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METEOROLOGY IN PARLIAMENT.

THE real discussion upon the vote for the new Meteorological Council is, we believe, intended to be taken upon the vote in the Supplementary Estimates. But as there was a long conversation upon the subject on July 17th, when the usual vote of £10,000 was asked for, and the opinions of the various hon. members who took part in it are of importance, we report it as fully as we are able:—

The House then resolved itself into Committee of Supply on the CIVIL SERVICE ESTIMATES.

On the vote to complete the sum of £12,550 for grants to certain learned societies in Great Britain and Ireland,

Dr. L. PLAYFAIR pointed out that a previous Government and two commissions of inquiry had expressed the opinion that some aid should be given to the Meteorological Society of Scotland, and the present Government had appointed a council of the Royal Society to distribute an increased vote of £10,000. Under the regulations made by the new council, the Meteorological Society of Scotland would receive from this grant only the most insignificant aid, and he asked whether the Chancellor of the Exchequer would not advise the council to allow a certain portion of the grant for national purposes connected with meteorology, such as the Scotch Society had been engaged in, and not merely for weather forecasts.

The CHANCELLOR of the EXCHEQUER said he was not at all disposed to undervalue the services rendered by the Meteorological Society of Scotland, but the Government had to bear in mind that the assistance which Parliament did or could give to scientific investigations must necessarily be limited, and that it was not every good or desirable object for which it would be their duty to propose a vote to Parliament. He was quite aware that those at the Treasury had continually to show themselves hardhearted, and perhaps they would be thought blind to the interests of science, as they were under the necessity of turning a deaf ear to applications in themselves worthy of attention, but which if they admitted they would be obliged to go further than

would be justifiable in the way of asking aid from Parliament. It was desirable that the Committee should understand precisely what the nature of the grant was. A good many years ago the collection of Meteorological observations was undertaken partly by the Board of Trade and partly by the Admiralty, under the direction of the late Admiral FitzRoy. When he died it was thought better that some scientific society should determine what sort of investigations should be carried on, and take the direction of them. With this view the Royal Society was applied to, and a small sum—£10,000—was for some years placed at their disposal. The question then arose whether some modification should not be made in the system. Representations were made by the Council of the Scottish Meteorological Society, that encouragement should be given to that Society by the Government. The Government had every desire to recognise the importance and the work of the Scottish Meteorological Society. A departmental committee was appointed, with Sir W. Stirling Maxwell as chairman, who presented a report, in consequence of which some changes were made in the Meteorological Committee of the Royal Society. It was replaced by a Meteorological Council, not necessarily consisting of members of the Royal Society, but of gentlemen designated by the Royal Society with the addition *ex officio* of the Hydrographer to the Admiralty. The Scottish Society was found to have done a good deal of work which was of use to the Government in the prosecution of their inquiries. They had received no remuneration for that work, and £1,000 was recommended and awarded to them, in respect of the past; and as to the future, it would be for the new Council to consider how far they could avail themselves of the services of the Scottish Meteorological Society in the conduct of their business, and on what terms that assistance should be rendered. The English Meteorological Society stood on precisely the same footing as the Scotch Society. Then came the question whether there should be a direct rate in aid of the Meteorological Council as a scientific body. They all desired to recognise the claims of scientific bodies to assistance from the national funds, but it was very difficult to draw a line and say where that assistance should begin and where it should end. It was one of the most perplexing questions with which successive Governments had to deal—how national aid could best be given for the promotion of scientific research. All the Treasury could do was fairly to consider the applications brought before them; and, looking to the very large amount contributed by the Government to the promotion of science, they could not undertake to extend that assistance in the way desired by the representatives of the Scottish Meteorological Society. There was an impression among some that the Government were indifferent to the interests of Scotland, but that certainly was not the case. The fact was, they were unable to enlarge indefinitely the assistance given to scientific societies. He therefore hoped the Committee would agree to this vote of £10,000 to the new Meteorological Council as now constituted, and would not press them

either to weaken the hands of the Council or to add to the sum now proposed to be granted.

Mr. M'LAREN thought the answer of the Chancellor of the Exchequer extremely unsatisfactory. Nothing could be more unjust than the constant effort to keep down all votes and grants to Scotland as compared with England and Ireland. It was hard that when Scotland contributed its full share to the Imperial Exchequer, it should be denied assistance for its learned societies, the proceedings of which were published for the general benefit, proportionate to that given to the English societies.

Mr. RYLANDS would base these grants entirely on the value of the services rendered to the public, and did not think that this or the preceding Government had shown any disposition towards extravagance in the encouragement of scientific research.

Mr. W. H. SMITH said it was gratifying to the Government to find themselves in accord with the hon. member, who would soon have an opportunity of supporting a supplemental estimate for scientific objects, for the Committee referred to had recommended an expenditure of £4,000 a year by the new Meteorological Council, and, in the judgment of the Treasury, the recommendation was one that ought to be adopted. As to the tests that ought to be applied in such cases, special regard ought to be paid to two points. The object to be attained ought to be distinctly national, and not one in which particular individuals or classes were concerned, and security should be taken that the persons who sought assistance were contributing largely to promote the object in view. The Government ought not to give to any society four or five times as much as the members themselves contributed.

Mr. BELL assented to these conditions, providing they did not tie too tightly the hands of those who had to determine what a national object was. He hoped that a board such as that spoken of by the Chancellor of the Exchequer would soon be established.

Dr. L. PLAYFAIR said all he asked was that the Government should intimate to the new Council that it was quite within their power to give a portion of the increased sum now about to be voted for meteorological purposes to the Scotch Meteorological Society, which was engaged in inquiries into matters affecting national interests. For example, inquiries into the climatic condition of the herring fishery, and the manner in which temperature affected the health of the population, were matters of national importance. If the Treasury could not agree to that suggestion, he hoped they would allow the Fishery Board, which made a large profit out of the herring fishery brands, to aid the Meteorological Society of Scotland in making the inquiries to which he referred. If this question were reserved, and if a satisfactory case were made out a Vote could be introduced into the Supplementary Estimates when they were brought in.

