowance for cleaning, &c. - - - - - | 190 | | | |
| Postage - - - - - | 57 | | | |
| Furniture and Office repairs - - - - - | 141 | | | |
| Carriage of parcels, &c. - - - - - | 16 | | | |
| Books and printing - - - - - | 54 | | | |
| Extra Commissionaires - - - - - | 27 | | | |
| Sundries - - - - - | 34 | | | |
| | 519 | | | |
| Deduct repayments under this head, including Commission - - - - - | 26 | 493 | 470 | 450 |
| (6.) Pensions : | | | | |
| Capt. H. Toynbee - - - - - | 144 | | | |
| Mr. J. S. Harding, senr. - - - - - | 43 | | | |
| | 187 | 187 | 190 | 190 |
| Special Researches and Experiments : | | | | |
| (1.) Salaries : | | | | |
| 1 Junior Clerk - - - - - | 150 | | | |
| Female staff - - - - - | 274 | | | |
| Add for estimated addition to or increments of salaries - | 32 | | | |
| Transfer from head <i>Land Meteorology</i> - - - - - | 250 | 706 | | |
| (2.) Other charges : | | | | |
| Bridled anemometer (Holyhead) - - - - - | 11 | | | |
| Actinometer observations - - - - - | 3 | | | |
| Dines's anemometer experiments - - - - - | 44 | | | |
| Calculation of hourly means - - - - - | 127 | | | |
| Sundries - - - - - | 20 | 205 | 1,000 | 1,000 |
| Carried forward - - - - - | - | 4,896 | 4,050 | 4,950 |

| | Actual Expenditure 1892-93. | Estimated Expenditure 1894-95. | Proposed for 1894-95. | Voted for 1893-94. |
|---|-----------------------------------|--------------------------------------|-----------------------------|--------------------------|
| Brought forward | - | £ 4,896 | £ 4,950 | £ 4,950 |
| <i>Land Meteorology :</i> | | | | |
| (1.) Observatories and stations : | | | | |
| Aberdeen (allowance 275 <i>l.</i>) | 278 | | | |
| Armagh (" 50 <i>l.</i>) | 51 | | | |
| Ben Nevis (" 100 <i>l.</i>) | 100 | | | |
| Falmouth (" 250 <i>l.</i>) | 254 | | | |
| Fort William (" 250 <i>l.</i>) | 256 | | | |
| Glasgow (" 75 <i>l.</i>) | 83 | | | |
| Kew (" 400 <i>l.</i>) | 407 | | | |
| Stonyhurst (" 56 <i>l.</i>) | 59 | | | |
| Valencia (including alterations at Westwood House) | 930 | | | |
| Anemograph stations | 71 | | | |
| Meteorological Societies (Observations 2nd Order) | 175 | | | |
| Instruments and sunshine cards | 65 | | | |
| Sundries, forms, &c. | 8 | | | |
| | 2,737 | | | |
| | £ | | | |
| Deduct expenses due to removal to Westwood House | 400 | | | |
| " for grazing receipts, sale of forms, &c. (say) | 30 | 430 | | |
| | | 2,307 | 2,300 | 2,240 |
| (2.) Salaries :—Discussion and reduction of observations : | | | | |
| 2 Senior Clerks | 520 | | | |
| 7 Junior Clerks | 832 | | | |
| 4 Unclassified Clerks | 173 | | | |
| | 1,525 | | | |
| Transfer to head of <i>Special Researches</i> | 250 | | | |
| | 1,275 | | | |
| Estimated addition to or increments of salaries | 29 | 1,304 | 1,300 | 1,260 |
| <i>Weather Information and Forecasts</i> | | | | |
| (1.) Telegraphic reports and storm warnings :— | | | | |
| Reports from inland stations | 602 | | | |
| Reports from abroad | 138 | | | |
| Reports sent abroad | 382 | | | |
| Storm warnings | 249 | | | |
| Hay harvest forecasts | 35 | | | |
| Private wires | 75 | | | |
| Payments to reporters, &c. (allowances and expenses) | 708 | | | |
| Sundry telegrams, forecasts, &c. | 22 | | | |
| Postage of reports and forecasts | 249 | | | |
| Instruments, &c. | 49 | | | |
| Wrappers, printing, &c. | 35 | | | |
| Weekly Reports | 49 | | | |
| Sundries | 24 | | | |
| | 2,617 | | | |
| Deduct :— | | | | |
| Repayments during the same period, including 26 <i>l.</i> for instruments | 625 | 1,992 | 2,000 | 2,000 |
| Carried forward | - | 10,499 | 10,550 | 10,450 |

| | Actual Expenditure 1892-93. | Estimated Expenditure 1894-95. | Proposed for 1894-95. | Voted for 1893-94. |
|---|-----------------------------------|--------------------------------------|-----------------------------|--------------------------|
| | £ | £ | £ | £ |
| Brought forward - - - - - | - | 10,499 | 10,550 | 10,450 |
| (2.) Salaries :—Preparation and issue of reports and forecasts. | | | | |
| 1 Senior Clerk (9 hours daily) - - - - - | 309 | | | |
| 7 Junior Clerks (5 work 9 hours daily) - - - - - | 1,148 | | | |
| 2 Unclassified Clerks - - - - - | 98 | | | |
| 1 Messenger - - - - - | 65 | | | |
| Addition for late evening and Sunday attendance - - - - - | 210 | | | |
| | 1,830 | | | |
| Add for estimated addition to or increments of salaries | 22 | 1,852 | 1,850 | 1,840 |
| <i>Inspections :</i> | | | | |
| Mr. Baker - - - - - | 3 | | | |
| „ Buchan, salary and expenses - - - - - | 200 | | | |
| „ Curtis - - - - - | 1 | | | |
| „ Ley, salary and expenses - - - - - | 187 | | | |
| Royal Meteorological Society - - - - - | 25 | | | |
| Mr. Scott - - - - - | 71 | | | |
| | 487 | 487 | 530 | 550 |
| <i>Ocean Meteorology :</i> | | | | |
| (1.) Salaries :—Discussion and reduction of observations :— | | | | |
| Marine Superintendent - - - - - | 400 | | | |
| 1 Senior Clerk (in charge of instruments) - - - - - | 333 | | | |
| 1 „ „ („ Marine Rooms) - - - - - | 275 | | | |
| 5 Junior Clerks - - - - - | 752 | | | |
| 2 Unclassified Clerks - - - - - | 96 | | | |
| | 1,856 | | | |
| Deduct proportion chargeable to care and issue of instruments (say) - - - - - | 200 | | | |
| | 1,656 | | | |
| Deduct for estimated reduction or increments of salaries - - - - - | 47 | 1,609 | 1,600 | 1,650 |
| (2.) Salaries :—Proportion chargeable to care and issue of instruments - - - - - | - | 200 | 200 | 200 |
| (3.) Supply of instruments to the Royal Navy : | | | | |
| Instruments, repairs, &c. - - - - - | 285 | | | |
| Verifications - - - - - | 30 | | | |
| Packing cases - - - - - | 14 | | | |
| | 329 | | | |
| Deduct repayments under this head - - - - - | 15 | | | |
| | 314 | (a) 271 | 350 | 400 |
| (4.) Supply of instruments, &c. to Mercantile Marine : | | | | |
| Instruments, repairs, &c. - - - - - | 114 | | | |
| Verifications - - - - - | 20 | | | |
| Agents' fees, &c. - - - - - | 101 | | | |
| Presentation labels - - - - - | 4 | | | |
| Sundries - - - - - | 30 | | | |
| | 269 | | | |
| Deduct repayments under this head - - - - - | 19 | | | |
| | 250 | (a) 217 | 200 | 190 |
| (a) The estimated expenditure under sub-heads (3) and (4) is taken as the approximate mean net expenditure of two years ending 31st March 1893. | | | | |
| (5.) Distant island or coast stations - - - - - | 22 | 20 | 20 | 20 |
| The payments under this head are irregular. | | | | |
| Totals - - - - - | £ - | 15,155 | 15,300 | 15,300 |

SYNOPSIS of OFFICE SALARIES AND PENSIONS (estimated Expenditure).

| Service. | 1894-95. | 1893-94. | 1894-95. | |
|-------------------------------|----------|----------|-----------|-----------|
| | | | Increase. | Decrease. |
| | £ | £ | £ | £ |
| Administration - - - - - | 1,580 | 1,602 | — | 22 |
| Special Researches - - - - - | 706 | 691 | 15 | — |
| Land Meteorology - - - - - | 1,304 | 1,271 | 33 | — |
| Weather Information - - - - - | 1,852 | 1,845 | 7 | — |
| Ocean Meteorology - - - - - | 1,809 | 1,878 | — | 69 |
| Pensions - - - - - | 187 | 187 | — | — |
| Totals - - - - - | £ 7,438 | 7,474 | 55 | 91 |

METEOROLOGICAL OFFICE. ESTIMATES for the Year 1894-95.

| Heads of Service. | Proposed for 1894-95. | | Voted for 1893-94. | | 1894-95. | |
|---|-----------------------|--------|--------------------|--------|-----------|-----------|
| | | | | | Increase. | Decrease. |
| | £ | £ | £ | £ | £ | £ |
| <i>Administration :</i> | | | | | | |
| Payment of Council - - - - - | 1,000 | - | 1,000 | | | |
| Secretary - - - - - | 800 | - | 800 | | | |
| Salaries and wages - - - - - | 780 | - | 800 | | | |
| Rent, fuel, and lighting - - - - - | 710 | - | 710 | | | |
| Incidental and contingent expenses - - - - - | 470 | - | 450 | | | |
| Pensions - - - - - | 190 | - | 190 | | | |
| | | 3,950 | | 3,950 | — | — |
| <i>Special Researches and Experiments :</i> | | | | | | |
| Salaries - - - - - | 700 | - | 690 | | | |
| Other charges - - - - - | 300 | - | 310 | | | |
| | | 1,000 | - | 1,000 | — | — |
| <i>Land Meteorology :</i> | | | | | | |
| Observatories and stations - - - - - | 2,300 | - | 2,240 | | | |
| Salaries :—Discussion and reduction of observations - - - - - | 1,300 | - | 1,260 | | | |
| | | 3,600 | | 3,500 | 100 | — |
| <i>Weather Information and Forecasts :</i> | | | | | | |
| Telegraphic reports and storm warnings - - - - - | 2,000 | - | 2,000 | | | |
| Salaries :—Preparation and issue of reports and forecasts - - - - - | 1,850 | - | 1,840 | | | |
| | | 3,850 | | 3,840 | 10 | — |
| <i>Inspections :</i> | | | | | | |
| Salaries and travelling expenses - - - - - | - | 530 | - | 550 | — | 20 |
| <i>Ocean Meteorology :</i> | | | | | | |
| Salaries :—Discussion and reduction of observations - - - - - | 1,600 | - | 1,650 | | | |
| Expenses incidental to the supply of instruments : | | | | | | |
| Care and issue of instruments - - - - - | 200 | - | 200 | | | |
| Royal Navy - - - - - | 350 | - | 400 | | | |
| Mercantile Marine - - - - - | 200 | - | 190 | | | |
| Distant island (and coast) stations - - - - - | 20 | - | 20 | | | |
| | | 2,370 | | 2,460 | — | 90 |
| Totals - - - - - | £ - | 15,300 | - | 15,300 | 110 | 110 |

The estimates were approved, and the Secretary was instructed to forward a copy to the Treasury (P.C. 2092).

Submitted—A memorandum (M. O. 2009) by Mr. R. Curtis on the action of Dines' pressure anemometer on the roof of the Office. Mr. Scott was instructed to forward the report to Mr. Dines for any criticism he might be disposed to make on it.

Submitted—The following summary as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

1. WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|---------------|
| A + B (successful) | - | - | - | = | 14 districts. |
| C (failures) | - | - | - | = | 11 „ |

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED

None.

(Signed) FREDC. GASTER.

Telegraphic Branch,
November 1, 1893.

Note.—Of the 11 failures 3 resulted from a faulty telegram from Scilly.

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|---|-------|----|----|
| Cash balance on 17th October | - | - | - |
| Receipts from 18th to 31st October | - | - | - |
| | 5,234 | 7 | 0 |
| | 19 | 2 | 5 |
| | 5,253 | 9 | 5 |
| Cheques drawn from 18th to 31st October | - | - | - |
| | 1,217 | 1 | 2 |
| | 4,036 | 8 | 3 |
| Balance on 31st October | - | - | - |

Submitted—The following list of publications which had been received since the last meeting :—

Calcutta Meteorological Office.—Rainfall of India. 1892.

