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THUNDERSTORMS IN RUSSIA.

PROFESSOR KLOSSOVSKY, of Odessa, has just issued an abstract in French* of the careful and elaborate paper which he published in Russian in 1884. Unfortunately we can only read Russian at a snail's pace, and the 116 pages of Professor Klossovsky's original work would *per se* have been beyond our power; but as he has been kind enough to send us both the full Russian memoir, and the French abstract, the two are mutually helpful, and enable us to lay before our readers a short account of one of the most careful studies of the causes and of the geographical distribution of thunderstorms which we remember having seen.

In the year 1871, the Imperial Geographical Society of St. Petersburg issued blank forms, giving instructions for observations of thunderstorms which would not require the use of instruments, but which should supply the following details :—

Government (*i.e.*, the equivalent of "country.")
District (*i.e.*, the equivalent of county.)
Place of Observation.
Thunderstorm date, month, year.

Time of	Commencement. Ending.
Cardinal Points	Whence it came, Whither it went.
Intensity	Lightning. Thunder.
Amount & Duration.	Rain. Hail.
Direction & Velocity.	Wind near the earth's surface, Movement of clouds.

Signature.

From the Russian memoir, it appears that during the 10 years 1873 to 1882, nearly six thousand such reports were received from a

* Les Orages en Russie. A. Klossovsky, Professeur à l Université d'Odessa. 8vo. 32 pages. Odessa, Imprimerie d'Odessky Westnik, 1886.

total of 176 stations, but this was not sufficient for so vast an empire as that of all the Russias (for it must be remembered that this memoir embraces Asiatic as well as European Russia). Prof. Klossovsky therefore searched the *Annales de l'Observatoire physique de St. Petersbourg* for 17 years, and also the records for five years of the claims upon a Russian Hailstorm Insurance Society.

The work is divided into three sections, of each of which we will give a brief epitome.

The author has determined (and gives in the Russian edition) the mean monthly and annual number of storms at 145 stations. It is rather a pity that he did not lay the annual values down upon a map, as it would have saved others the trouble of doing it perhaps several times over. However, probably the following table, which we have worked out from Prof. Klossovsky's data, will give a sufficient general idea :—

District.	No. of Stations.	Mean No. of Days with Storm.	Highest.*	
Northern Russia	11	8·0	Bielosiersk	11·3
Baltic Provinces	21	9·4	Dorpat	13·4
Western Provinces	12	15·3	Stary-Bychow	26·0
Central Provinces	12	15·9	Tambof	26·2
Southern Russia and Crimea	11	15·4	Kichineff	32·7
Uralia	6	20·5	Blagodat	26·1
Caucasia	10	26·6	Tiflis	40·8
Shores of the Caspian	5	7·1	Astrabad	12·0
Siberia	17	14·2	Kaltuk (on Lake Baikal)	24·6
Central Asia	4	8·4	Irgis	11·0

The district where storms are most frequent is the Caucasus, where there are generally about 30 in a year; at Tiflis there are 41. On the contrary, they are rare on the shore of the Caspian, in Central Asia, Northern Siberia, at Kola in Lapland, and at Archangel. The author examines the yearly frequency of storms, and finds that of the ten years 1870-79, they were most numerous in 1872, and rarest in 1874; he mentions incidentally that 1874 was a year of minimum sunspots, but if so the max. in 1872 is too uncomfortably close to the minimum to harmonize with an eleven-year sunspot period.

The preponderances of storms in the twelve hours between noon and midnight (81 per cent.), over those between midnight and noon (19 per cent.) is very marked.