Mr. M'LAREN said that the Scottish Meteorological Society would be

quite content with a grant equal to that which the members had themselves contributed.

Mr. RAMSAY said that the work done by the Meteorological Society of Scotland was for the benefit of the whole community, and it was therefore entitled to assistance from the Treasury. He thought it was reasonable that the Treasury should contribute an equal sum to that raised by the Scotch Society. The Scotch members had not hitherto combined to carry their objects like the Irish members, but if right hon. gentlemen on the Treasury bench continued to treat Scotland in this manner, Scotch members might be trained to fight like the Irish members, and might be quite as successful in obtaining justice by obstructing business, and in other ways. They did not desire to set up a Home Rule agitation, but if the claims of Scotland were to be continually ignored in this way, he did not know anything better calculated to create a feeling in Scotland in favour of Home Rule. (Hear, hear.)

The CHANCELLOR of the EXCHEQUER protested against the doctrine they had just heard. Grants of this kind ought only to be given on account of some public benefit to be desired, and not on account of any supposed share being due to Scotland. When the papers connected with this matter were laid on the table it would be seen that the grants were made for strictly national objects, and that the committee appointed consisted of gentlemen thoroughly competent to deal with the question. He could assure the committee that if the new Council recommended that a further extension should be given to meteorological inquiries the Government would consider what could be done to meet the fair claims of Scotland.

Sir J. LUBBOCK said that, having appointed a competent body of gentlemen on the new Council, it would be much better to leave to them the disposal of the funds. It was a novel doctrine to say that every scientific society ought to receive from the Treasury a sum equal to its own subscriptions. The question ought not to be looked at from either an English, Irish, or Scotch point of view, but simply how the money should be spent in the best manner.

Sir G. MONTGOMERY hoped that before the Supplementary Estimates were brought in, the Government would see their way to giving greater liberty to the new Council, so that they might afford assistance to the Scotch Society if they thought it desirable.

Mr. M'LAGAN said that the Vote was already too small, but he should move to reduce it still further unless the claims of Scotland were recognized. (A laugh.) The Committee had been told that the new Council would have the power to recommend a grant to the Scotch Society for meteorological purposes. If they had not this power he should be under the necessity of moving to reduce the grant.

Captain HOME inquired whether any Scotchman would be proposed as a member of the new Council? If the grant was to be national, so ought the Council to be.

Mr. W. H. SMITH doubted whether it would be convenient for a representative from Scotland to attend the meetings of the Council in

London at his own expense. The names of the proposed Council would be laid on the table before the Supplementary Estimates was moved.—The Vote was then agreed to.

To the foregoing we add the following article from our contemporary *Nature*, although with some of the remarks we do not quite agree.

THE NEW METEOROLOGICAL COUNCIL.

"The final stage of the labours of the Treasury Committee, to which we have made frequent reference, has now been reached. The Royal Society has been appealed to to nominate the new council; they have done so, and the Government has accepted the nominations, which are as follows:—Prof. H. J. S. Smith, Savilian Professor of Geometry in the University of Oxford and Keeper of the University Museum (Chairman); Prof. Stokes, Lucasian Professor of Mathematics in the University of Cambridge, and Secretary of the Royal Society; Dr. Warren de la Rue, Mr. F. Galton, and Gen. Strachey, Member of the Indian Council. In addition to these there is Capt. Evans, the Hydrographer of the Navy, as an *ex-officio* member.

"The new Meteorological Council, then, like the old Meteorological Committee, is composed of Members of the Royal Society, who severally hold distinguished positions in special departments of science, and who collectively represent considerable administrative ability. The addition to the new Council of two distinguished mathematicians and physicists such as Professors Smith and Stokes, will be generally regarded with satisfaction, particularly when it is considered that it is to the mathematician and physicist that meteorologists must always look for information and guidance on many matters affecting the intricate and difficult problems with which they, in the position the science has attained, must now deal.

"It is, however, matter of general surprise among meteorologists, or we should rather say of wide-spread regret, that the New Council will resemble the old Committee in having no meteorologist upon it. The omission, so far as concerned the Meteorological Committee, was a serious one, and led to mistakes; so far as concerns the new one it will be well if it does not seriously mar its usefulness and retard the foundation of the future science of physical meteorology. At the same time it is only just to point out that because the science is of the future, the choice of the Royal Society was small, and that considerations not on the surface may have had to be borne in mind. However this may be, there is no doubt that the Royal Society and the new Council have accepted a great responsibility, and that the action of the latter will be most keenly watched. The Royal Society, in a report to the Government, has stated:—

"‘The Council of the Royal Society is of opinion that the most practical method of advancing meteorology is to endeavour by research and experiment to place that science on a firm basis. They are also of opinion that this can be done only by the devotion of the time of scientific men to the necessary research and experiment.’"

"Men of science, therefore, will be justified in looking both for research and experiment from the new Council, in addition to the dreary piles of observations which have cumbered all scientific libraries for the last half-century.

"And here is the rub. Will the busy—not to say already over-worked—members of the Council adopt this "practical method," and conduct researches? or do they propose to content themselves by going into the market with the £1,000 which is given for *research*, and, be it remarked, not for mere *observations*? In the latter case it is to be hoped that their advances will be met in no narrow spirit; for if the new Council only fosters research and experiment, it will be a great gain.

"While, on the one hand, then, we have a right to expect results of a high order from the new Council, on the other we are glad to see they are to be no longer an unpaid body. Besides the £1,000 devoted to research, there is another £1,000 devoted to the payment of the members. This sum is to be spent partly in retaining fees and partly in payment for attendance.

"The vote asked for the present year and agreed to on Tuesday is £10,000, and the Secretary of the Treasury then stated that the Committee had recommended an expenditure of £4,000 a year by the Meteorological Council, and, in the judgment of the Treasury, the recommendation was one that ought to be adopted. A supplementary vote will be asked for this at an early date.