Hong Kong Observatory.—Observations and researches. 1892.

Macfarlane, A.—On rainmaking.

Strachey, R.—Harmonic analysis of hourly observations of air temperature and pressure at British Observatories. Part i.—Temperature.

Frankfurt am Main, Physikalischer Verein.—Jahresbericht. 1891–92.

Berlin, Königlich Preussisches Meteorologisches Institut.—Ergebnisse der Beobachtungen an den Stationen II. und III. Ordnung im Jahre 1893.

Pietkiewicz, A.—Słowo o krzywej wyrównanych temperatur dziennych Warszawy przez Bolesława Danielewicza.

— Jednoczesny stan pogody oraz jej zmiany na pewnej przestrzeni.

63, *Victoria Street*, November 15, 1893.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.

PROFESSOR DARWIN.

MR. GALTON.

MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

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

Mr. Scott reported—That on the 7th inst. he had had a visit from Mr. Yerburch of the Exchequer and Audit Department (Letter 2046), and that an examiner from that Department had attended at the Office on three days examining into the classification of the accounts.

Reported—That in accordance with the memorandum by Mr. Gaster (Minutes, p. 27), letters (P.C. 1466 and 1518) had been written to Dr. Buchan and Mr. Symons respectively, in the month of July, requesting the supply of data for rainfall for the ten years, 1881–90, for 138 stations in Scotland, and for 303 in England, Wales, and Ireland.

Mr. Symons' reply had been received (M.O. 2059) with returns from 297 stations, the total cost of which would be 222*l.* 15*s.* 0*d.*

Both gentlemen had been further requested to state for how many of their stations, not appearing in the previous publication of the Office for the interval 1866–80, they could supply data for either ten or five years immediately prior to 1881.

In answer replies (M.O. 1838 and 2011) had been received, as described in the subjoined memorandum :—

RAINFALL INVESTIGATION.

(Material available for the Decade 1871–80.)

MEMORANDUM.

1. *Mr. Symons* reports that of the stations in *England, Wales, and Ireland*, for which he is supplying the data for the ten years 1881–90, and which were not included in the previous (1883) publication of the Meteorological Office, he has information available for the ten years prior to 1881.

| | Stations. |
|--|-----------|
| Records going back for 5 years (1876–80) - - - | = 115 |
| Of these those going back for 10 years (1871–75) - - - | = 52 |
| Total number of station-lustra - - - | 167 |

The cost of supplying these at 7*s.* 6*d.* per station-lustrum - £62 12*s.* 6*d.*

2. *Dr. Buchan* reports that, similarly, he can supply data, as follows, for stations in Scotland, but not previously appearing :—

| | |
|--|------|
| Records going back for 5 years (1876–80) - - - | = 81 |
| Of these „ „ 10 „ (1871–75) - - - | = 69 |
| Total - - - | 150 |

To these must be added—

| | |
|---|-----|
| Probable number of lustra for stations for which <i>Dr. Buchan</i> has not yet forwarded the required information - - - | 20 |
| Total number of station-lustra (say) - - - | 170 |

The cost of supplying these data is estimated at 2*s.* 6*d.* per station-lustrum, and would be £21 5*s.* 0*d.*

Dr. Buchan submits, in addition, a statement as to the information he can supply for the above stations for years prior to 1871, and for other stations having long series of observations, the records for which had mostly ceased before 1890.

Mr. Symons has not yet been asked to supply a statement of that kind.

Mr. Scott was instructed to prepare by next meeting a map showing all the stations referred to in the above memorandum which were available for the ten years 1871–80,

and also for those in Ireland which were available for the five years 1876–80. Mr. Scott was also instructed to prepare an estimate of the approximate cost of clerical work entailed by the preparation of the projected publication.

Read—A letter (No. 2012) from the Rev. M. Dechevrens, S.J., stating that his Society proposed to establish a magnetical and meteorological observatory in Jersey, and requesting assistance.

Mr. Scott was instructed to ask M. Dechevrens (P.C. 2232) if he would be prepared to undertake the management of self-recording meteorological instruments similar to those at the observatories in connexion with the Office, if lent to him by the Council. English units (inches and Fahrenheit) to be used.

Read—A memorandum (Letter 556) from Mr. Baillie, requesting permission to obtain from Dr. Neumayer additional current observations from the Pacific for the sum of 20*l*. (Minutes, 1892, p. 75).—Authorised.

Reported (Minutes, p. 55)—That Mr. Dines had made no criticisms of Mr. R. Curtis' Memorandum, and this was ordered to be printed.

DINES' PRESSURE-TUBE ANEMOMETER.

MEMORANDUM No. 3.

October 31st, 1893.

In my last report on the working of this instrument (June 28th) I called attention to a displacement of the zero, caused by the action of temperature upon the air enclosed in the float. This has been remedied by connecting the sealed float with the external air, by means of two small tubes leading into a larger tube, substituted for the solid rod which had previously carried the pen.

The form of pen originally supplied with the instrument has been discarded for a steel crow-quill with which very satisfactory traces have been obtained. I first had the pen fitted to a holder which was kept up to the paper by a weak spiral spring; more recently I have contrived another form of holder in which the pen swings from a horizontal arm, and is kept to the paper by means of a counterpoise. As yet I am not quite certain which is the better of the two methods, and they are still being tested.

The instrument was last returned from Munro's on August 14th, and since that date it has been in continuous action.

The records for August and September have been compared with those of the Kew anemometer, first correcting the latter to bring them to *true* velocities (factor 2). Arranging the observations according to direction, under eight points, the Dines instrument gives a somewhat lower velocity generally than the Kew instrument; but the effect of the neighbouring houses in sheltering the Office roof is most marked with easterly winds, the higher houses in that direction being close at hand.

| Direction of Wind. | Per-centage. M.O.I. \pm Kew. | Direction of Wind. | Per-centage. M.O.I. \pm Kew. |
|--------------------|-----------------------------------|--------------------|-----------------------------------|
| N. | 90 | S. | 89 |
| N.E. | 72 | S.W. | 90 |
| E. | 66 | W. | 86 |
| S.E. | 86 | N.W. | 88 |

The observations from S. and S.W. were also grouped according to velocity to see if the difference between the records of the two instruments depended upon the force of the wind, but the observations of strong winds are not sufficiently numerous as yet to give a reliable result.

Bearing in mind the distance of Kew Observatory from Westminster, and the more open situation of the former, I think the agreement between the two records a very close one, especially when it is remembered that the tabulations of the Office curves are only *estimated* means of the oscillations recorded by the pen, and are therefore only approximately correct,—they were certainly not *over* estimated.

Together with the recording form of the instrument I have been testing two other forms, (1) the tube described by Mr. Dines in the Quarterly Journal of the Royal Meteorological Society, vol. xix., No. 85, and (2) a newer form of the instrument in which only the maximum is recorded.

The agreement between all three is remarkably close, and the last appears to be a very promising instrument, as it could be made for a small cost.

R. H. CURTIS.

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

Read—Letter 1905 from Mr. Chree as to repairs required at Kew to the self-recording apparatus, and a memorandum by Mr. Munro thereon.

Mr. Scott was instructed to have the repairs carried out, and to write to Mr. Chree accordingly (P.C. 2172).

Submitted—The following report on the 8.30 p.m. forecasts for October 1893 :—

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 1893.

| DISTRICTS. | | Per-centages. | | | Per-centage of Success. a + b. |
|------------------|---|---------------|----------|----------------------|--------------------------------------|
| | | Wind. | Weather. | Average Forecast. | |
| SCOTLAND, N. | a | 45 | 58 | 52 | 82 |
| " | b | 29 | 32 | 30 | |
| " | c | 13 | 7 | 10 | |
| " | d | 13 | 3 | 8 | |
| SCOTLAND, E. | a | 39 | 52 | 46 | 75 |
| " | b | 23 | 35 | 29 | |
| " | c | 29 | 10 | 19 | |
| " | d | 9 | 3 | 6 | |
| ENGLAND, N.E. | a | 61 | 36 | 49 | 86 |
| " | b | 19 | 55 | 37 | |
| " | c | 10 | 6 | 8 | |
| " | d | 10 | 3 | 6 | |
| ENGLAND, E. | a | 52 | 65 | 59 | 91 |
| " | b | 35 | 29 | 32 | |
| " | c | 13 | 3 | 8 | |
| " | d | 0 | 3 | 1 | |
| MIDLAND COUNTIES | a | 36 | 68 | 52 | 78 |
| " | b | 32 | 19 | 26 | |
| " | c | 19 | 10 | 14 | |
| " | d | 13 | 3 | 8 | |
| ENGLAND, S. | a | 49 | 68 | 59 | 86 |
| " | b | 35 | 19 | 27 | |
| " | c | 13 | 10 | 11 | |
| " | d | 3 | 3 | 3 | |
| SCOTLAND, W. | a | 49 | 68 | 59 | 75 |
| " | b | 19 | 13 | 16 | |
| " | c | 16 | 6 | 11 | |
| " | d | 16 | 13 | 14 | |
| ENGLAND, N.W. | a | 45 | 61 | 53 | 77 |
| " | b | 32 | 16 | 24 | |
| " | c | 16 | 16 | 16 | |
| " | d | 7 | 7 | 7 | |
| ENGLAND, S.W. | a | 35 | 61 | 48 | 76 |
| " | b | 29 | 26 | 28 | |
| " | c | 23 | 10 | 16 | |
| " | d | 13 | 3 | 8 | |
| IRELAND, N. | a | 32 | 58 | 45 | 77 |
| " | b | 32 | 32 | 32 | |
| " | c | 23 | 3 | 13 | |
| " | d | 13 | 7 | 10 | |
| IRELAND, S. | a | 39 | 55 | 47 | 75 |
| " | b | 23 | 32 | 28 | |
| " | c | 22 | 7 | 14 | |
| " | d | 16 | 6 | 11 | |
| SUMMARY. | | | | | |
| BRITISH ISLES | a | 44 | 59 | 52 | 80 |
| " | b | 28 | 28 | 28 | |
| " | c | 18 | 8 | 13 | |
| " | d | 10 | 5 | 7 | |

Read—A memorandum from Mr. Baillie stating that since the meeting in October 10 logs had been received, 6 of them being “excellent.”

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

Submitted the following memorandum :—

The stock of Aneroids is exhausted, except about a dozen “portable” in sling cases, which have to be kept here and only issued on special directions from the Admiralty. Requisitions are to hand for 32, and 12 are ordered from the makers. The sanction of the Council is requested for the purchase of 25 at a cost of 60*l*.

R. STRACHAN.

November 15th, 1893.

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

The order for 25 Aneroids was sanctioned.

Mr. Scott was instructed to submit at next meeting a list of Admiralty instruments in stock, for issue, and a return of all demands made from Home Dockyards since January 1, 1893, and of the date at, and extent to which each had been met.

Mr. Scott reported (Minutes, 1892, p. 49) that a set of instruments had been sent to Rarotonga (Cook's Islands), May 27, 1893, and that a letter (No. 1991) had been received, announcing their safe arrival.

Submitted—The following as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

1. WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|-----------------|
| A + B (successful) | - | - | - | - | = 19 districts. |
| C (failures) | - | - | - | - | = 9 „ |

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

One in the extreme north of Scotland (very local) on the nights of November 4th and 5th.*

(Signed) FREDC. GASTER.

Telegraphic Branch.
15th November, 1893.

Submitted the following statement of accounts :—

| | £ | s. | d. |
|---|-------|----|----|
| Cash balance on 31st October | - | - | - |
| Receipts from 1st to 14th November- | - | - | - |
| | 4,036 | 8 | 3 |
| | 9 | 3 | 2 |
| | 4,045 | 11 | 5 |
| Cheques drawn from 1st to 14th November - | - | - | - |
| | 32 | 2 | 0 |
| Balance on 14th November | - | - | - |
| | 4,013 | 9 | 5 |

Submitted—The following list of publications which had been received since the last meeting :—

Mauritius, Royal Alfred Observatory.—Meteorological observations taken during the year 1892.

Barber, C. A.—Rainfall returns, 1892—Dominica and Montserrat.

London, Admiralty.—Admiralty manual for the deviations of the compass. Sixth edition.

Eberswalde, Hauptstation des forstlichen Versuchswesen in Preussen.—Jahresbericht. xviii. Jahrg. 1892.