The few thunderstorms which occur in Northern Russia occur almost solely in the summer, 86·2 per cent. of the total number are in the three summer months, and a nearly equally large proportion occur in those months in the Ural mountains, and throughout Siberia; but less than three-quarters of the total storms occur in the

* We do not give the lowest, because in several cases it seems evident that the observers have not been careful—*e.g.*, Novaia Ladoga, which reports 3·8, has two stations near to it reporting 9·6 and 11·6 respectively; and again, Weissenstein, with 6·8, has for its nearest neighbours Pernau, with 12·0, and Dorpat with 13·4. It is therefore probable that all the means are below rather than above the truth.

summer in Central, Eastern, and Southern Russia, and in the Caucasus. In the last-named district there are more autumn and winter storms than in any other part of Russia. The author seems to have drawn (but not printed) a map of storm frequency, and to have compared it with the curves in Dr. Wild's great work on the temperature of Russia,* but though there was some correspondence, it was not close. Prof. Klossovsky then computed from the *Annales* the mean annual and seasonal rainfall for 48 stations, the annual values did not help him much, but the summer ones did. We must, however, express a little hesitation as to whether this relation should not be regarded rather as the effect than the cause of the distribution of thunderstorms. We quite agree with the author that the essentials for a heavy thunderstorm are a high temperature and moisture; but a thunderstorm is usually accompanied by rain and hail, and hence our difficulty as to which is cause and which effect.

The author proceeds to study very carefully the relations of thunderstorms and of storm tracks to cyclonic systems. He devotes nearly 50 pages of the Russian memoir to placing side by side a daily epitome of the weather of Europe according to Hoffmeyer's charts, and the details obtained from his own reporters respecting the occurrence of storms.

He gives a table which we may reduce into two lines, and which shows that thunderstorms do not prevail with low barometer readings :—

Sea Level Pressure...	28·9 to 29·1	to 29·3	to 29·5	to 29·7	to 29·9	to 30·1	to 30·3
Per centage of thunderstorms ...	0·1	0·3	5·8	37·5	48·3	7·9	0·1

He then remarks that his researches have convinced him that thunderstorms in Russia are small and unimportant eddies or whirlwinds due to the segmentation of the periphery of a cyclone, and he proceeds to discuss the 4,519 storm reports, in order to ascertain in which quadrant of a cyclone they are most frequent, and finds a great preponderance in the quadrant between S. and E.

Prof. Klossovsky then discusses the reports which he has received respecting hailstorms, and finds that they are most prevalent in the same portion of cyclones, and he concludes by remarking that this S.E. quadrant has already been pointed out as that in which tornadoes are generally formed, and that therefore there may fairly be assumed to be some points of analogy between an ordinary Russian thunderstorm and the furious tornadoes of some other countries.

* Die Temperaturverhältnisse des Russischen Reiches. 4to.

MR. AITKEN ON DEW.

[It is not often that we allot any of the limited space at our command to reprints. The following is, however, so essentially appropriate to our pages, and so many of our readers are competent to discuss it, that we think its reproduction a duty. The following is the abridgment published in *Nature.* The paper was read before the Royal Society of Edinburgh on December 21st, 1885.—Ed.]

The first point referred to in this paper is the source of the vapour that condenses to form dew. A short historical sketch is given of the successive theories from time to time advanced on this point, showing how in early times dew was supposed to descend from the heavens, and then afterwards it was suggested that it rose from the earth, while Dr. Wells, who has justly been considered the great master of this subject, thought it came neither from above nor from below, but was condensed out of the air near the surface of the earth. He combated Gersten's idea that it rose from the earth, and showed that all the phenomena observed by Gersten and others which were advanced to support this theory could be equally well explained according to the theory that it was simply formed from the vapour present at the time in the air, and which had risen from the ground during the day, and concluded that if any did rise from the ground during night, the quantity must be small, but, with great caution, he adds that "he was not acquainted with any means of determining the proportion of this part to the whole."

A few observations of the temperature of the ground near the surface and of the air over it, first raised doubts as to the correctness of the now generally received opinion that dew is formed of vapour existing at the time in the air. These observations, made at night, showed the ground at a short distance below the surface to be always hotter than the air over it; and it was thought that so long as this excess is sufficient to keep the temperature of the surface of the ground above the dew-point of the air, it will, if moist, give off vapour; and it will be this rising vapour that will condense on the grass and form dew, and not the vapour that was previously present in the air.

The first question to be determined was whether vapour does, or does not, rise from the ground on dewy nights. One method tried of testing this point was by placing over the grass, in an inverted position, shallow trays made of thin metal and painted. These trays were put over the ground to be tested after sunset and examined at night, and also next morning. It was expected that, if vapour was rising from the ground during dewy nights, it would be trapped inside the trays. The result in all the experiments was that the inside was dewed every night, and the grass inside was wetter than that outside. On some nights there was no dew outside the trays, and on all nights the inside deposit was heavier than the outside one.