"As regards the meteorological societies, on whom must devolve the practical working out of the large problem of the comparative climatology of the various districts of the United Kingdom—the working out of this problem being beyond the scope of the operations of the New Council, just as certainly as it is beyond the resources originally placed at its disposal—we cannot but suppose that the Government have, in handing over the administration of the meteorological grant to the New Council, made provision that a portion of the additional £4,000 will be spent in adequately aiding these societies in doing important national work which they are in a position to do so economically, and which, judging from the past, they can do so effectively.

"This now seems to be the Treasury view, for in the warm debate very properly raised by the Scotch members in favour of the claims of the Scottish Meteorological Society, Mr. W. H. Smith stated that, as to the tests that ought to be applied in such cases, special regard ought to be paid to two points. The object to be attained ought to be distinctly national, and not one in which particular individuals or classes were concerned, and security ought to be taken that the persons who sought assistance were contributing largely to promote the object in view. There is no doubt that the Scottish Society satisfies both these requirements.

"The Chancellor of the Exchequer also stated that it would be for the Council to consider how far they could avail themselves of the services of the Scottish Meteorological Society in the conduct of their business, and on what terms that assistance should be rendered.

"The Council have lost no time in entering upon their duties, and it is devoutly to be wished that some sign may soon be given that if its constitution is not what was generally looked for, it is still well qualified to discharge its functions and to merit the confidence of meteorologists, although they have had so little to say to its appointment."

ST. SWITHIN'S RAIN IN 1877.

WE cannot give a full report of this rain until we receive the whole of our returns at the end of the year. In the meanwhile, we give a few extracts from letters, and a table, respecting which we desire to draw prominent notice to the fact that a blank (...) denotes *no information*, and '00 *no rain*.

The fall seems to have exceeded three inches in a period of about 40 hours at most stations in an oval area, whose extreme points were near Richmond, Yorkshire, and near Oswestry, Salop, but, probably, these limits will be modified when full information is received.

Rainfall, July 13th—16th, 1877.

DIV.	STATION.	DATE.				DIV.	STATION.	DATE.			
		13th.	14th.	15th.	16th.			13th.	14th.	15th.	16th.
II.	Bournemouth...	...	1·95	...	...	VIII.	Fox Hill, Frodsham	...	1·95	2·80	...
"	Selborne	·09	1·11	·42	·64	"	Walton, Liverpool ..	·02	2·02	1·33	·20
"	Alton	·07	1·15	1·33		"	Crooke Hall, Chorley	...	1·03	2·32	·54
V.	Pewsey	·06	1·60	·40	·42	IX.	Arnccliffe	·09	1·90	1·72	·74
"	Mildenhall .....	...	1·98	...	...	"	Buckden	·05	1·38	1·25	·49
"	Compton Bassett	·17	1·73	·28	·25	"	Mickley	·00	1·02	·52	·92
"	Holne Vic.	·60	·98	·58	·40	"	East Layton	·00	1·20	·37	·87
"	Dartmoor	1·10	1·58	1·35	1·14	X.	Gainford	·04	1·03	·20	·99
"	Tavistock	·57	·88	·45	·77	"	Seathwaite	·47	·70	1·17	·29
"	Coryton	·21	1·23	·74	·75	"	Elterwater	·39	·65	2·03	·21
"	Okehampton ...	·20	1·35	1·08	·45	"	Shap	·21	·69	·61	·74
"	Court Barn	·66	1·19	1·10	·00	XI.	Llanfrecifa	·30	1·25	·65	·15
"	Langtree Wick	·43	1·24	·85	·29	"	Cardiff	·43	1·27	·85	·18
"	Barnstaple ...	·48	·49	1·08	·13	"	Carno	·50	·62	·64	·30
"	Glenthorn	·23	·90	·80	·48	"	Aberdovey	·45	·85	1·43	·52
VI.	Haughton Hall	·12	3·04	·82	·11	"	Rhiwbrifdir .....	...	3·10		...
"	Leaton Vic. ...	·19	1·32	·50	·11	"	Port Madoc	·27	2·76		·26
"	Sansaw	·18	1·59	·50	·13	"	Llandudno	·27	1·52	1·65	·20
"	Tamworth .....	...	1·85	...	...	XII.	Dumfries	·24	1·00	·68	·33
"	Barlaston .....	...	2·00	·56	...	"	Hawick	·67	·78	·48	·79
"	Cheadle	·14	1·95	·52	·27	XXIII.	Warrenpoint	·15	1·45	·70	·45
VII.	Duffield .....	...	2·27	...	...	"	Seaford, Co. Down...	·10	·57	·96	·54
VIII.	Buglawton .....	...	1·82	...	...	"	Waringstown	·28	·78	·60	1·70

TAMWORTH.—As rainfalls exceeding an inch are rare here, I send you a few particulars of yesterday's (July 14th) rainfall, which amounted to 1·85 in. The first portion of the rain fell in heavy showers yesterday morning, with distant thunder, and lasted in that

way until 7 p.m., by which time $\cdot 57$ in. had fallen; but from that hour until 7 a.m. this morning there has been a heavy, persistent downpour without a moment's cessation, and it is still going on now in the same way (9 a.m.). It is the heaviest fall since July 20th, 1875.—WILLIAM ARNOLD.

BARLASTON, STOKE.—On Sunday morning last, July 15th, my rain-gauge registered exactly 2 in. for the previous twenty-four hours, the greatest fall I have ever noted, and the nearest to which occurred on the 17th August, 1871, when 1·95 in. was measured. On the 7th August, 1872, the quantity was 1·76 in., but the rainfall for twenty-four hours very seldom reaches an inch. From Friday afternoon the air had been almost entirely saturated with moisture, and the barometer had fallen from 29·780 on the previous Sunday and 29·310 on Friday morning to 28·626 (all uncorrected) on the 15th. On Monday morning (16th) the amount registered was $\cdot 56$ in. The wind was chiefly S. and S.W.; a moderately stiff breeze from Friday till Sunday morning, when it increased to half a gale, and at night blew hard.—W. SCOTT.