Clements, H.—Clements' weather calendar for 1894, containing forecast of the weather for every day in the year.

* A careful examination of the information available at 6 p.m. on the 4th shows that there was at that time no clear indication of the advance of this gale.

63, Victoria Street, November 29, 1893.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.

PROFESSOR DARWIN.

THE HYDROGRAPHER.

MR. GALTON.

MR. STONE.

The Secretary was in attendance.

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

Read—Letter 2099 from the Exchequer and Audit Office (Minutes, p. 58), containing some slight suggestions in the classification of the Office accounts.

Mr. Scott was instructed to have these suggestions carried out.

The memorandum on the proposed Rain Tables, appearing on the Minutes of last meeting (p. 58), was considered, and the Chairman was requested to prepare a plan of publication of the results.

Mr. Scott submitted (Letter 2002) a memorandum, as directed at last meeting, as to the supply of instruments to the different dockyards during the current year. The Chairman was requested to look into this return, as well as that submitted February 22nd, 1893 (Minutes, 1892, p. 79).

It was resolved to order on the Admiralty account—

| | | £ | s. | d. |
|-------------------------------|---|-----|----|----|
| 25 barometers, estimated cost | - | 106 | 0 | 0 |
| 40 aneroids „ | - | 96 | 0 | 0 |

Mr. Scott reported that having learnt from the Chairman that Mr. Preece had had the electrical anemometer (Minutes, 1892, p. 1) for some time in action on the General Post Office, and wished to have it inspected, he had directed Mr. R. Curtis to visit the Post Office for that purpose, and submitted the following report :—

(M.O. 2181.)

SIR,

24th November 1893.

I HAVE to report that, in accordance with your instructions, I went on the 15th inst. to the office of the Engineer-in-Chief at the General Post Office, and inspected the electrical anemometer now erected there.

Since the return of the instrument to the Post Office from the Kew Observatory in 1890, an important alteration has been made in the electrical arrangements for turning the *direction* pencil. Formerly this pencil was moved directly from the vane, that is to say, the motion of the vane closed the circuit and allowed the current to pass directly to one or other of the two pairs of magnets by which the pencil was turned. With this plan it occasionally happened (as I mentioned in my report, M.O. 799/90) that a tooth of the cogwheel was missed, mainly owing, no doubt, to the weight of the pencil to be turned and the time required to turn it. As now arranged this work is done in a somewhat different manner. The contact caused by the motion of the vane first moves a small hand in a corresponding direction round a dial, and this, in its turn, allows the current to pass to the magnets by which the pencil is turned.

The pencil turns more slowly than before, but there is no danger of a slip, and Mr. Kempe assured me that, as a matter of fact, it had not slipped a single tooth during the whole time it has been at work in its present position. I tried how long it took to move the pencil for a change in the wind of eight points, and found it to be about 10 seconds.

An important consequence of this alteration is the much smaller battery power required to work the instrument. Mr. Kempe showed me that eight ordinary Leclanché cells were more than enough for the purpose, and he told me the battery I saw had been at work for more than 12 months, during which time it had not required any renewing, and had remained absolutely untouched.

The apparatus for working the *velocity* pencil has not been altered, but no difficulty was ever experienced with this part of the instrument, and when it was at Kew, and also when it was erected on the roof of the observatory at Valencia, the velocity trace generally agreed very closely with the record of the Standard instrument. Both the vane and the cups are, however, *heavier* than those now made, and with light winds the instrument would necessarily be a little less sensitive in picking up changes in direction or velocity than one of modern make. That, however,

is a mechanical defect, and, of course, has nothing whatever to do with the method of registration employed.

The external portion of the instrument appeared unchanged from what it was when at Kew; the arrow head has, however, been knocked off from the vane, and if this is to be put right, it would be advisable at the same time to remove the error of about two points which I found the vane had when at Kew, as compared with the instrument running there.

I am, &c.

(Signed) R. H. CURTIS.

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

ELECTRICAL ANEMOGRAPH.

The general arrangement of the electrical anemograph is shown by a sketch (not reproduced).

A toothed wheel is actuated by means of two propellers, which are worked by two electro-magnets. One of these electro-magnets receives impulses from the transmitting apparatus connected to the fans when the wind veers in one direction, and the other electro-magnet receives similar impulses when the wind veers in the other direction; the one propeller turning the wheel in the one direction and the other propeller turning it in the opposite direction.

So far the apparatus works as it was originally constructed, but in the original arrangement the wheel was, through its axle, geared directly on to the recording drum. But owing to the friction which occurred between this drum and the surface of the paper on which it made the records, very considerable battery power was required to drive the drum, and under these conditions there was (owing to the inertia of the drum) often a liability, when the wind shifted quickly and electrical impulses consequently followed quickly, for the propellers to fail to actuate the wheel; this resulted in the records being incorrectly made. By the arrangement now introduced this difficulty has been completely got over, and the apparatus, which originally required from 30 to 40 battery cells to work it (and that imperfectly), now works without failure with eight cells only.

The way in which the causes of failure have been overcome is as follows:—

The wheel instead of being geared direct on to the drum, works quite independently of it and its movements are quite unhampered, its sole function being to move a small hand which is provided with a platinum contact, which presses lightly against the surface of an ebonite wheel. This wheel has a metal disc fixed to its surface; this disc is divided into two halves, insulated from each other. One of these halves is connected (by a rubbing contact) with one end of the coils of an electro-magnet, the other half is connected similarly with a second electro-magnet; the other end of the coils of these magnets are connected together and with one pole of a battery, the other pole of which is connected with a contact piece consisting of a metallic plate with small ebonite insulating pieces inserted on it. A light metal wheel connected to the pendulum of the clock driving the recording drum moves backwards and forwards over the contact piece as the pendulum oscillates. The result of this arrangement is that if the hand has its platinum contact point resting upon one half of the metal disc, then the movement of the wheel on the contact piece causes a series of impulses to pass through the corresponding electro-magnet, and actuates the propeller which works a wheel round, and through the medium of a pinion attached to it actuates the drum, working it round in the same direction until the platinum contact of the hand comes on the insulating strip of the ebonite wheel; the circuit being thus broken, the electro-magnet ceases to act. If the hand had been on the opposite half of the disc, then the other electro-magnet would have received the impulses, and the wheel would have been worked round in the reverse direction. Thus whatever position the hand takes up, the recording cylinder will gradually be worked round to the corresponding position.

As the recording drum is actuated through the medium of a small pinion, a comparatively small power is sufficient to overcome the friction which prevents it from turning easily; hence a small battery power only is required to actuate the wheel and the drum, and as the contacts are made and broken at the contact piece two or three times at each oscillation of the pendulum, the wheel is worked to the position of the hand in a few seconds.

The general principle of the arrangement, it will be seen, is that of making the transmitting arrangement set the light hand in position, then throwing upon independent mechanism the heavier work of bringing the recording drum into the corresponding position.

It may be pointed out that in the whole apparatus as arranged one battery is used for the purpose of working the four electro-magnets used, and also the velocity magnet.

The transmitting apparatus attached to the direction fans and velocity cups has practically undergone but little alteration, though one or two changes have been made in matters of detail which have considerably improved the working from a mechanical point of view, so that any liability to get out of order has been considerably diminished.

(Signed) H. R. KEMPE.

December 2nd, 1893.

Read—A letter (No. 2160) from MM. Richard Frères, inquiring if the Office was disposed to purchase, at the price of 42*l.*, one of their anemocinematographs at present lying at Kew Observatory.

Mr. Scott was instructed to reply that the Council had no need of the instrument (P.C. 2299).

Mr. Scott reported that the Meteorological Conference of Munich, 1891, had recommended the institution of regular observations of the motion and velocity of cirrus clouds, at about a score of stations distributed over the earth, for the space of 12 months, to be commenced at a date to be hereafter fixed. He stated that he had recently received a letter (No. 2119) from Professor H. Wild of St. Petersburg, inquiring if the Council was willing to organise such observations in England.

Mr. Scott was instructed to reply (P.C. 2320) that the Council regretted that they did not see their way at present to the institution of such a system of observation.

Read—Letter 2173 from the Rev. M. Dechevrens, S.J., accepting the proposal of the Council (Minutes, p. 59) if the conditions thereto attached were not too onerous.

Mr. Scott was instructed to reply (P.C. 2295), inviting M. Dechevrens to come to London and discuss the subject before coming to a final conclusion.

Read—A memorandum from Mr. Baillie stating that since last meeting eight logs had been received, four of them being “excellent,” and recommending that charts (O. 92) be presented to Captain Pentin and to Mr. Coulton Elliott, of the SS. “Wilcannia.”

Mr. Scott was instructed to present the charts as suggested, and to convey the best thanks of the Council to the other observers.

Reported—That nine copies of the Indian Daily Weather Charts for the month of February had been received from the India Office, making 10 in all (Minutes, p. 33). Of these one had been supplied to the Hydrographic Office and one to the Scottish Meteorological Society.

Submitted—The following as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

1. WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|-----------------|
| A + B (successful) | - | - | - | - | = 44 districts. |
| C (failures) | - | - | - | - | = 11 districts. |

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

(Signed) FREDC. GASTER.

Telegraphic Branch,
November 29, 1893.

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|--|-------|----|----|
| Cash balance on 14th November | 4,013 | 9 | 5 |
| Receipts from 15th to 28th November | 4 | 14 | 11 |
| | 4,018 | 4 | 4 |
| Cheques drawn from 15th to 28th November | 89 | 0 | 5 |
| Balance on 28th November | 3,929 | 3 | 11 |

Submitted—The following list of publications which had been received since the last meeting :—

Rotch, A. L.—Meteorology at the Paris Exposition.

Bombay, Government Observatory.—Report on the condition and proceedings of the Government Observatory, Colába, for the year which ended with the 30th June 1893.

Kiel, Ministerial-Kommission zur Untersuchung der deutschen Meere, in Kiel.—Ergebnisse der Beobachtungsstationen an den deutschen Küsten über die physikalischen Eigenschaften der Ostsee und Nordsee und die Fischerei. Jahrg. 1892.

— Sechster Bericht der Kommission zur wissenschaftlichen Untersuchung der deutschen Meere, in Kiel, für die Jahre 1887 bis 1891.

Scott, R. H.—Fifteen years' fogs in the British Islands, 1876–1890.

Gaster, F.—Suggestions, from a practical point of view, for a new classification of cloud forms.

Kammermann, A.—Résumé météorologique de l'année 1892, pour Genève et le Grand Saint Bernard.

Grablovitz, G.—Sulle osservazioni mareografiche in Italia e specialmente su quelle fatte ad Ischia.

Calvori, P.—Andamento della pioggia in Pesaro nel ventennio 1871–90 con altri dati meteorologici dedotti dal settennio d'osservazioni 1876–82.

Utrecht, Koninklijk Nederlandsch Meteorologische Instituut.—Onweders in Nederland. Deel xiii. 1892.

— — — Nederlandsch meteorologisch Jaarboek voor 1892.

63, Victoria Street, December 13, 1893.

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 29) were read and confirmed.

Read—Letter 2256 from the Hydrographer stating that the stock of instruments to be kept at the several home dockyards should be increased to the extent of—

| | | | | | |
|------------|---|----|------------------------------|---|-----|
| Barometers | - | 13 | Thermometers, ordinary | - | 324 |
| Aneroids | - | 60 | Do. max. and min. (in pairs) | - | 104 |
| Screens | - | 64 | Hydrometers | - | 2 |

The Chairman reported that he had examined into the office accounts and registers of the “A” instruments, and had directed that a monthly list of such instruments, actually in the office, and available for issue, be submitted.

It was resolved to order on the “A” account—

| | | | £ | s. | d. |
|----------------------------|---|----------------|---|----|------|
| Ordinary thermometers, 200 | - | Estimated cost | - | 69 | 10 0 |
| Max. and min. „ 50 pairs | - | „ „ | - | 65 | 0 0 |
| Screens - 20 | - | „ „ | - | 10 | 10 0 |

The Chairman reported that as requested at last meeting (Minutes, p. 62) he had examined the list of proposed rain stations for England, Wales, and Ireland, and had directed Mr. Gaster to prepare a tabular Report of the result of this examination (M.O. 2302), which was approved.

The Chairman further said that no returns from Scotland had as yet arrived, and that he hoped, as soon as he should have had an opportunity of examining these, to be able to submit a definite scheme for the publication.