An analysis of the action of these trays is given, and it is concluded that they act very much the same as if the air was quite still. Under these conditions vapour will rise from the ground so long as the vapour-tension on the surface of the ground is higher than that at the top of the grass, and much of this rising vapour is, under ordinary conditions, carried away by the passing air, and mixed with a large amount of drier air, whereas the vapour rising under the trays is not so diluted; and hence, though only cooled to the same amount as the air outside, it yields a heavier deposit of dew.

Another method of testing this point was employed, which consisted in weighing a small area of the exposed surface of the ground, as it was evident that if the soil gave off vapour during a dewy night it must lose weight. A small turf about 6 inches (152 mm.) square, was cut out of the lawn and placed in a small shallow pan of about the same size. The pan with its turf, after being carefully weighed, was put out on the lawn in the place where the turf had been cut. It was exposed for some hours while dew was forming, and on these occasions it was always found to lose weight. It was thus evident that vapour was rising from the ground while dew was forming, and therefore the dew found on the grass was formed of part of the rising vapour, trapped or held back by coming into contact with the cold blades of grass.

The difference between these experiments in which the exposed bodies *lose* weight, and the well-known ones in which bodies are exposed to radiation, and the amount of dew formed is estimated by the *increase* in their weight, is pointed out. In the former case the bodies are in good heat-communication with the ground, whereas in the latter, little or no heat is received by conduction from the earth.

Another method employed for determining whether the conditions found in nature were favourable for dew rising from the ground on dewy nights, was by observations of the temperatures indicated by two thermometers, one placed on the surface of the grass, and the other under the surface, amongst the stems, but on the top of the soil. The difference in the readings of these two thermometers on dewy nights was found to be very considerable. From 10° to 18° F. was frequently observed. A minimum thermometer placed on, and another under, the grass, showed that during the whole night a considerable difference was always maintained. As a result of this difference of temperature, it is evident that vapour will rise from the hotter soil underneath, into the colder air above, and some of it will be trapped by coming into contact with the cold grass.

While the experiments were being conducted on grass land parallel observations were made on bare soil. Over soil the inverted traps collected more dew inside them than those over grass. A small area of soil was spread over a shallow pan, and after being weighed was exposed at the place where the soil had been taken out, to see if bare soil as well as grass lost weight during dewy nights. The result was that on all nights on which the tests were made the soil lost weight, and lost very nearly the same amount as the grass land.

Another method employed of testing whether vapour is rising from bare soil, or is being condensed upon it, consisted in placing on the soil, and in good contact with it, small pieces of black mirror, or any substance having a surface that shows dewing easily. In this way a small area of the surface of the earth is converted into a hygroscope, and these test-surfaces tell us whether the ground is cooled to the dew-point or not. So long as they remain clear and undewed, the surface of the soil is hotter than the dew-point, and vapour is being given off, while if they get dewed, the soil will also be condensing vapour. On all nights observed, these test-surfaces kept clear, and showed the soil to be always giving off vapour.

All these different methods of testing point to the conclusion that during dewy nights, in this climate, vapour is constantly being given off from grass land, and almost always from bare soil; that the tide of vapour almost always sets outwards from the earth, and but rarely ebbs, save after being condensed to cloud and rain, or on those rarer occasions on which, after the earth has got greatly cooled, a warm moist air blows over it. The results of some of the experiments are given, showing, from weighings, the amount of vapour lost by the soil at night, and also the heat lost by the surface soil.

It seems probable that when the radiation is strong, that soil, especially if it is loose and not in good heat-communication with the ground, will get cooled below the dew-point, and have vapour condensed upon it. On some occasions the soil certainly got wetter on the surface, but the question still remains, Whence the vapour? Came it from the air, or from the soil underneath? The latter seems the more probable source: the vapour rising from the hot soil underneath will be trapped by the cold surface soil, in the same way as it is trapped by grass over grass land. During frost, opportunities are afforded of studying this point in a satisfactory manner, as the trapped vapour keeps its place where it is condensed. On these occasions the under sides of the clods, at the surface of the soil, are found to be thickly covered with hoar-frost, while there is little on their upper or exposed surfaces, showing that the vapour condensed on the surface soil has come from below.