HAUGHTON, SHIFFNAL.—An unprecedented rainfall occurred here on Saturday, July 14th. On Sunday morning I registered 3·04 in., by far the greatest fall since I commenced observing in 1834. There was distant thunder, but nothing more; I was not at home then, but those who have witnessed rainfalls in the Tropics declare that what fell between 12 and 1 p.m. quite resembled that. On Sunday, too, it rained from morn till night, and I measured $\cdot 82$ in. next morning—3·86 in. in the forty-eight hours.—J. BROOKE.

FOXHILL, NEAR FRODSHAM, CHESHIRE.—An unprecedentedly heavy fall of rain began on Saturday, July 14th. Up to about 4 p.m. on that day there had been scarcely any rain. It then came on a very heavy thunder shower, which lasted about half-an-hour. I did not hear any thunder, but others reported hearing it about 10 miles off. After the shower there was no more rain until near midnight, when a deluge poured down for several hours. It ceased however about 6 o'clock a.m., and at 9 o'clock, the usual time of registering, there was found to be 1·95 in. in the gauge. It remained without rain until about 11 a.m., after which it rained incessantly until after dark, and the next morning I measured 2·80 in. I estimate that the whole of this rain, 4·75 in., fell in less than 40 hours. The wind was W. on Sunday morning when the rain began, and then gradually veered round to the S.E., where it remained the whole time of the rainfall. This locality is by no means a wet district, the average for the year being about 30 in., yet we have had up to the present date (24th) no less than 7·05 in. this month. I do not remember having recorded over 2 inches before in the 24 hours, except on one occasion, which is now about five years ago. The remarkable part is the continuous nature of the rain for so long a period together.—JAMES REYNOLDS.

OZONÉ TEST PAPERS.

To the Editor of the Meteorological Magazine.

SIR,—Will you or some of your readers kindly tell me what is to be done in the matter of Ozone Observations? My test-papers (Schönbein's) this year are wretched. I have written to Mr. Casella, and have been informed that he can get no better now, and consequently intends to drop the agency. I enclose you some specimens, that you may judge for yourself whether these things are worth using.

Yours, &c.,

J. D. P.

July 11th, 1877.

GREENWICH EXTREME TEMPERATURES.

The extreme Shade Temperatures of the month of July at the Royal Observatory, Greenwich, during the past 36 years.

Year.	Maximum.		Minimum.		Year.	Maximum.		Minimum.	
	deg.	date.	deg.	date.		deg.	date.	deg.	date.
1841	76·6	3	44·3	12	1859	93·0	18	46·5	25
1842	78·8	18	45·5	6	1860	75·0	17	41·6	5
1843	89·8	5	44·6	23	1861	76·3	1, 8	48·4	11
1844	87·4	25	47·1	16	1862	79·0	26	44·6	22
1845	83·3	7	44·6	29	1863	86·0	15	38·7	19
1846	93·3	5	44·4	10	1864	85·6	20	45·8	8, 15
1847	89·4	12	45·4	23	1865	85·0	15, 27	47·0	12
1848	84·5	14	42·7	1	1866	87·2	13	46·0	31
1849	84·1	8	39·5	1	1867	81·5	5	43·3	30
1850	87·0	16	43·5	10	1868	96·6	22	48·2	5
1851	84·4	2	41·4	11	1869	90·9	22	49·1	5
1852	90·3	5	49·2	23	1870	89·7	8	47·1	3
1853	81·7	7	48·3	1	1871	82·6	17	46·8	31
1854	88·7	25	44·0	29	1872	90·9	25	47·0	18
1855	79·3	10	43·7	5	1873	88·7	22	46·4	19
1856	87·5	31	44·0	10, 3	1874	92·0	9	46·2	18
1857	89·7	15	45·7	8	1875	77·5	29	42·5	13
1858	88·2	15	43·8	29	1876	94·0	17	44·7	12

Extremes in 1877, Max. : 88°·2 on 31st ; Min. : 42°·6 on 8th.

	Year.	Max.	Date.	Min.	Date.	Year.
Means of 36 years	...	86·0	15	45·0	15	...
Highest	1868	96·6	22	49·2	23	1852
Lowest	1860	75·0	17	38·7	19	1863
Range .....	...	21·6	...	10·5	...	...

Addiscombe.

EDWD. MAWLEY.

BOOKS RECEIVED.

[HAVING been unable to acknowledge books received for a few months, the following list is naturally longer than usual, but we cannot help calling attention to its unprecedented length, and to the importance of many of the works quoted. No stronger proof of the rapid progress of Meteorology could be given than this list affords.—ED.]

AUSTRALIA.

- ELLERY, R. L. J. Monthly Record of the Observations taken at the Melbourne Observatory, Jan.-Oct., 1876. 8vo.
 RUSSELL, H. C., B.A. Climate of New South Wales, Descriptive, Historical, and Tabular. 8vo. Sydney, 1877.
 TODD, C., C.M.G. Meteorological Observations made at the Adelaide Observatory, Jan.-Dec., 1876. Fcap. folio.

AUSTRIA.

- JELINEK C. UND OSNAGHI F. Jahrbücher der K. K. Central-Anstalt für Meteorologie und Erdmagnetismus. Jahrgang, 1874, Wien, 1876. 4to.
 Zeitschrift der Österreichischen Gesellschaft für Meteorologie, Jan. 1 to Aug. 1, 1877. 8vo.

BELGIUM.

- HOUEAU, J. C. Annales de l'Observatoire Royal de Bruxelles, Jany. and Feby., 1877. 4to.
 „ „ AND BUYS-BALLOT, C. H. D. Observations Météorologiques faites aux Stations Internationales de la Belgique et des Pays-Bas. Jan.-March, 1877. 4to.
 LANCASTER, A. Quelques remarques a propos de l'Hiver der 1876-1877. 8vo. Bruxelles, 1877.

CANADA.

- KINGSTON, G. T. Monthly Meteorological Register at the Magnetical Observatory, Toronto. Jan.-Dec., 1876. 4to.
 „ „ General Meteorological Register for the year 1876 at the Magnetical Observatory, Toronto. 8vo.

CEYLON.