With reference to the electrical anemometer (Minutes, p. 62), Mr. Scott was instructed to request the Kew Committee to arrange for a trial of the instrument at Kew, and to inform the office of the probable cost of its erection (P.C.).

Read—Letter 2247 from Glasgow observatory reporting a change in the position of the recording portion of the anemometer (Minutes, p. 26). The letter had been acknowledged (P.C. 2339).

Read—A memorandum from Mr. Baillie stating that since last meeting two logs had been received, both being “excellent.” Mr. Scott was instructed to convey the best thanks of the Council to the observers.

Submitted—The following as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

1. WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|---------------|
| A + B (successful) | - | - | - | = | 36 districts. |
| C (failures) | - | - | - | = | 4 districts. |

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

(Signed) FREDC. GASTER.

Telegraphic Branch,
13th December 1893.

Submitted—The following report on the 8.30 p.m. forecasts for November 1893 :—

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.

| DISTRICTS. | | Per-centages. | | | Per-centage of Success. a + b. |
|------------------|---|---------------|----------|----------------------|--------------------------------------|
| | | Wind. | Weather. | Average Forecast. | |
| SCOTLAND, N. | a | 53 | 57 | 55 | 80 |
| " | b | 17 | 33 | 25 | |
| " | c | 23 | 7 | 15 | |
| " | d | 7 | 3 | 5 | |
| SCOTLAND, E. | a | 47 | 57 | 52 | 82 |
| " | b | 30 | 30 | 30 | |
| " | c | 10 | 13 | 12 | |
| " | d | 13 | 0 | 6 | |
| ENGLAND, N.E. | a | 70 | 60 | 65 | 85 |
| " | b | 17 | 23 | 20 | |
| " | c | 3 | 17 | 10 | |
| " | d | 10 | 0 | 5 | |
| ENGLAND, E. | a | 47 | 77 | 62 | 91 |
| " | b | 40 | 17 | 29 | |
| " | c | 7 | 6 | 6 | |
| " | d | 6 | 0 | 3 | |
| MIDLAND COUNTIES | a | 40 | 73 | 57 | 87 |
| " | b | 40 | 20 | 30 | |
| " | c | 20 | 7 | 13 | |
| " | d | 0 | 0 | 0 | |
| ENGLAND, S. | a | 54 | 73 | 64 | 90 |
| " | b | 33 | 20 | 26 | |
| " | c | 13 | 7 | 10 | |
| " | d | 0 | 0 | 0 | |
| SCOTLAND, W. | a | 50 | 64 | 57 | 85 |
| " | b | 23 | 33 | 28 | |
| " | c | 17 | 0 | 9 | |
| " | d | 10 | 3 | 6 | |
| ENGLAND, N.W. | a | 47 | 73 | 60 | 85 |
| " | b | 33 | 17 | 25 | |
| " | c | 10 | 7 | 9 | |
| " | d | 10 | 3 | 6 | |
| ENGLAND, S.W. | a | 47 | 74 | 61 | 87 |
| " | b | 33 | 20 | 26 | |
| " | c | 10 | 3 | 7 | |
| " | d | 10 | 3 | 6 | |
| IRELAND, N. | a | 37 | 64 | 51 | 81 |
| " | b | 37 | 23 | 30 | |
| " | c | 20 | 13 | 16 | |
| " | d | 6 | 0 | 3 | |
| IRELAND, S. | a | 50 | 73 | 62 | 82 |
| " | b | 24 | 17 | 20 | |
| " | c | 13 | 7 | 10 | |
| " | d | 13 | 3 | 8 | |
| SUMMARY. | | | | | |
| BRITISH ISLES | a | 49 | 68 | 59 | 85 |
| " | b | 30 | 23 | 26 | |
| " | c | 13 | 8 | 11 | |
| " | d | 8 | 1 | 4 | |

Submitted—The following reports of work during the month of November 1893:—

MARINE BRANCH.

December 12, 1893.

Examined 11 new logs.

For the area between the Cape of Good Hope and New Zealand obtaining monthly wind and current results; drawing wind-roses, and tabulating observations of fog. Drawing the final forms of charts for the publication of the results of the various elements.

Preparing the data in Office logs for the district south of the Equator from the African coast to longitude 90° W.

The lithographed Red Sea charts of wind results for February, March, October, and December received and examined, and those for February and December sent to press. Down to the close of last month seven wind charts and one current chart had gone to press.

Hydrographic remarks copied from the log of the ship "Earnock," No. 9045, and sent to the Admiralty.

CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) C. W. BAILLIE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

(To 30th November 1893.)

Weekly Weather Reports, 1893.—All numbers issued promptly to date. *Appendix I*, Part 3, issued; *Appendices II. and III.* well in hand. *Supplement*. Summary for January issued; February is in proof; March is at printer's; April well advanced. For later numbers tables are all prepared, and rough maps, showing average conditions, are drawn.

Daily Weather Report, 1893.—All numbers issued promptly, with correction and addition sheet for September.

Primary Checking of Storm Warnings, 1893.—Done to date.

Checking of Daily (8.30 p.m.) Forecasts.—Almost ready to date.

Checking of Hay Harvest Forecasts, 1893.—Completed.

Preparation of summary, for Council, now in hand. Preparation of tables, charts, &c., in connexion with the new rainfall publication, has occupied the major part of my own time, but a good deal of time has been devoted to general work of room also. Tables of rainfall values, from stations working in connexion with this Office, have also been prepared for most of the stations available.

Mr. Sargeant, owing to serious illness and deaths at home, has been absent during the greater part of the month.

(Signed) FREDC. GASTER.

Telegraphic Branch,

December 13, 1893.

PANTAGRAPH ROOM.

December 1, 1893.

Hourly Means.—The tables of mean values for 1891 are well advanced, with the exception of those for Fort William.

A good deal of my own time has been occupied on anemometry, and the ordinary routine work of the room has taken up rather more time than usual this month. In addition, I was absent a fortnight through illness, and Mr. Call has been away the whole month from a similar cause.

(Signed) R. H. CURTIS.

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

EXAMINATION BRANCH.

December 1, 1893.

Examinations.

May and June, 1893.—Proceeded with.

Weekly examination (on receipt) of curves and documents from all observatories.

Miscellaneous.

Diurnal Range of Rainfall, 1871-90.—Examination and correction, &c., of the hourly values proceeded with.

Kew Barograph Scale Values.—Measurements, &c. (memorandum submitted).

Aberdeen Wet-bulb Scale and Zero-line Values.—Partly done.

Diary of Operations, 1894.—Prepared, and proofs revised.

Revising Forms 21 and 27 and correcting proofs thereof.

(Signed) T. E. ALLEN.

Resolved—That the usual bonus of 3*l.* 3*s.* 0*d.* be given to those of the telegraphic reporters who have discharged their duties satisfactorily during the year. (Minutes, 1892, p. 60.)

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|---|-------|----|----|
| Cash balance on 28th November - - - | 3,929 | 3 | 11 |
| Receipts from 29th November to 12th December | 28 | 14 | 8 |
| | <hr/> | | |
| | 3,957 | 18 | 7 |
| Cheques drawn from 29th November to 12th December | 780 | 4 | 3 |
| | <hr/> | | |
| Balance on 12th December - - - | 3,177 | 14 | 4 |
| | <hr/> | | |

Submitted—The following list of publications which have been received since the last Meeting :—

Bidwell, S.—Fogs, clouds, and lightning.

Schück, A.—Beobachtungen über Temperatur, Salzgehalt und specifisches Gewicht des Meerwassers zwischen den Norwegischen Scheren.

Russell, H. C.—Moving anticyclones in the southern hemisphere.

London, Meteorological Office.—Report of the Meteorological Council to the Royal Society, for the year ending 31st of March 1893.

Lloyd's Seaman's Almanac.—1894.

Merrifield, F.—The colouring of *chrysophanus phloxas* as affected by temperature.

63, Victoria Street, January 10, 1894.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.
PROFESSOR DARWIN.

MR. GALTON.
MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (December 13) were read and confirmed.

Read—Letter 2369 from the Hydrographer stating that the reserve stock of instruments to be kept at the Office should be as follows :—

Barometers, 45. Aneroids, 120. Thermometers (ordinary), 250; max. and min. (pairs), 80. Screens, 50.

The following return of instruments at the Meteorological Office, either available for issue or under construction or repair (Minutes, p. 65), was submitted :—

STOCK of AVAILABLE "A" INSTRUMENTS.

| | Bar. | Aner. | Ther. | Max. | Min. | Screens. | Hyd. |
|---------------------------------|------|-------|-------|------|------|----------|------|
| Available, 13th December 1893 | 8 | — | 156 | 33 | 35 | 20 | 27 |
| Received, new | — | 25 | — | — | — | 20 | — |
| „ repaired, cleaned, &c. | 7 | 4 | 1 | 3 | — | — | — |
| | 15 | 29 | 157 | 36 | 35 | 40 | 27 |
| Issued | 15 | 18 | 49 | 17 | 16 | 8 | — |
| | — | 11 | 108 | 19 | 19 | 32 | 27 |
| Available, January 10th, 1894 | — | 11 | 108 | 19 | 19 | 32 | 27 |
| Ordered | 25 | 15 | 200 | 50 | 50 | — | — |
| Repairing | 22 | — | — | — | — | — | — |
| To be ordered | 13 | — | — | — | — | — | — |
| | 60 | 26 | 308 | 69 | 69 | 32 | 27 |
| Total available and ordered | 60 | 26 | 308 | 69 | 69 | 32 | 27 |
| Total required for yards abroad | 58 | 68 | 242 | 60 | 60 | 12 | 65 |
| „ „ home yards | 69 | 179 | 450 | 145 | 145 | 82 | — |
| Reserve | 45 | 120 | 250 | 80 | 80 | 50 | — |
| | 172 | 367 | 942 | 285 | 285 | 144 | 65 |
| Grand Total | 172 | 367 | 942 | 285 | 285 | 144 | 65 |

(Signed) R. STRACHAN.
January 10th, 1894.

R. H. Scott, Esq.

Read—Letter 2348/93, from Messrs. Few and Company, enclosing their bill of costs, amounting to £l. 11s. 2d. The amount was ordered to be paid.

Read—A memorandum from Mr. Baillie reporting that since last meeting 12 logs had been received, 6 of them being "excellent," and recommending that the charts (O. 76) be presented to Captain F. Alford, H.M. Telegraph ship "Monarch."

Mr. Scott was instructed to present the charts, as above, and to convey the best thanks of the Office to the other observers.

Submitted—The following as the result of the primary checking of the Storm Warnings issued to the coasts of the British Islands since the last meeting of the Council.

(1.) WARNINGS ISSUED.

A + B (successful) - - - = 78 districts.
C (failures) - - - = 17 districts.

(2.) GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

FREDC. GASTER.

Telegraphic Branch,
10th January 1894.

Submitted—The following report on the forecasts issued at 8.30 p.m. daily during the month of December 1893 :—

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 1893.

| DISTRICTS. | | Per-centages. | | | Per-centage of Success. a + b. |
|------------------|---|---------------|----------|----------------------|--------------------------------------|
| | | Wind. | Weather. | Average Forecast. | |
| SCOTLAND, N. | a | 49 | 68 | 59 | 86 |
| " | b | 32 | 23 | 27 | |
| " | c | 16 | 6 | 11 | |
| " | d | 3 | 3 | 3 | |
| SCOTLAND, E. | a | 45 | 55 | 50 | 81 |
| " | b | 23 | 39 | 31 | |
| " | c | 19 | 3 | 11 | |
| " | d | 13 | 3 | 8 | |
| ENGLAND, N.E. | a | 65 | 55 | 60 | 83 |
| " | b | 13 | 32 | 23 | |
| " | c | 19 | 7 | 13 | |
| " | d | 3 | 6 | 4 | |
| ENGLAND, E. | a | 65 | 61 | 63 | 83 |
| " | b | 13 | 26 | 20 | |
| " | c | 16 | 10 | 13 | |
| " | d | 6 | 3 | 4 | |
| MIDLAND COUNTIES | a | 61 | 61 | 61 | 86 |
| " | b | 20 | 29 | 25 | |
| " | c | 16 | 3 | 9 | |
| " | d | 3 | 7 | 5 | |
| ENGLAND, S. | a | 58 | 65 | 62 | 91 |
| " | b | 29 | 29 | 29 | |
| " | c | 13 | 0 | 6 | |
| " | d | 0 | 6 | 3 | |
| SCOTLAND, W. | a | 35 | 52 | 44 | 73 |
| " | b | 26 | 32 | 29 | |
| " | c | 26 | 6 | 16 | |
| " | d | 13 | 10 | 11 | |
| ENGLAND, N.W. | a | 36 | 58 | 47 | 73 |
| " | b | 26 | 26 | 26 | |
| " | c | 35 | 6 | 21 | |
| " | d | 3 | 10 | 6 | |
| ENGLAND, S.W. | a | 40 | 55 | 48 | 80 |
| " | b | 33 | 32 | 32 | |
| " | c | 27 | 7 | 17 | |
| " | d | 0 | 6 | 3 | |
| IRELAND, N. | a | 50 | 65 | 58 | 78 |
| " | b | 17 | 23 | 20 | |
| " | c | 27 | 6 | 16 | |
| " | d | 6 | 6 | 6 | |
| IRELAND, S. | a | 40 | 65 | 53 | 77 |
| " | b | 30 | 19 | 24 | |
| " | c | 27 | 6 | 17 | |
| " | d | 3 | 10 | 6 | |
| SUMMARY. | | | | | |
| BRITISH ISLES | a | 49 | 60 | 55 | 81 |
| " | b | 24 | 28 | 26 | |
| " | c | 22 | 6 | 14 | |
| " | d | 5 | 6 | 5 | |

Submitted—The following reports of work during the month of December 1893 :—

MARINE BRANCH.