The next division of the subject is on dew on roads. It is generally said that dew forms copiously on grass, while none is deposited on roads, because grass is a good radiator and cools quicker, and cools more, than the surface of a road. It is shown that the above statement is wrong, and that dew really does form abundantly on roads, and that the reason it has not been observed is that it has not been sought for at the correct place. We are not entitled to expect to find dew on the surface of roads as on the surface of grass, because stones are good conductors of heat, and, the vapour-tension being higher underneath than above the stones, the result is, the rising vapour gets condensed on the under sides of the stones. If a road is examined on a dewy night, and the gravel turned up, the under sides of the stones are found to be dripping wet.

Another reason why no dew forms on the surface of roads is that the stones, being fair conductors, and in heat-communication with the ground, the temperature of the surface of the road is, from observations taken on several occasions, higher than that of the surface of the grass alongside. The air in contact with the stones is, therefore, not cooled so much as that in contact with the grass.

For studying the formation of dew on roads, slates were found to be useful. One slate was placed over a gravelly part of the road, and another over a hard dry part. Examined on dewy nights the under sides of these slates were always found to be dripping wet, while their upper surfaces, and the ground all round, were quite dry.

The importance of the heat communicated from the ground is illustrated by a simple experiment with two slates or two iron weights, one of them being placed on the ground, either on grass or on bare soil, and the other elevated a few inches above the surface. The one resting on the ground, and in heat-communication with it, is found always to keep dry on dewy nights, whereas the elevated one gets dewed all over.

The effect of wind in preventing the formation of dew is referred to. It is shown that, in addition to the other ways already known, wind hinders the formation of dew by preventing an accumulation of moist air near the surface of the ground.

An examination of the different forms of vegetation was made on dewy nights. It was soon evident that something else than radiation and condensation was at work to produce the varied appearances then seen on plants. Some kinds of plants were found to be wet, while others of a different kind, and growing close to them, were dry, and even on the same plant some branches were wet, whilst others were dry. The examination of the leaf of a broccoli plant showed better than any other that the wetting was not what we might expect if it were dew. The surface of the leaf was not wet all over, and the amount of deposit on any part had no relation to its exposure to radiation, or access to moist air ; but the moisture was collected in little drops, placed at short distances apart, along the very edge of the leaf. Closer examination showed that the position of these drops had a close relation to the structure of the leaf ; they were all placed at the points where the veins in the leaf came to the outer edge, at once suggesting that these veins were the channels through which the liquid had been expelled. An examination of grass revealed a similar condition of matters : the moisture was not equally distributed over the blade, but was in drops attached to the tips of some of the blades. These drops, seen on vegetation on dewy nights, are therefore not dew at all, but are an effect of the vitality of the plant.

It is pointed out that the excretion of drops of liquid by plants is no new discovery, as it has been long well known, and the experiments of Dr. Moll on this subject are referred to ; but what seems strange is that the relation of it to dew does not seem to have been recognised.

Some experiments were made on this subject in its relation to dew. Leaves of plants that had been seen to be wet on dewy nights were experimented on. They were connected by means of an india-rubber tube with a head of water of about 1 metre, and the leaf surrounded with saturated air. All were found to exude a watery liquid after being subjected to pressure for some hours, and a broccoli leaf got studded all along its edge with drops, and presented exactly the same appearance it did on dewy nights. A stem of grass was also found to exude at the tips of one or two blades when pressure was applied.

The question as to whether these drops are really exuded by the plant, or are produced in some other way, is considered. The tip of a blade of grass was put under conditions in which it could not extract moisture from the surrounding air, and, as the drop grew as rapidly under these conditions as did those on the unprotected blades, it is concluded that these drops are really exuded by the plant. Grass was found to get "dewed" in air not quite saturated.