- FYERS, A. B., Lieut.-Col., R.E. Rainfall in Ceylon during the year 1876, and Means during Seven Years. Single sheet folio.
 „ „ „ Results of Meteorological Observations taken in the Surveyor-General's Office, Colombo, during the year 1876. 8vo.
 „ „ „ Results of Meteorological Observations in Ceylon, Feb.-April, 1877. Single sheets folio.

DENMARK.

- Bulletin Météorologique du Nord, publié par les Instituts météorologiques de Norvège, de Danemark et de Suède. Jan.-June, 1877. Oblong 4to.
 Meteorologisk Aarbog for 1875. Udgivet af det Danske Meteorologiske Institut, Anden del. Fcap. folio. 1876.

FRANCE.

- BELGRAND, M., ET LEMOINE, M. G. Service Hydrométrique du bassin de la Seine. Observations sur les Cours d'Eau et la Pluie centralisées pendant l'Année 1875. Folio.

- BORIUS, A. *Le Climat de Brest ses rapports avec l'état Sanitaire. Première partie Température et Pluie.* Brest. 8vo. 1877.
- LEMOINE, M. G. *Service Hydrométrique du Bassin de la Seine, Résumé des Observations Centralisées pennant l'Année 1875.* Versailles. 8vo. 1876.
- MARIÉ-DAVY, M. *Annuaire de l'Observatoire de Montsouris pour l'an 1877.* Paris. 12mo.
- „ „ *Bulletin Mensuel de l'Observatoire de Montsouris, Jan.-March, 1877.* 4to.

GREAT BRITAIN.

- Army Medical Department, *Report for the year 1875.* 8vo. 1877.
- CHRISTIE, W. H. M., M. A. *The Observatory : a Monthly Review of Astronomy, April-July, 1877.* 8vo.
- CLARK, J. E., B. A. *The Natural History Journal, Feb.-April, 1877.* 8vo.
- COKE, R. G. *The Pollution of Rivers and Streams a source of injury to the Land Owner, Tenant Farmer, and the Public Health. (Trans. of the Chesterfield and Derby Institute of Engineers).* 8vo. 1874.
- GLAISHER, J., F. R. S. *On the Mean Temperature of Every Day from all the Thermometrical Observations taken at the Royal Observatory, Greenwich, from 1814 to 1873 (Quarterly Journal of the Met. Soc.).* 8vo.
- HAVILAND, A., M. R. C. S. *Physical Geography in Relation to Sanitary Science. (Proceedings of the National Association for the Promotion of Social Science).* 8vo.
- LASLETT, T. N. *A Description of the Metroscope, an Instrument for measuring inaccessible Heights and Distances, and for Levelling.* 4to.
- Leicester Literary and Philosophical Society. *Transactions, 1835-41.* 8vo. 1876.
- LUCAS, J. *The Chalk Water System. (Minutes of Proceedings of the Institution of Civil Engineers).* 8vo.
- MAIN, Rev. R., M. A. *Results of Meteorological Observations made at the Radcliffe Observatory, Oxford, in 1874.* Oxford. 8vo. 1876.
- Marlborough College Natural History Society. *Report for the half-year ending Christmas, 1876.* Marlborough. 8vo. 1877.
- MARRIOTT, W. *Contributions to Hygrometry, the Wet Bulb Thermometer. (Quarterly Journal of the Met. Soc.).* 8vo.
- MARRIOTT, W. T. *Riparian Rights. (Transactions of the Institution of Surveyors).* 8vo.
- Meteorological Committee. *Meteorological Observations at Stations of the Second Order for the year 1875. Part II.* 4to. 1877.
- „ „ *Quarterly Weather Reports, July-Sept., and Oct.-Dec., 1874.* 4to. 1877.
- „ „ *Monthly Charts of Meteorological Data for nine 10-degree Squares, folio. Remarks to accompany the same,* 4to. 1876.
- „ „ *Supplement to the Report of the Permanent Committee of the First International Congress at Vienna. Meeting at London, 1876.* 8vo. 1877.
- Mill Hill Magazine, Dec., 1876. 8vo.
- NICOL, Dr. J. *Llandudno as a Health Resort.* 4to. 1877.
- READE, T. MELLARD, C. E. *On Geological Time. Presidential Address to the Liverpool Geological Society.* 8vo. 1877.
- REDMAN, J. B., C. E. *On the River Thames (Minutes of Proceedings of the Institution of Civil Engineers).* 8vo.
- Report of the Astronomer Royal to the Board of Visitors of the Royal Observatory, Greenwich.* 1877. 4to.
- Report of the Kew Committee for the year ending October 31st, 1876.* 8vo.
- Rugby School Natural History Society. Report for the year 1876.* Rugby. 8vo. 1877.

- SLADE, H. P. A short practical treatise on Dew Ponds. 8vo. 1877.
- STEWART, Prof. BALFOUR, LL.D., F.R.S. On an Instrument for measuring the Direct Heat of the Sun (from Memoirs of the Literary and Philosophical Society of Manchester). 8vo. 1877.
- „ „ On the Variations of the Daily Range of Atmospheric Temperature as recorded at Kew Observatory (from the proceedings of the Royal Society). 8vo. 1877.
- „ „ On the Variations of the Daily Range of the Magnetic Declination as recorded at Kew Observatory (from the proceedings of the Royal Society). 8vo. 1877.
- Stonyhurst College Observatory Results of Meteorological and Magnetical Observations, 1876. 8vo. 1877.
- TAAFFE, R. P. B., M.D. Report to the Sanitary Committee for the fourth quarter of 1876. Brighton. 1877. 4to.
- TARBOTTON, M. O., F.G.S. Meteorological Observations in Nottingham during 1876. Fcap folio.
- TRIBE, J. W., M.D. Report of the Sanitary State of the Hackney district for 1875, and for the 20 years, 1856-75. 8vo. 1876.
- Watford Natural History Society Transactions, March, 1877. 8vo.
- Yorkshire Philosophical Society Annual Report for 1875. York. 1876. 8vo.

HAMBURG.

- NEUMAYER, Dr. Deutsche Seewarte. Monatliche Übersicht der Witterung, Jan-May, 1876, and Jan., 1877. 8vo.