January 9th, 1894.

Examined nine new logs.

Drawing wind-roses, tabulating fog observations, and obtaining generalized current results for the district between the Cape of Good Hope and New Zealand. Chart forms for winds and for currents prepared and forwarded to the lithographer for reproduction.

Preparation and extraction of data in Office logs for the area south of the Equator between longitudes 10° E. and 90° W.

Red Sea wind charts for March, August, and October passed for press, and that of November for revise.

Hydrographical notices in log No. 9076 copied and forwarded to the Admiralty.

A copy made of an abstract log of the S.S. "Port Chalmers," for October and November 1893, received from the Hydrographic Office.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) C. W. RAILLIE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.
(To 31st December 1894.)

Weekly Weather Report, 1893 :—

All numbers issued promptly.

Appendices.—Well in hand.

Monthly Summaries.—February gone for press ; March nearly ready ; all other numbers well in hand, and being pushed forward speedily.

Daily Weather Report, 1893 :—

All numbers issued to date.

Storm Warnings, 1893.—Primary checking done to date.

Daily (8:30 p.m.) Forecasts.—Checking done to date.

Tables, &c. for new *Rainfall* publication being steadily pushed on. List of Scotch Stations carefully revised.

Mr. Sargeant returned to duty on December 11th. Edward Pycock was away ill from 13th to 21st (8 days).

(Signed) FREDC. GASTER.

Telegraphic Branch,

January, 1894.

PANTAGRAPH ROOM.

January 1st, 1894.

Hourly Means.—The mean values for Fort William Observatory for the year 1891 are now in hand.

The routine work of the room has been kept up to date.

One member of the staff was absent a fortnight through illness.

(Signed) R. H. CURTIS.

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

EXAMINATION BRANCH.

January 1st, 1894.

Examinations.

May and June 1893.—Proceeded with.

Weekly examination (on receipt) of curves and documents from all observatories.

Miscellaneous.

Diurnal Range of Rainfall, 1871–1890.—Examination and correction, &c. of the hourly values proceeded with.

Kew Barograph Residuals.—Measurements, &c. re the investigation of.

Aberdeen Wet-Bulb Scale and Zero-line Values.—Proceeded with.

General routine work.

(Signed) T. E. ALLEN.

Submitted—The following memorandum :—

| | £ | s. | d. |
|---|--------|----|----|
| Cash balance on 12th December - - - | 3,177 | 14 | 4 |
| Receipts from 13th December to 9th January - | 4,868 | 8 | 10 |
| | 8,046 | 3 | 2 |
| Cheques drawn from 13th December to 9th January | 1,912 | 10 | 8 |
| Balance on 9th January - - - | £6,133 | 12 | 6 |

Submitted—The following list of publications which had been received since the last meeting :—

Greenwood, W. N.—Greenwood's nautical almanac, general and coasting Kludonometric tide tables. 1894.

Washington, Smithsonian Institution.—Smithsonian miscellaneous collections. Vol. XXXIV.

Chemnitz, K. Sächsisches Meteorologisches Institut.—Deutsches meteorologisches Jahrbuch für 1892.

Rome, Specola Vaticana.—Classificazione delle nubi.

Rio Janeiro Observatorio.—Annuario. 1893.

Sydney Observatory.—Results of rain, river, and evaporation observations made in New South Wales during 1892.

Hellmann, G.—Schneekrystalle.

Cyprus.—Meteorological observations. 1892.

Stockholm, Académie Royale des Sciences de Suède.—Observations du magnétisme terrestre faites à Upsala sous la direction de R. Thalén. 1882–83.

Ottawa, Geological Survey of Canada.—Annual report. New series, Vol. V., 1890–91. Parts i and ii, with maps.

Aitken, John.—On the number of dust particles in the atmosphere of certain places in Great Britain and on the Continent, with remarks on the relation between the amount of dust and meteorological phenomena. Part ii.

— Breath figures.

— On the colour of the Mediterranean and other waters.

Stuttgart, Meteorologische Centralstation.—Meteorologische Beobachtungen in Württemberg. 1892.

Watts, F.—Report on the hurricanes passing over the West Indies during the month of August 1893.

Clayton, H. H.—The movements of the air at all heights in cyclones and anti-cyclones, as shown by the cloud and wind records at Blue Hill.

— Six and seven day weather periods.

— Six and seven day weather periodicities.

Wilk, E.—Grundbegriffe der Meteorologie für höhere Schulen und zum Selbstunterricht zusammengestellt.

Coimbra, Observatorio Meteorologico e Magnetico.—Observações Meteorologicas e magneticas. 1892.

Chandler, A.—The climate of Torquay.

Ben Nevis.—Guide to Ben Nevis, with an account of the foundation and work of the meteorological observatory.

— Meteorological observations on Ben Nevis.

Pomortzeff M. M.—Determination of the directions and angular velocity of the movement of clouds. (In Russian.)

— Apparatus to determine the directions and angular movements of clouds.

Tacubaya, Observatorio Astronomico Nacional.—Anuario. 1894.

Lyons, C. J.—Rainfall for the Hawaiian Islands. 1892.

— Report of Assistant in charge of Meteorology. 1890.

— Weather record for Honolulu and the Hawaiian Islands, 1892.

Paris, Service Hydrométrique du Bassin de la Seine.—Observations sur les cours d'eau et la pluie centralisées pendant l'année 1892.

— — Résumé des observations centralisées pendant l'année 1892.

Hepites, S. C.—La pluie en Roumanie.

— Le climat de Sulina d'après les observations météorologiques de 1876 à 1890.

— Notice historique sur l'Institut Météorologique de Roumanie.

— Observations pluviométriques en Roumanie pour l'année 1891.

Bombay, Meteorological Office.—Brief sketch of the meteorology of the Bombay Presidency in 1892–93.

Stuttgart, K. statistisches Landesamt.—Instruktion für die Beobachter der württembergischen meteorologischen Stationen.

Oettingen, A. von.—Meteorologische Beobachtungen angestellt in Dorpat im Jahre 1892.

63, Victoria Street, January 24, 1894.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.
MR. GALTON.

MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (January 10) were read and confirmed.

Read—Letter 134 from the Hydrographer of the United States Navy, forwarding a specimen pilot chart which he proposes to issue monthly for the North Pacific Ocean.

Mr. Scott was instructed to acknowledge receipt of the communication (P.C. 197).

Submitted—The following report :—

REPORT OF INSPECTION of the ENGLISH STATIONS, 1893.

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

TELEGRAPHIC REPORTING STATIONS.

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

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

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

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

Jersey, September 2nd and 3rd.—The observer had been obliged to relinquish his office as railway station master at St. Aubin's, and the barometers had been moved to his own house, without, however, any appreciable change of altitude above mean sea level. The instruments were in good order. I examined some other sites for both the outdoor and indoor instruments, some remarks about which I supplied to the Meteorological Office, in the prospect of Mr. Fisher's having to resign the work of observation. It is not unlikely that all requirements will be met by the establishment of an observatory on the grounds of the Jesuit College at St. Helier's, as I have lately learned at the Meteorological Office.

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

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

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

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

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

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

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

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

SECOND ORDER STATIONS.

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

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

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

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

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

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

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

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

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

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

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

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

SECOND ORDER STATIONS whose RETURNS are not fully published.

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

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

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

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

SELF-RECORDING OBSERVATORIES.

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

NEW STATIONS.

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

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

WEEKLY WEATHER REPORTING STATIONS.

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

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

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

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

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

RAINFALL STATIONS.

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

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

INSTRUMENTS EMPLOYED.

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

I brought back from Mr. Keig, Douglas (whose station is discontinued), a barometer saved from the "Thorne," also a fishery barometer from the Custom House requiring repair.

| NAME OF STATION. | BAROMETER. | THERMOMETER. | | | | | | | | |
|------------------|------------|-----------------------|--|--|---------------------------------|----------------------|--|--|--|--------------------|
| | | Temperature of Water. | DRY BULB. | WET BULB. | Difference of Wet from Dry Bulb | State of Hygrometer. | MAXIMUM. | MINIMUM. | SPARE ON GRASS. | General Condition. |
| | | | Correction to reduce to Inspector's Standards. | Correction to reduce to Inspector's Standards. | | | Correction to reduce to Inspector's Standards. | Correction to reduce to Inspector's Standards. | Correction to reduce to Inspector's Standards. | |
| Alnwick Castle | — | 47 | +0.8 | +1.2 | -0.4 | C | -3.0 | -2.0 | — | C |
| Arlington Court | — | 61 | -0.4 | -0.5 | +0.1 | C | -0.4 | -0.1 | — | C |
| Aysgarth | — | 52 | -0.1 | -0.7 | +0.6 | A | -0.3 | -1.2 | — | A |
| Bristol | — | 62 | -0.4 | -0.4 | 0.0 | A | -0.1 | -0.3 | -0.2 | A |
| Cambridge | — | 51 | -0.6 | -0.5 | -0.1 | A | -0.9 | +0.1 | — | A |
| Cirencester | — | 61 | -0.1 | -0.2 | +0.1 | A | -0.1 | -0.1 | 0.0 | A |
| Cronkbourne | — | 40 | -0.4 | -0.3 | -0.1 | A | 0.0 | +0.2 | -0.1 | A |
| Dungeness | — | 45 | -0.1 | 0.0 | -0.1 | A | 0.0 | -0.2 | — | A |
| Durham | — | 46 | -0.4 | -0.4 | 0.0 | A | -0.2 | +0.4 | — | A |
| Eastbourne | — | 46 | 0.0 | -0.2 | +0.2 | A | -0.2 | 0.0 | — | A |
| Geldeston | — | 51 | -0.3 | -0.6 | +0.3 | A | -0.1 | -0.1 | — | A |
| Hesley Hall | — | 51 | -0.6 | -0.1 | -0.5 | A | -0.2 | -0.1 | — | A |
| Heysham Hall | — | 51 | -0.3 | -0.1 | -0.2 | A | -0.1 | +0.2 | — | A |
| Hurst Castle | — | 61 | -0.8 | -0.2 | -0.6 | A | -0.8 | -0.1 | — | A |
| Jersey | — | 62 | -0.2 | -0.5 | +0.3 | A | +0.4 | +0.1 | — | A |
| Liverpool | — | 44 | -0.1 | 0.0 | -0.1 | B | -0.2 | +0.2 | — | B |
| Liverpool | — | 44 | -0.1 | 0.0 | -0.1 | B | -0.1 | +0.2 | — | B |
| Loughborough | — | 52 | -0.4 | -0.4 | 0.0 | A | -0.4 | -0.3 | +0.3 | A |
| Manchester | — | 47 | 0.0 | -0.1 | +0.1 | A | +0.4 | +0.1 | — | A |
| Normanburst | — | 51 | -0.1 | 0.0 | -0.1 | A | +0.2 | -0.2 | — | A |
| North Foreland | — | 43 | -0.4 | 0.0 | -0.4 | A | 0.2 | 0.0 | -0.2 | A |
| North Shields | — | 53 | -0.1 | -0.1 | 0.0 | B | -0.1 | +0.1 | — | A |
| Plymouth | — | 66 | -0.1 | -0.6 | +0.5 | A | 0.0 | +0.3 | -0.1 | A |
| Praule Point | — | 67 | -0.2 | -0.7 | +0.5 | A | -0.1 | -0.2 | 0.0 | A |
| Prestwich | — | 48 | -0.5 | -0.1 | -0.4 | A | -0.2 | +0.3 | -0.2 | A |
| St. Helena | — | 50 | -0.2 | -0.2 | 0.0 | A | -0.3 | +0.1 | — | A |
| St. Leonards | — | 50 | -0.7 | -0.9 | +0.2 | C | 0.0 | +0.1 | — | C |
| Scilly | — | 65 | -0.7 | -0.6 | -0.1 | B | -0.5 | -0.3 | — | B |
| Seaham | — | 40 | -0.6 | -0.4 | -0.2 | A | -0.1 | -0.3 | — | A |
| Southampton | — | 63 | -0.2 | -0.2 | 0.0 | A | -0.2 | -0.2 | -0.1 | A |
| Spurn Head | — | 48 | -0.7 | -0.4 | -0.3 | A | 0.0 | 0.0 | — | A |
| Stonyhurst | — | — | -0.1 | -0.3 | +0.2 | A | 0.0 | +0.1 | — | B |
| Tealby | — | 45 | -0.4 | -0.2 | -0.2 | A | -0.6 | +0.4 | -0.1 | A |
| Uppingham | — | 55 | -0.3 | 0.0 | -0.3 | A | -0.5 | -0.2 | — | A |
| Yarmouth | — | 50 | -0.1 | -0.5 | +0.4 | A | -0.5 | -0.1 | — | A |
| York | — | 53 | -0.7 | -0.7 | 0.0 | A | -0.1 | 0.0 | — | A |
| York | — | 53 | -0.7 | -0.7 | 0.0 | A | -0.4 | 0.0 | — | A |