On many nights no true dew is formed, and nothing but these exuded drops appears on the grass ; and on all nights when vegetation is active, these drops appear before the true dew, and if the radiation is strong enough and the supply of vapour sufficient, true dew makes its appearance, and now the plants get equally wet all over, in the same manner as dead matter. The difference between true dew on grass, and these exuded drops, can be detected at a glance. The drops are always exuded at a point near the tip of the blade, and form a drop of some size, while true dew is distributed all over the blade. The exuded liquid forms a large diamond-like drop, while the dew coats the blade with a pearly lustre.

Towards the end of the paper the radiating powers of different surfaces at night is considered, and after a reference to some early experiments on this subject, the paper proceeds to describe some experiments made with the radiation-thermometer described by the author in a previous paper. When working with this instrument it is placed in a situation having a clear view of the sky all round, and is fixed at the same height as the ordinary thermometer-screen, which is worked along with it, the difference between the thermometer in the screen and the radiation-thermometer being observed. This difference in clear nights amounts to from 7° to 10°. By means of the radiation-thermometer the radiating powers of different surfaces were observed. Black and white cloths were found to radiate equally well; soil and grass were also almost exactly equal to each other. Lampblack was equal to whitening. Sulphur was about 2/3rds of black paint, and polished tin about 1/7th of black paint. Snow in the shade on a bright day was at midday 7° colder than the air, while a black surface at the same time was only 4° colder. This difference diminished as the sun got lower, and at night both radiated almost equally well.

ROYAL METEOROLOGICAL SOCIETY.

THE annual General Meeting of this Society was held on Wednesday evening, January 20th, at the Institution of Civil Engineers, Mr. R. H. Scott, F.R.S., President, in the chair.

The Secretary read the report of the Council, which stated that the past year had been one of great activity, as the eight Committees which had been appointed had met frequently, and had done much for the advancement of meteorology. The number of Fellows on the roll of the Society is 537.

The President (Mr. R. H. Scott), in his address, said that as he had treated of land climatology in his previous address, he proposed to deal with marine climatology on the present occasion, and to take up the subject at the point where he had left it in his paper, "Remarks on the Present Condition of Marine Meteorology," printed in the Society's "Quarterly Journal" for 1876. He enumerated the various investigations which had been announced as in progress at that date, and specified the several outcomes of these enquiries which had seen the light during the ten years. The "Meteorological Charts for the Ocean District Adjacent to the Cape of Good Hope," published by the Meteorological Office in 1882, was first noticed, and the methods of "weighting" observations of wind, &c., employed in that work were fully explained, as well as the mode of representing barometrical results. The "Charts Showing the Surface Temperature of the Atlantic, Indian, and Pacific Oceans," published in 1884; and those of barometrical pressure, now in the engraver's hands, were next noticed, and it was announced that the Meteorological Council had decided to undertake the issue of Monthly Current Charts for the entire sea surface. The Wind Charts, published by the late Lieut. Brault, of the French Navy, were next described, with an expression of the profound regret with which the intelligence of his premature death in August last had been received by all meteorologists. The Wind Charts and Pressure Tables issued by the Meteorological Institute of the Netherlands were then explained, and also the publications of the Deutsche Seewarte at Hamburgh—"The Atlas of the

Atlantic Ocean," &c. The series of "Monthly Charts for the Atlantic and Pacific Oceans," issued by the Hydrographic Office, Washington, was then described, and the present series of "Pilot Charts," issued by the same office, was explained.

As for projected work in 1886, Mr. Scott stated that the daily maps of Atlantic weather for the year of the circumpolar expeditions were now complete, and were being engraved, a process which must take several months. The German Office had undertaken the preparation of daily weather maps for the same period for the South Atlantic. The Meteorological Office had also taken up the marine meteorology of the Red Sea. The Dutch Institute had announced its intention to publish an atlas for the Indian Ocean.

In conclusion Mr. Scott stated that there still existed a lamentable want of data for the Pacific Ocean, but that, thanks to the energy of the Canadian Government in opening up their new Pacific Railroad, it was to be hoped that every year would bring a greater amount of traffic to British ports on the Pacific coast, and, therefore, a greater number of observations to the Meteorological Office; while from the existing trade to San Francisco a mass of materials was quickly accumulating, for certain routes at least, over the vast area of the Pacific.