ITALY.

- GUIDI, L. Curves of the Meteorological and Magnetic Observations at the Pesaro Observatory, July-Dec., 1876. Single sheets folio.
- LUVINI, J. Le Diéthéroscope Troisième communication faite à l'Académie des Sciences de Turin. 8vo.
- RAGONA, D. Progetto di una Società Meteorologica Italiana. Modena. 8vo. 1876.
- SECCHI, P. A. Bulletino Meteorologico dell'Osservatorio del Collegio Romana, Jan.-May, 1877. 4to.

JAPAN.

- JOYNER, H. B., C.E. The Progress and Ultimate Results of Meteorology especially considered in reference to Japan. Tokei. 8vo.

PRUSSIA.

- KARSTEN, Dr. G. Ergebnisse der Beobachtungsstationen an den deutschen Küsten. March-Sept., 1876. Oblong 4to. Berlin.

RUSSIA.

- WILD, H. Annalen des Physikalischen Central-Observatoriums, Jahrgang, 1875. Anhang. 4to. 1876. St. Petersburg.
- „ „ Monats und Jahresresumés der Beobachtungen der Meteorologischen Stationen in Russland. Aus den Annalen des Physikalischen Central-Observatoriums. Jahrgang, 1875. 4to. 1876. St. Petersburg. 4to.

SWEDEN.

- HILDERBRANDSSON, Dr. H. H. Bulletin Météorologique Mensuel de l'Observatoire de l'Université d'Upsal. Sept.-Oct., 1876. 4to.
- RUBENSON, R. Manads-och Arsmedia af Temperaturen på Statens Meteorologiska Stationer Under Åren, 1859-1872. 4to. 1876. Stockholm.
- „ „ Om Storleken af Temperaturens Dagliga Variation i Sverige. 4to. 1877. Stockholm.

UNITED STATES.

HINRICH, Dr. G. Iowa Weather Review, June, 1876. 4to.

LOOMIS, ELIAS. Contributions to Meteorology, being Results derived from an Examination of the Observations of the United States Signal Service, and from other sources. Sixth and Seventh Papers (American Journal of Science and Arts). 8vo.

Report of the State Board of Health of Massachusetts. 1877. 8vo. Boston.

SUPPLEMENTARY TABLE OF RAINFALL IN JULY, 1877.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see Met. Mag., Vol. XI., p. 28., but the list is under revision and further details will be given in a month or two.]

Div.	Station.	Total Rain.	Div.	Station.	Total Rain.
		in.			in.
II.	Acol	2.01	XI.	Llanfrechfa	4.18
„	Hailsham	2.48	„	Castle Malgwyn	4.81
„	St. Lawrence, I. of W....	2.19	„	Heyope .....	...
„	Andover.....	3.85	„	Carno	4.33
„	Strathfield Turgiss	2.53	„	Rhug, Corwen	2.76
III.	Addington Manor.....	2.49	„	Port Madoc	6.82
„	Oxford	3.08	XII.	Melrose	4.74
„	Northampton	3.17	XIV.	Cessnock, Glasgow	2.98
„	Cambridge.....	2.71	XV.	Gruinart	4.18
IV.	Sheering	3.82	XVII.	Keith	3.57
„	Ipswich	3.35	XVIII.	Dalwhinnie	4.12
„	Diss	3.12	„	Auchnasheen	6.01
„	Swaffham	3.27	„	Springfield, Tain	2.75
V.	Compton Bassett	4.74	XX.	Skibbereen .....	...
„	Dartmoor	11.49	„	Glenville, Fermoy	2.49
„	Teignmouth	2.28	„	Tralee	3.29
„	Langtree, Torrington ..	5.72	„	Newcastle W., Limerick ..	1.42
„	Cosgarne, St. Austell ...	5.02	„	Kilrush	2.44
„	Taunton.....	3.05	XXI.	Kilkenny	2.11
VI.	Bristol	3.39	„	Kilsallaghan	3.14
„	Sansaw	3.39	„	Twyford, Athlone	3.62
„	Cheadle	4.34	XXII.	Ballinasloe.....	2.58
VII.	Coston, Melton Mowbray ..	2.94	„	Kylemore	7.40
„	Bucknall	2.32	„	Carrick on Shannon.....	2.01
VIII.	Walton, Liverpool	5.16	XXIII.	Rockcorry	3.55
„	Broughton-in-Furness ..	5.55	„	Warrenpoint	4.02
IX.	Stanley, Wakefield	2.46	„	Carnlough, Larne. ....	...
X.	Gainford	3.60	„	Bushmills	4.12
„	Shap	5.78	„	Buncrana	4.67