(Signed) W. CLEMENT LEY.

Read—Letter 17 from Mr. Buchan stating that the Kew Certificate, of the year 1888, supplied with the standard Fortin's barometer No. 689 by Barrow, was not correct.

Mr. Scott stated that he had ascertained that the barometer, after receipt from Kew Observatory in 1888, had been successively employed *pro tempore* at both Valencia and Stonyhurst. In March 1889 it had been sent to Messrs Adie and Co. to be cleaned before issue to Fort William, and, by an oversight, had not been sent to be reverified at Kew before it was sent down to the observatory.

Mr. Scott was instructed to recal the barometer for reverification (P.C. 195).

Reported that the stock of the "Barometer Manual for Seamen" issued in 1884 was much reduced.

It was resolved to revise the work before reprinting it.

Reported also that the "Instructions in the use of Meteorological Instruments," issued in 1875, was also nearly out of print. It was resolved that a new edition should be prepared.

Mr. Scott reported that Mr. Ellery, F.R.S., of Melbourne, had written privately to inquire if the office would recommend him to order one of Dines' Pressure Tube Anemometers. Mr. Scott was instructed to forward a specimen record from the instrument, and to say that it was still in the experimental stage (P.C. 202).

Read a memorandum by Mr. Baillie stating that since last meeting 8 logs had been received, 5 of them being "excellent," and recommending that charts be presented to Captain Fraser, P. and O. steamship "Massilia" and to Captain W. Philip, junior, ship "Salamis."

Mr. Scott was instructed to present O. 76 to Captain Fraser and O. 27 to Captain Philip, and to convey the marked thanks of the Council to the other observers.

Submitted—The following as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council:—

1. WARNINGS ISSUED.

| | | | | |
|--------------------|---|---|---|-----------------|
| A + B (successful) | - | - | - | = 52 districts. |
| C (failures) | - | - | - | = 12 districts. |

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

(Signed) FREDC. GASTER.

Telegraphic Branch,
January 8, 1893.

Read—The following memorandum:—

January 24, 1894.

THE stock of fishery barometers is reduced to one, and two have to be issued. The sanction of the Council is requested for the purchase of six, at a cost of 24*l*.

(Signed) R. STRACHAN.

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

—The order was sanctioned.

Reported—That the cash accounts for the six months ended the 30th September, 1893, had been audited on the 11th instant by the Chairman and Dr. Buchan, and would be sent in due course to the Treasury for the Audit Office. The receipts for the six months amounted to 7,416*l*. 11*s*. 1*d*., the payments amounted to 7,084*l*. 6*s*. 4*d*., leaving a balance of 1,832*l*. 12*s*. 11*d*. in hand and at the bank on the 1st October 1893, as against 1,500*l*. 8*s*. 2*d*. on the 1st April last.

Submitted—The following statement of accounts:—

| | £ | s. | d. |
|---|--------|----|----|
| Cash balance on 9th January | - | - | - |
| Receipts from 10th to 23rd January | - | - | - |
| | 6,133 | 12 | 6 |
| | 31 | 6 | 8 |
| | 6,164 | 19 | 2 |
| Cheques drawn from 10th to 23rd January | - | - | - |
| | 309 | 10 | 5 |
| Balance on 23rd January | - | - | - |
| | £5,855 | 8 | 9 |

Submitted—The following statement of accounts for the nine months ending 31st December 1893 :—

[illegible]

| LIABILITIES. | | | | ASSETS. | | | |
|----------------------------------|---|--------|-------|------------------|---|--------|-------|
| | | £ | s. d. | | | £ | s. d. |
| To Council | - | 750 | 0 0 | By cash at Bank | - | 1,320 | 3 6 |
| „ Post Office (partly estimated) | - | 335 | 2 4 | „ „ at Office | - | 76 | 15 5 |
| „ sundry creditors | - | 1,068 | 0 4 | „ H.M. Exchequer | - | 975 | 0 0 |
| „ balance | - | 368 | 0 6 | „ sundry debtors | - | 149 | 4 3 |
| | | £2,521 | 3 2 | | | £2,521 | 3 2 |

• Some expenses under this head not yet brought to account.

† Includes part of charges for rainfall values, payment of which will be spread over two years.

Submitted—The following list of publications which had been received since the last meeting :—

Zürich, Schweiz. Departement des Innern.—Graphische Darstellung der schweizerischen hydrometrischen Beobachtungen. 1892.

Cambridge (Mass.) Astronomical Observatory of Harvard College.—Annals. Vol. xxxi., Part ii. Investigations of the New England Meteorological Society for the year 1891.

— — — Annals. Vol. xl., Part ii. Observations made at the Blue Hill Meteorological Observatory, Mass., U.S.A., in the year 1892. Under the direction of A. L. Rotch.

Hepites, S. C.—Le verglas du 11 et du 12 Novembre 1893.

— — — La pluie en Roumanie en 1891.

Knipping, E.—Die tropischen Orkane der Südsee zwischen Australien und den Paumotu-Inseln.

Ellis, W.—Map [of England and Wales] showing lines of equal Magnetic Declination for January 1, 1894.

Hann, J.—Beiträge zum täglichen Gange der meteorologischen Elemente in den höheren Luftschichten.

Copenhagen, Institut Météorologique de Danemark.—Annales de l'observatoire magnétique de Copenhague. 1892.

Wollny, E.—Untersuchungen über den Einfluss der Struktur des Bodens auf dessen Feuchtigkeitsverhältnisse.

Halle, Kaiserliche Leopoldino-Carolinische Deutsche Akademie der Naturforscher.—Leopoldina, xxviii. Heft, 1892.

63, Victoria Street, February 7, 1894.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. STONE.

|

MR. GALTON.

The Secretary was in attendance.

The Minutes of the last meeting (January 24) were read and confirmed.

Read—Letter 233 from Kew Observatory (Minutes, p. 65) stating the probable cost of testing the electrical anemometer there at 14*l*.

Mr. Scott was instructed to inquire from the General Post Office if arrangements could be made for some member of the staff at Kew to go to the Post Office for instruction in the mode of erection and management of the apparatus (P.C. 295) and communicate with Kew accordingly (P.C. 292).

Submitted—The following as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

1. WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|-----------------|
| A + B (successful) | - | - | - | - | = 44 districts. |
| C (failures) | - | - | - | - | = 12 districts. |

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

A strong N.W. gale in the south-west of England on the evening of January 31st, caused by the advance of a secondary depression over Ireland and North Wales. At 2 p.m. on the 31st the depression appeared to be filling up, and the gale then prevalent in the South of Ireland did not seem likely to extend. The Irish coasts were warned in the morning.

(Signed) FREDC. GASTER.

Telegraphic Branch,
February 7, 1894.

Reported—That J. R. Schuymer, aged 15 years, had been taken on approval at a salary of 12*s*. 6*d*. per week from February 5th. Approved.

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|---|-------|----|----|
| Cash balance on 23rd January - - - | 5,855 | 8 | 9 |
| Receipts from 24th January to 6th February - | 16 | 2 | 8 |
| | 5,871 | 11 | 5 |
| Cheques drawn from 24th January to 6th February - | 984 | 15 | 6 |
| | 4,886 | 15 | 11 |

Submitted—The following Report :—

HAY HARVEST FORECASTS, 1893.

Meteorological Office, Telegraph Branch,
February 7, 1894.

SIR,

I BEG to submit, herewith, the results of the checking of the *Hay Harvest Forecasts* issued in 1893.

The telegrams were sent, between 3.30 p.m. and 4 p.m., on each week-day, for a period of about five weeks, the issue commencing in the south of England on the 12th June, and extending to other parts of the kingdom in the course of the ensuing three weeks.

The summary given in Table I. shows that the general per-centage of success for the entire country was 91, or 2 per cent. higher than any previously recorded. The largest per-centage was 97 in England, E., next to which came Scotland, E., and England, S., with 95 per cent. The smallest per-centage of success (84) was in England, N.W.

In Table II. will be found the names and addresses of the various recipients, and also remarks testifying to the value and accuracy of the forecasts. In addition to these, the telegrams were sent to seven gentlemen at their own cost. In the two cases of subscribers of former years declining to avail themselves of the forecasts, the reason assigned was the shortness of grass, due to the continued drought, not any doubt as to the value of the forecasts.

In addition to the issue of these forecasts to the regular recipients whose names are given below, the forecasts for two districts—England, N.E., and England, East—were forwarded daily at the request of the Board of Agriculture to the Post Office, for transmission to selected stations in Northumberland and Essex, respectively.

No information as to the result of this experiment have reached the Meteorological Office; the figures subjoined have therefore no reference to this part of the service.

R. H. Scott, Esq., M.A., F.R.S.,
Secretary, Meteorological Council.

I am, &c.
(Signed) FREDC. GASTER.

HAY HARVEST FORECASTS, 1893.

TABLE I.—SUMMARY of RESULTS.

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

TABLE II.—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. | Addresses. | No. of Forecasts sent. | No. of Forecasts checked. | Per-centages. | | | | Remarks. |
|---------------------|---|---|------------------------------|---------------------------------|----------------------|----------------------|---------------------|-------------------|---|
| | | | | | Complete Success. | Partial Success. | Partial Failure. | Total Failure. | |
| 0. SCOTLAND, N. | Major Smith Rev. Dr. Joass | Munlochy, Inverness Golspie | 30 36 | 30 36 | 63·3 58·3 | 30·0 38·3 | 6·7 8·4 | — — | Dr. Joass says: "The forecasts have " been of real service, and are much " appreciated." Letter 1558/93 |
| 1. SCOTLAND, E. | T. Bett C. Pirrie T. Wilson | Dalnaline, Aberfeldy Rothiemay, Huntly Glanis Castle, Glamis | 30 36 30 | 30 36 30 | 60·0 58·3 56·7 | 36·7 33·3 40·0 | 3·3 8·4 — | — — 3·3 | |
| 2. ENGLAND, N.E. | J. Turner Sir Jacob Wilson | The Grange, Ulceby Chillingham Barns, Chatterton, Northumberland. | 30 30 | 30 30 | 56·7 78·6 | 30·0 14·3 | 13·3 7·1 | — — | |
| 3. ENGLAND, E. | Sir J. B. Lawes, Bart. W. Birkbeck Professor Hugo Ohm | Rothamsted, St. Albans High House, Thorpe, Norwich Royal Agricultural College, Ch Cirencester. | 29 30 30 | 29 30 30 | 93·0 86·7 80·0 | 3·5 10·0 10·0 | 3·5 3·3 6·7 | — — 3·3 | |
| 4. MIDLAND COUNTIES | E. E. Harcourt-Vernon Major Fosbery T. H. Thursfield | Grove, Retford Warwick Barrow, Broseley, Shropshire | 30 30 54 | 30 30 54 | 66·7 56·7 59·3 | 23·3 36·6 35·2 | 6·7 6·7 5·5 | 3·3 — — | Mr. Birkbeck says: "The correctness " of the forecasts has been very very " remarkable." |
| 5. ENGLAND, S. | C. Whitehead Martin J. Sutton E. P. Squarey | Barning House, Maidstone Kidmore Grange, Caversham, Oxford. The Moot, Downton, Wilts | 30 30 30 | 30 30 30 | 73·4 66·6 76·7 | 23·3 26·7 20·0 | 3·3 6·7 3·3 | — — — | |
| 6. SCOTLAND, W. | Sir M. J. Stewart, M.P. J. S. R. Ballingal W. Calder | Ardwell, Wigtownshire Eallabus, Islay by Greenock Dalreock, Dumbarton | 30 30 25 | 30 30 25 | 63·3 53·3 60·0 | 26·7 33·3 32·0 | 10·0 6·7 8·0 | — 6·7 — | |
| 7. ENGLAND, N.W. | G. W. Wray | Leyburn, R.S.O., Yorks | 30 | 30 | 56·7 | 26·7 | 13·3 | 3·3 | |
| 8. ENGLAND, S.W. | T. Dyke The Earl of Ducie R. Neville Grenville | Long Ashton, Clifton, Bristol Tortworth, Gloucestershire Butleigh Court, Glastonbury | 24 24 30 | 24 24 30 | 66·6 62·5 56·7 | 29·2 25·0 36·6 | 4·2 12·5 6·7 | — — — | Mr. Milward remarks that "on the " whole they have been most wonder- " fully accurate." |
| 9. IRELAND, N. | E. F. Farrell J. M. Wilson, J.P. | Moynalty, Kells, Co. Meath Currygrane, Edgeworthstown | 30 40 | 30 40 | 53·3 44·8 | 30·0 44·8 | 10·0 6·9 | 6·7 3·5 | |
| 10. IRELAND, S. | Dawson A. Milward W. Talbot Crosbie | Lavistown, Kilkenny Ardfert Abbey, Tralee | 30 30 | 30 30 | 60·0 63·4 | 26·7 23·3 | 13·3 10·0 | — 3·3 | |

Submitted—The following reports of work during the month of January 1894 :—

MARINE BRANCH.

February 6, 1894.

Examined 16 new logs and 1 lighthouse register.

Drawing wind-roses, and obtaining fog frequency, for the area between the Cape of Good Hope and New Zealand. Lithographed forms of charts for winds, currents, &c., received and examined. Preparation and extraction of data for the district south of the Equator between longitudes 10° E. and 90° W.

Red Sea wind charts for November passed for press, and September for revise. The current charts for January, February, March, and May received and examined.

Obtaining specific gravity observations of sea water in all ocean 10° squares for Dr. Buchan. Charting additional Pacific Ocean currents supplied by the Deutsche Seewarte, Hamburg.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) C. W. BAILLIE.

TELEGRAPHIC (FORECAST AND STORM WARNING) DEPARTMENT.

(To 31st January 1894.)

Weekly Weather Report, 1893 :—

Appendices I. and II. completed and published.

Monthly Summaries.—All months done and sent to printer. *January to June* have been issued.

July to September have been revised and sent “for press.”

October is undergoing revision.

November and December.—Proof not received yet.

Title-page and Preface sent to printer.

Weekly Weather Report, 1894.—All numbers issued promptly.

Daily Weather Report, 1894.—Ditto, ditto. Form of publication thoroughly revised.

Hay Harvest Forecast Checking, 1893.—Completed.

Daily (8.30 p.m.) Forecasts.—Checked almost to date.

Storm Warnings Issued, 1894.—Primary checking done.

Rainfall Publication.—Many of the returns received; considerable progress made in settling form of publication.

Inquiries for Information have been numerous, and many of the replies very lengthy.

This Branch continues to suffer much from sickness of members of staff. Mr. Snell has been away for 15 days, and has not returned; and Mr. Goad for five days, but is back to duty.

(Signed) FREDC. GASTER.

Telegraphic Branch,

7th February 1894.

PANTAGRAPH ROOM.

February 1, 1894.

Hourly Means.—The mean values for Fort William for the year 1891 are being prepared, and the tables for the other observatories have also been advanced somewhat.

The mean values for Kew 1893, required for insertion in the Kew Observatory Annual Report, have been calculated as far as the observations are available.

(Signed) R. H. CURTIS.

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

EXAMINATION BRANCH.

February 1, 1894.

Examinations.

July–September, 1893.—Kew records.

October–December, 1893.—Valencia records.

Reports.

July, 1893.—“Notes of errors” to Kew.

October–December, 1893.—“Notes of errors” to Valencia.

Miscellaneous.

Diurnal Range of Rainfall, 1871–90.—Correction of the tables, &c., proceeded with.

Aberdeen Wet-bulb Scale and Zero-line Values.—Proceeded with.

(Signed) T. E. ALLEN.

Submitted—The following list of publications which had been received since the last meeting :—

London, Meteorological Office.—Meteorological observations at Stations of the Second Order for the year 1889.

Mellish, H.—The weather of 1893 at Hodsock Priory, Worksop.

Prague, Technisches Bureau des Landesculturrathes für das Königreich Böhmen.—Ergebnisse der Wasserstands-beobachtungen an den Flüssen Böhmens für das Jahr 1892.

— — — — — Ergebnisse der ombrometrischen Beobachtungen in Böhmen für das Jahr 1892.

London, Admiralty, Hydrographic Office.—The South America Pilot. Part i.

Zurich, Schweizerische Meteorologische Central-Anstalt.—Annalen. 1891.

— — — — — Instruktionen für die Beobachter der meteorologischen Stationen der Schweiz. Zweite umgearbeitete und vermehrte Auflage.

Berlin, Königlich Preussisches Meteorologisches Institut.—Ergebnisse der meteorologischen Beobachtungen im Jahre 1890.

Hamburg, Deutsche Seewarte.—Deutsche ueberseeische meteorologische Beobachtungen. Heft vi.

Leyst, E.—Untersuchungen über den täglichen und jährlichen Gang der meteorologischen Elemente an den Cyclonen-und Anticyclonentagen.

Richter, E.—Die Einrichtung der Wasserstands-Voraussage an der oberen Elbe.

Figee, S.—Uitkomsten van meteorologische waarnemingen in Nederlandsch-Indië gedurende de maanden Januari-Juni van het jaar 1891.

Schreiber, P.—Die klimatischen Grundgleichungen des Königreichs Sachsen.

— — — — — Die Grundgleichungen für Zustand und Zustands-änderung in der Atmosphäre

— — — — — General-Bericht über den gegenwärtigen Stand unserer Kenntnisse über Gewitter und die begleitenden Erscheinungen im Königreich Sachsen.

63, Victoria Street, February 21, 1894.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.
MR. STONE.

MR. GALTON.

The Secretary was in attendance.

The Minutes of the last meeting (February 7) were read and confirmed.

Read—Letter 354 from the Post Office stating that the electrical anemometer was being cleaned, and that as soon as it was re-erected a visit from some member of the Kew staff would be welcomed (p. 78).

Read—A memorandum (M. O. 426) from Mr. R. Curtis as to the failure of the metallic papers to retain markings in wet weather. Mr. Scott was authorised to refer the matter to Dr. Hugo Müller.

The Chairman submitted a definite scheme of publication of the rain returns (Minutes, p. 65). This was adopted, and Mr. Scott was instructed to have the data for one district (England, South-west) set up, and to submit it.

Read—Letter 335, stating that a meeting of the International Meteorological Committee was proposed for August 20th at Upsala. Mr. Scott was authorised to attend it.

Read—Letter 363 from Mr. Cullum asking if the Council would sanction his erecting a greenhouse at the east end of the observatory at Cahirciveen and would repair the boathouse, which had been blown down.

Mr. Scott was instructed to inquire about the boathouse, and to sanction the erection of the greenhouse by Mr. Cullum, if the insurance of the house was not interfered with thereby (P.C. 400).

Read—A memorandum from Mr. Baillie stating that since last meeting eight logs had been received, two of them being “excellent.” Mr. Scott was instructed to convey the marked thanks of the Council to the observers.

Mr. Scott reported that he had allowed Mr. C. Harding to take a number of documents from the Office for use in preparing his recent paper on the storm of November 18th. Two of these papers, being two barograph tabulations, had been mislaid. Mr. Scott stated that he had arranged for fresh sheets of tabulations to be made to replace the missing ones.

The Council regretted Mr. C. Harding's want of care, and ordered that in future no documents be taken from the Office without special order of Council.

Submitted—The following as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

1. WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|---------------|
| A + B (successful) | - | - | - | = | 46 districts. |
| C (failures) | - | - | - | = | 9 „ |

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

(Signed) FREDC. GASTER.

Telegraphic Branch,
February 21, 1894.

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|---|---|----|-------------|
| Cash balance on 6th February | - | - | 4,886 15 11 |
| Receipts from 7th to 20th February | - | - | 15 12 4 |
| | | | <hr/> |
| | | | 4,902 8 3 |
| Cheques drawn from 7th to 20th February | - | - | 71 12 0 |
| | | | <hr/> |
| Balance on 20th February | - | - | 4,830 16 3 |

Submitted—The following list of publications which had been received since the last meeting :—

- St. Petersburg, Physikalisches Central Observatorium.*—Annalen. Jahrg. 1892. Theil i. und ii.
Paris, Bureau Central Météorologique de France.—Annales. 1891. i.-iii.
Akerblom, P.—De l'emploi des photogrammètres pour mesurer la hauteur des nuages.
Marseilles, Commission de Météorologie du Département des Bouches-du-Rhone.—Bulletin annuel, 1892.
McLandsborough, J., and Preston, A. E.—Meteorology of Bradford for 1893.
Stonyhurst College Observatory.—Results of meteorological and magnetical observations. 1893.
Berlin, Deutsche Meteorologische Gesellschaft.—Berliner Zweigverein der deutschen meteorologischen Gesellschaft. 1894.
Wild, H.—Beiträge zur Entwicklung der erdmagnetischen Beobachtungsinstrumente.
 — Über den säcularen Gang der magnetischen Declination in St. Petersburg-Pawlowsk.
Calcutta, Meteorological Office, Bengal.—Meteorological summary for the monsoon period of 1893.
San Luis Potosi, Observatorio Meteorológico del Colegio-Seminario.—Cuadro meteorográfico de la Lluvia durante los años de 1891, 1892, y 1893.
 — — — Resumen de las observaciones meteorológicas practicadas durante el año de 1893.
Mitchell, J. C.—The weather at Chester during the first ten months of 1893.
Smith, H.—Rainfall and temperature at Kenley, for six years, 1888 to 1893.
Manchester, Sheffield, and Lincolnshire Railway.—Monthly statement of rain fallen in the year ending 31st December 1893.
Edinburgh, Royal Society.—Proceedings. Vol. xix. 1891-92.
Vienna, Kais. Akademie der Wissenschaften.—Berichte der Commission für Erforschung des Östlichen Mittelmeeres. Zweite Reihe.

63, *Victoria Street*, March 7, 1894.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

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

Read—Letter M.O. 431 from the India Office inquiring how many copies of the Indian Weather Charts (Minutes, p. 32) should be supplied to the Council for distribution in these Islands.

Mr. Scott was instructed to apply for six copies, and to request the India Office to supply the Hydrographic Office and the Scottish Meteorological Society independently.

Submitted proofs of the complete series of charts for the Red Sea (Minutes 1892, p. 79). Mr. Baillie was in attendance. The Council instructed him to insert on the charts any trustworthy meteorological data for stations on the coasts of the Red Sea which were to be found.

Mr. Scott reported that Dr. Hugo Müller had suggested the substitution of silver, or, by preference gold, for brass in the spiral flanges on the anemometer cylinders. Read letter 489 from Mr. Munro estimating cost of affixing gold wire at 5*l.* for the first instrument.

Mr. Scott was instructed to make further inquiry.

Read—Letter 441 from Mr. Dines enclosing specimen curves from his anemometer when “damped.”

It was resolved to try the effect of damping on the anemometer in the office.

Read—Letter 491 from Mr. Cullum stating that the insurance on the house would not be endangered by the erection of the proposed greenhouse (Minutes, p. 82), and stating that he did not urge on the Council the repair of the boathouse.