JULY, 1877.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.						TEMPERATURE.						No. of Nights below 32°
		Total Fall.	Difference from average 1860-5	Greatest Fall in 24 hours.		Days on which .01 or more fell.	Max.		Min.		In shade	On grass		
				Dpth	Date.		Deg.	Date.	Deg.	Date.				
inches													in.	
I.	Camden Town	3.94	+ 2.15	.71	14	14	87.1	31	43.6	6	0	0		
II.	Maidstone (Hunton Court)...	1.85	+ .21	.73	14	10	...	...	...	...	...	...
III.	Selborne (The Wakes).....	5.19	+ 2.99	1.11	14	15	80.0	31	42.0	6, 8	0	0		
III.	Hitchen	3.23	+ 1.33	.55	14	17	75.0	31	42.0	6, 7	0	0		
IV.	Banbury	4.52	+ 2.46	1.25	14	19	79.0	29*	41.0	6	0	...		
IV.	Bury St. Edmunds (Culford)...	3.11	+ 1.12	.65	14	18	82.0	31	40.0	7	0	0		
V.	Norwich (Sprowston).....	3.25	...	.59	14	18	...	...	...	...	...	...
V.	Bridport	2.12	+ .01	.62	25	7	...	...	...	...	...	...
ENGLAND.	Barnstaple.....	4.80	+ 1.94	1.08	15	18	77.0	31	45.0	8	0	...		
VI.	Bodmin	4.93	+ 1.82	.82	14	24	75.0	31	44.0	6	0	0		
VI.	Cirencester	3.98	+ 1.54	1.45	14	19	...	...	...	...	...	...
VI.	Shifnal (Haughton Hall) ...	5.63	+ 3.46	3.04	14	16	76.0	30	43.0	6	0	0		
VI.	Tenbury (Orleton)	3.33	+ .95	.92	14	22	81.6	30	39.3	5	0	0		
VII.	Leicester (Belmont Villas) ...	2.64	...	.74	14	18	79.8	30	44.0	7	0	...
VII.	Boston	2.82	+ .52	...	...	16	80.0	28	43.0	8	0	...
VII.	Grimsby (Killingholme).....	2.23	...	.40	14	17	76.0	29	44.0	8	0	...
VII.	Mansfield	2.55	...	.85	14	15	81.9	29	41.0	8	0	0
VIII.	Manchester .....	...	...	...	...	...	...	...	...	...	...	...
IX.	York	2.99	+ 1.05	.52	14	12	...	...	...	...	...	...
IX.	Skipton (Arncliffe)	7.71	+ 4.48	1.90	14	28	72.0	30	36.0	6, 7	0	...		
X.	North Shields	2.43	+ .62	.80	17	14	...	...	...	...	...	...
X.	Borrowdale (Seathwaite).....	15.45	+ 7.31	2.35	21	27	...	...	...	...	...	...
XI.	Cardiff (Crockherbtown).....	4.94	...	1.27	14	18	75.0	30*	40.0	12	0	0		
XI.	Haverfordwest	4.43	+ 1.13	1.20	22	12	70.0	9†	39.0	26	0	...		
XI.	Aberdovey.....	6.03	...	1.43	15	18	77.0	12	46.0	6	0	...		
XI.	Llandudno.....	5.28	+ 2.99	1.65	15	19	74.1	30	47.0	6	0	...		
XII.	Dumfries (Crichton Asylum)...	4.79	+ 2.26	1.00	14	25	68.3	25	40.0	8	0	...		
XII.	Hawick (Silverbut Hall).....	4.70	...	.79	17	24	...	...	...	...	...	...
XIV.	Kilmarnock (Annanhill).....	4.09	...	.48	17	28	66.1	31	42.1	6	0	0
XV.	Castle Toward	4.84	+ 1.70	1.03	17	28	67.0	17	37.0	6	0	...		
XVI.	Mull (Quinish)	5.31	...	1.11	21	26	...	...	...	...	...	...
XVI.	St Andrews (Cambo Ho.) ...	2.75	...	...	...	...	...	...	...	...	...	...
XVI.	Grandtully	2.94	...	.60	15	12	...	...	...	...	...	...
XVII.	Braemar	3.29	+ 1.01	.76	15	22	67.2	9	38.3	20	0	0		
XVII.	Aberdeen	3.04	...	.43	19	22	72.7	30	42.5	8	0	0
XVIII.	Gairloch	4.56	...	1.06	30	26	...	...	...	...	...	...
XVIII.	Portree	6.22	+ .15	.71	30	29	...	...	...	...	...	...
XVIII.	Inverness (Culloden)	2.81	+ .14	.65	16	21	68.7	22	39.9	5	0	0		
XIX.	Helmsdale	2.89	...	.65	16	20	...	...	...	...	...	...
XIX.	Sandwick	2.85	+ .96	.48	19	24	65.7	22	45.0	23	0	0		
XX.	Caherciveen Darrynane Abbey	2.89	...	.70	25	21	...	...	...	...	...	...
XX.	Cork	1.43	...	.33	3	8	...	...	...	...	...	...
XX.	Waterford	2.35	— .97	.53	22	15	80.0	29	48.0	25	0	0		
XX.	Killaloe	2.59	— .60	.30	5	25	85.0	30	38.0	4	0	...		
XXI.	Portarlinton	2.80	— .74	.80	16	24	76.0	30	43.0	5	0	0		
XXI.	Monkstown, Dublin	3.21	+ .78	.79	15	18	83.0	30	44.0	4, 17	0	0		
XXII.	Galway	3.20	...	.48	15	25	70.0	30	39.0	6	0	0
XXII.	Ballyshannon	5.17	...	1.00	15	30	...	...	...	...	...	...
XXIII.	Waringstown	4.92	...	1.70	16	26	77.0	14	40.0	4	0	0		
XXIII.	Edenfel (Omagh)	4.31	...	1.41	15	28	68.0	30	40.0	5, 6	0	0		

* And 31. † 10, 14, 27.

+Shows that the fall was above the average; —that it was below it.

METEOROLOGICAL NOTES ON JULY.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

SELBORNE.—Heavy R and H during a TS on 3rd; distant T on 7th; most oppressive on 31st. Mean max. temp. $66^{\circ}\cdot8$; mean min. $51^{\circ}\cdot4$. Prevailing wind, first half of the month N.W. and W.; remainder S.W. and W.

HITCHIN.—With the exception of 1875, the coldest July on our record.

BANBURY.—L on 5th, T on 7th, and TS on 6th and 16th. High wind and max. rainfall on 14th. Hay making not finished at the end of the month.

CULFORD.—T on 15th and 31st. Mean temp. of the month $60^{\circ}\cdot8$. Easterly winds only prevailed during two days.

BODMIN.—Mean temp. of month, $59^{\circ}\cdot8$. Rainfall above the average of 28 years.

HAUGHTON HALL, SHIFNAL.—An excessive rainfall, the greatest since 1855, when $5^{\circ}\cdot83$ was recorded; the fall this month ($5^{\circ}\cdot63$) is $3^{\circ}\cdot46$ above the average; the fall on the 14th beyond all precedent here, $3^{\circ}\cdot04$ fell in 24 hours, and $\cdot82$ in addition on the next day (St. Swithin); although distant T was heard in the N., nothing more took place here on the 14th, but a severe storm occurred at Newport, 9 miles N., from 12 to 1 p.m.; the rain was quite tropical. T was also heard in the afternoons of 4th and 5th. The nights were cold throughout, only six being above 55° . Root crops are patchy; wheat good on light and loamy soils, bad on strong soils.