Approved.

Mr. Scott inquired if the Council wished to insure their instruments at the Observatories which were not under their direct management, and he was instructed to ascertain if those Observatories were already insured.

Submitted—A memorandum from Mr. Baillie stating that since last meeting seven logs had been received, three of them being “excellent.” Mr. Scott was instructed to convey the marked thanks of the Council to the observers.

Submitted—The following as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

1. WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|-----------------|
| A + B (successful) | - | - | - | - | = 52 districts. |
| C (failures) | - | - | - | - | = 7 districts. |

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

(Signed) FREDC. GASTER.

Telegraphic Branch,
March 7, 1894.

Submitted—The following reports of work during the month of February, 1894 :—

MARINE BRANCH.

March 6, 1894.

Examined nine new logs and one lighthouse register.

Tabulating fog observations within the district between the Cape of Good Hope and New Zealand. The wind-roses for all months have been drawn, and the revised proofs of the lithographed forms of charts for winds and currents sent for further revision.

Preparing the data contained in Office logs for the area south of the Equator between the longitudes of 10° E. and 90° W., and extracting the observations between the Equator and latitude 10° S. in the Atlantic.

Charting the Pacific Ocean Current observations received from the Deutsche Seewarte.

Received from the lithographer first proofs of the Red Sea Current charts for June, July, September, October, and November. Returned for revise January, February, March, June, July, August, October, and November. Proofs of the revised charts for February, July, and October received.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) C. W. BAILLIE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

February 28, 1894.

Weekly Weather Report, 1893:—

Monthly Summaries.—All revised and gone finally "for press." *August* published, September to December now due from printer.

Title-page, preface, &c., gone for revise (there is delay on these from some cause—apparently owing to non-delivery of "plates" from lithographer to printer).

Weekly Weather Report, 1894.—All numbers published to date.

Daily Weather Report, 1894.—Summary for January is in printer's hands.

Daily 8.30 p.m. Forecasts.—Checking in progress—delayed owing to sickness of staff.

Storm Warnings Issued, 1894.—Primary checking done to date.

Storm Warnings Issued, 1893.—Final checking not commenced owing partly to sickness of part of staff, and partly to non-receipt of lighthouse registers from Scotch and Irish stations.

Rainfall Publication being now proceeded with for publication.

Sickness has continued very prevalent with members of staff. Mr. Francis has been absent from this cause (except on one day) throughout the month; Mr. Snell did not return to duty until the 12th February.

(Signed) FREDC. GASTER.

Telegraphic Branch,
February 7, 1894.

PANTAGRAPH ROOM.

March 1, 1894.

Hourly Means.

The mean values for Fort William for the year 1891 are completed, except as regards pressure and sunshine; the former cannot be completed until the correction for the standard barometer is determined; the latter will be commenced immediately.

The tables of sunshine "Frequency" for the ten years 1881–90 are in hand.

The mean values required for insertion in the Kew Observatory Annual Report for 1893 have been prepared, and sent to Kew.

(Signed) R. H. CURTIS.

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

EXAMINATION BRANCH.

March 1, 1894.

Examinations.

May 1893.—Completed.

June–July 1893.—Proceeded with.

October–December 1893.—Kew records.

Weekly examination (on receipt) of Curves and Documents from all Observatories.

Reports.

April 1893.—Copies of "Notes of Errors" to all Observatories except Kew.

August–December 1893.—Copies of "Notes of Errors" to Kew.

Miscellaneous.

Diurnal Range of Rainfall, 1871–90.—Examination and correction of the hourly values, &c., proceeded with.

Aberdeen Wet Bulb Scale and Zero-line Values.—Proceeded with

General routine work and instructing Mr. Schuymer.

(Signed) E. T. ALLEN.

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|---|-------|----|----|
| Cash balance on 20th February - - | 4,830 | 16 | 3 |
| Receipts from 21st February to 6th March - | 15 | 13 | 7 |
| | 4,846 | 9 | 10 |
| Cheques drawn from 21st February to 6th March - | 860 | 7 | 1 |
| | 3,986 | 2 | 9 |

Submitted—The following list of publications which had been received since the last meeting :—

- Mohorovičić, A.*—Der Tornado bei Novska.
Hamburg, Deutsche Seewarte.—Deutsches meteorologisches Jahrbuch für 1892. Ergebnisse der meteorologischen Beobachtungen. Jahrg xv.
 ——— Resultate meteorologischer Beobachtungen von Deutschen und Holländischen Schiffen für Eingradfelder des nordatlantischen Ozeans. Quadrat 150. No. xii.
Gratzl, A.—Schwerebestimmungen in hohen Norden.
Sterneck, R. von.—Relative Schwerebestimmungen ausgeführt im Jahre 1892.
Davis, W. M.—Elementary Meteorology.
San Fernando, Instituto y Observatorio de Marina.—Anales. Sección 2a. Observaciones meteorológicas y magnéticas. Año 1892.
London, Admiralty, Hydrographic Department.—Catalogue of Admiralty charts, plans, and sailing directions, 1894.
 ——— The Irish Coast Pilot. 4th edition.
Russell, H. C.—Hail storms.
 ——— Pictorial rain maps.
 ——— Diagram of isothermal lines of New South Wales.
Dewar, D.—Explanatory notes on the system of weather forecasting,
Bombay Government Observatory.—Magnetical and meteorological observations made at the Government Observatory, Bombay, in the years 1891, 1892.
Schück, A.—Magnetische Beobachtungen an der Unterelbe.
Tananarive, Observatoire Royal de Madagascar.—Observations météorologiques faites à Tananarive par le R. P. E. Colin. Vol. IV. 1892.
Greenwood, W. N.—Tides and tidal phenomena considered in connexion with atmospheric pressure.
Karlinski, F.—Stan Wody na rzekach Galicyjskich oraz opad atmosferyczny. 1891, 1892.
Cambridge (Mass.), New England Weather Service.—Annual Summary. 1892.
Barcena, M.—El clima de la Ciudad de México.

63, Victoria Street, March 21, 1893.

PRESENT :

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.

PROFESSOR DARWIN.

MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (March 7) were read and confirmed.

Mr. Scott drew the attention of the Council to the fact that the lease of the Office (Minutes, 1889, p. 73) would expire January 1, 1895. He was instructed to inquire and report as to its renewal, &c.

Specimens of the tables of rain data (p. 82) were submitted. The Chairman undertook to examine and revise them.

Submitted—Replies from the several observatories as to the insurance of the apparatus, &c. Mr. Scott was instructed to issue a circular stating the amount for which the apparatus should be insured in all cases where insurance did not exist.

Submitted—The following report on the forecasts issued at 8.30 p.m. daily during the month of January 1894 :—

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.

| DISTRICTS. | | Per-centages. | | | Per-centage of Success a + b. |
|------------------|---|---------------|----------|----------------------|-------------------------------------|
| | | Wind. | Weather. | Average Forecast. | |
| SCOTLAND, N. | a | 45 | 74 | 60 | 89 |
| " | b | 39 | 19 | 29 | |
| " | c | 3 | 7 | 5 | |
| " | d | 13 | 0 | 6 | |
| SCOTLAND, E. | a | 26 | 68 | 47 | 83 |
| " | b | 45 | 26 | 36 | |
| " | c | 16 | 3 | 9 | |
| " | d | 13 | 3 | 8 | |
| ENGLAND, N.E. | a | 29 | 68 | 49 | 78 |
| " | b | 32 | 26 | 29 | |
| " | c | 29 | 6 | 17 | |
| " | d | 10 | 0 | 5 | |
| ENGLAND, E. | a | 32 | 58 | 45 | 83 |
| " | b | 36 | 39 | 38 | |
| " | c | 29 | 3 | 16 | |
| " | d | 3 | 0 | 1 | |
| MIDLAND COUNTIES | a | 39 | 61 | 50 | 78 |
| " | b | 20 | 36 | 28 | |
| " | c | 35 | 3 | 19 | |
| " | d | 6 | 0 | 3 | |
| ENGLAND, S. | a | 42 | 61 | 52 | 88 |
| " | b | 36 | 36 | 36 | |
| " | c | 19 | 3 | 11 | |
| " | d | 3 | 0 | 1 | |
| SCOTLAND, W. | a | 29 | 61 | 45 | 77 |
| " | b | 35 | 29 | 32 | |
| " | c | 26 | 0 | 13 | |
| " | d | 10 | 10 | 10 | |
| ENGLAND, N.W. | a | 35 | 61 | 48 | 81 |
| " | b | 39 | 26 | 33 | |
| " | c | 16 | 7 | 11 | |
| " | d | 10 | 6 | 8 | |
| ENGLAND, S.W. | a | 42 | 74 | 58 | 84 |
| " | b | 35 | 16 | 26 | |
| " | c | 10 | 3 | 6 | |
| " | d | 13 | 7 | 10 | |
| IRELAND, N. | a | 32 | 65 | 49 | 81 |
| " | b | 39 | 26 | 32 | |
| " | c | 16 | 3 | 10 | |
| " | d | 13 | 6 | 9 | |
| IRELAND, S. | a | 39 | 74 | 57 | 84 |
| " | b | 39 | 16 | 27 | |
| " | c | 9 | 3 | 6 | |
| " | d | 13 | 7 | 10 | |
| SUMMARY. | | | | | |
| BRITISH ISLES | a | 35 | 66 | 51 | 82 |
| " | b | 36 | 27 | 31 | |
| " | c | 19 | 4 | 12 | |
| " | d | 10 | 3 | 6 | |

Mr. Scott stated that as the self-recording rain-gauge at Fort William did not work quite satisfactorily, he proposed to exchange it for the spare one now at Kew.—Approved.

Read—A letter from Dr. W. F. C. Rogers, asking if the Office would supply him with instruments for a station at Newala, River Rovuma, East Coast of Africa.

Mr. Scott was instructed to supply him with thermometers and a rain-gauge.

Read—A memorandum from Mr. Baillie stating that since last meeting six logs had been received, two of them being “excellent.”

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

Submitted—The following as the result of the primary checking of the storm warnings issued to the coasts of the British Islands since the last meeting of the Council :—

1. WARNINGS ISSUED.

| | | | | | |
|--------------------|---|---|---|---|-----------------|
| A + B (successful) | - | - | - | - | = 28 districts. |
| C (failures) | - | - | - | - | = 5 „ |

2. GALES EXPERIENCED, BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

(Signed) FREDC. GASTER.

Telegraphic Branch,
21st March 1894.

Submitted—The following statement of accounts :—

| | £ | s. | d. |
|--|-------|----|----|
| Cash balance on 6th March - | 3,986 | 2 | 9 |
| Receipts from 7th to 20th March - | 125 | 18 | 1 |
| | 4,112 | 0 | 10 |
| Cheques drawn from 7th to 20th March - | 199 | 17 | 7 |
| Balance on 20th March - | 3,912 | 3 | 3 |

Submitted—The following list of publications which had been received since the last meeting :—

- Havana, Real Colegio de Belen.*—Observaciones magnéticas y meteorológicas. 1889.
Williams, C. T.—Aero-therapeutics, or the treatment of lung diseases by climate.
Vienna, Kais. Königl. Geographische Gesellschaft.—Mittheilungen, 1893. xxxvi. Bd.
Mauritius, Royal Alfred Observatory.—Annual report. 1892.
Nordenskiöld, A. E.—Om stoftfallet i Sverige och angränsande länder den 3dje Maj 1892.
Copenhagen, Institut Météorologique de Danemark.—Observations internationales polaires, 1882–83. Expédition Danoise. Observations faites à Godthaab. Tome i., 1^{re} Livr.
MM. Richard Bros.—Automatic recording instruments. Illustrated and descriptive catalogue.
Rugby School Natural History Society.—Report for the year 1893.
Milan, R. Osservatorio Astronomico di Brera.—Osservazioni meteorologiche eseguite nell’ anno 1893.
Davis, W. M.—Memoir of William Ferrel.
 — The winds of the Indian Ocean.
Hann, J.—Meteorological stations and the publication of results of observations.
Morandi, L.—La Lluvia en el clima de Monte Video.
Scott, R. H.—The publication of daily weather maps and bulletins.
Madrid Observatorio.—Treinta años de observaciones meteorológicas. Exposición y resumen de las efectuadas en el Observatorio de Madrid desde el 1° de Enero de 1860 al 31 de Diciembre de 1889.