ORLETON.—The same damp and sunless weather that has prevailed for so long a period, continued till near the end of this month, with rough winds, veering frequently from S.E. to S.W. and N.W. During the first 28 days there were only four on which the max. temp. in the shade reached 70° . A sudden change then took place, and the last three days were very fine and hot. The mean temp. of the month was nearly $2\frac{1}{4}^{\circ}$ below the average. R fell on almost every day, but frequently in very small quantities. A storm of L and T occurred on 5th, and distant T was heard on the 6th, 7th, 14th, and 31st.

LEICESTER.—A very favourable month for vegetation; rainfall slightly above the average, but equally distributed; no very warm weather till the last two or three days of the month. Wind generally W. to S.W.

GRIMSBY.—T at 1 p.m. and T, L and R at 4.20 p.m. on 5th; TS in morning and T at intervals in afternoon of 6th; T at mid-day on 14th, and at 1.45 p.m. on 17th. Very beautiful cir-cu at 11 p.m. on 27th. The month, as a whole, cold and cloudy, not ripening the corn, but the showers greatly improved the crops and filled the ears. The last three days splendid weather; much haze on 31st. Hay crops not equal to those of last year.

MANSFIELD.—T and R at 6 p.m. on 5th; the beginning and end of the month hot and bright sunny days; the remaining parts generally dull and showery.

ARNcliffe.—TS on 6th, 7th, and 14th. Rainfall in one hour, 2.30 to 3.30., $\cdot70$, and in the following three hours, 3.30 to 6.30, $\cdot72$, being $1^{\circ}\cdot42$ in four hours, in afternoon of the 14th, the total fall on that day being $1^{\circ}\cdot90$; $1^{\circ}\cdot72$ fell on the following day, the 15th, and $1^{\circ}\cdot18$ fell on 23rd; the fall during the month was $7^{\circ}\cdot71$, being more than double the average. The month was unusually dark and rainy.

SEATHWAITE.—Total fall $15^{\circ}\cdot45$, being $7^{\circ}\cdot31$ above the average; there were six days on which the fall exceeded $1^{\circ}\cdot00$. T on 6th, 7th, and 20th.

WALES.

HARVERFORDWEST.—A cold cloudy wet July, very little sun; temperature reached 70° only on four days. Hay operations much retarded; corn harvest likely to be very late. Scarletina prevailing.

ABERDOVEY.— $6^{\circ}\cdot03$, about twice the average fall of rain for this place, arising probably from the prevalence of westerly winds. In neighbouring parts, more to the E., where the fall is generally greater than at Aberdovey, such as Carno,

Llanidloes, Newtown, &c., there has been less than here. Heavy falls on 15th and 22nd, 1·43 and 1·06.

LLANDUDNO.—T and L more or less on 5th, 6th, 7th and 15th. Oats in ear on 7th. The month began and ended warm, but otherwise it was cold, 1° below the average.

SCOTLAND.

DUMFRIES.—The weather during the month has been of a very irregular character, generally damp, chilly and cloudy, the evenings cold; the mean temp. was 55°·0 as compared with 55°·4 last month.

HAWICK.—A very wet and cold month, with but little sunshine to enable the farmers to house their fine crop of hay. Potatoes keep clear so far of disease and Colorado beetles. Thunder showers on the 6th. First wasp of the season seen on 23rd. More than half the total rainfall of the month fell on 14th, 15th, 16th, and 17th. On 26th hay got into the barn.

ANNANHILL.—Rainfall above the average; bar. pressure below that of last month; temperature about the same; winds principally W. and S.W., usually light to fresh. Gales on 24th to 30th, and high wind on 10th and 15th. T heard and L seen on 6th and 17th; heavy R and H on the same dates. Pastures good and crops looking well, but the harvest will be late. Forest foliage very fine.

CASTLE TOWARD.—This has been a very wet month throughout; we have had little or no sunshine, and only three dry days during the month; it has been very backward weather for all kinds of out-door labour, more especially for hay-making; but little hay cut yet in this district; grass looks well and is in abundance now; crops of all kinds are an average, but later this season than in former years.

QUINISH.—The rainfall in the months of June and July has been unusually large.

BRAEMAR.—A damp and cloudy month, crops looking well, but very backward, sunshine much wanted.

ABERDEEN.—Bar. pressure and estimated wind pressure below the average; temp. and rainfall above it. Winds from N., S., and S.W. more frequent than usual. TS on 3rd, 12 to 1 p.m. A month of rather unsettled weather.

PORTREE.—A very wet, stormy and cold month; distant T on 5th; Heavy crops of all kinds, but very backward, fully a month later than usual. Cattle and sheep healthy, and thriving well on the grass.

CULLODEN.—Very heavy shower of H in the afternoon of the 4th. Solar halo in forenoon of 9th; T in afternoon of 14th with R; fog on 15th, 17th, and 19th, R slightly above the average.

SANDWICK.—July has been a very wet month, but more remarkable for the number of wet days (24) than for any heavy fall, the greatest fall having only been ·48, which fell on the 19th.

IRELAND.

DARRYNANE.—Early part of the month rather fine, but cold for the season, last few days very foggy. Potato blight spreading very fast.

KILLALOE.—R fell on 25 days during the month, much perplexing the hay-makers. General character of the month dull and sultry, but it closed with three brilliant days. Mean temp. 61°, the same as June, and rather less than July, 1876. Potato disease appeared about the 10th of the month, and is increasing. Corn harvest likely to be late.

MONKSTOWN.—With the exception of the last three days, a cold damp July, very unlike summer.

EDENFELL, OMAGH.—There has been no return during the entire month of the short summer which ended with the TS of the 20th of June. On the contrary, July has been characterized by strong winds, constant R, and low temperature, the thermometer having only on one occasion marked a higher degree than 62°; there has been no sun to mature the splendid crops forced into luxuriance by the heat of June, nor drought to save the hay, and at present the prospects of the farmers are again gloomy.