The following gentlemen were elected Officers and Council for the ensuing year :—*President.*—William Ellis, F.R.A.S. *Vice-Presidents.*—George Chatterton, M.A., M.Inst.C.E.; Edward Mawley, F.R.H.S.; George Mathews Whipple, B.Sc., F.R.A.S.; George Theodore Williams, M.A., M.D., F.R.C.P. *Treasurer.*—Henry Perigal, F.R.A.S., F.R.M.S. *Trustees*—Hon. Francis Albert Rollo Russell, M.A.; Stephen William Silver, F.R.G.S. *Secretaries.*—George James Symons, F.R.S.; John William Tripe, M.D., M.R.C.P.Ed. *Foreign Secretary.*—Robert Henry Scott, M.A., F.R.S., F.G.S. *Council.*—Edmund Douglas Archibald, M.A.; William Morris Beaufort, F.R.A.S., F.R.G.S.; Arthur Brewin; Frederic William Cory, M.R.C.S.; Henry Storks Eaton, M.A.; Charles Harding; Richard Inwards, F.R.A.S.; Baldwin Latham, M.Inst.C.E., F.G.S.; John Knox Laughton, M.A., F.R.G.S.; William Marcet, M.D., F.R.S., F.C.S.; Cuthbert Edgar Peek, M.A., F.R.A.S., F R.G.S.; Captain Henry Toynbee, F.R.A.S.

RAINFALL AT SMYRNA.

In an early volume of this Magazine* we gave an abstract of the meteorological observations which had been started at the Smyrna Station of the Smyrna and Aidin Railway by Mr. G. Purser, M.I.C.E.

Professor Raulin has been kind enough to prepare, and to forward to us, the following table, which contains the whole of the monthly values for twenty years, 1864-83, together with the mean for each month, and for the year, as well as for the seasons.

* *Meteorological Magazine,* Vol. IV. (1869), page 106.

We may add, that Smyrna is on the west coast of Asia Minor, in Lat. 38° 26′ N., and Lon. 27° 10′ E., and that the station is about 300 yards inland from the head of the gulf.

It will be noticed that the curve of monthly fall is remarkably regular, in fact but for the exceptional rains of March 1868 and March 1869 it would be absolutely so.

Contrary to our usual practice, and contrary to that which we consider safest as a general rule, we have in this table indicated months of no rain by ..., instead of by 0·00 because, the table being perfect, the ... is not needed to indicate, as usual, "No information," and because the rainless months are so frequent that it was desirable to make their occurrence as visible as possible.

Rainfall of Smyrna for 20 Years, 1864–1883, 3 ft. above the surface of the ground, in English inches.

Date.	1864	1865	1866	1867	1868	1869	1870	1871	1872	1873
January	3·29	6·47	1·30	2·43	8·30	3·21	5·79	11·10	3·17	2·41
February	1·43	8·26	1·68	2·94	·32	·74	2·81	1·19	1·46	5·64
March	·54	4·03	1·69	1·06	11·24	12·07	2·29	1·29	·50	2·08
April	3·45	1·32	·20	·37	·92	1·78	2·24	·66	4·18	·50
May	1·49	·23	·95	1·27	·83	·19	·07	1·09	3·09	2·38
June	·74	·34	·63	·67	·67	·59	...	·39	·60	·16
July	2·40	·10	·13	...	·27	·04	...	...	...	...
August	·50	...	·06	...	·07	...	·47	...	...	...
September	3·00	...	·39	...	·52	·08	3·95	·07	...	2·82
October	3·21	1·17	·08	1·44	1·30	1·81	4·45	1·36	...	2·30
November	6·20	2·47	3·54	5·26	4·92	3·46	·18	7·04	3·65	2·92
December	1·39	·10	3·61	6·48	·84	·80	6·73	4·58	4·76	2·62
Total	27·64	24·49	14·26	21·92	30·20	24·77	28·98	28·77	21·41	24·03

Date.	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	Mean average (20 yrs.).
Jan.	·14	4·58	2·88	3·08	6·27	4·28	1·61	6·15	1·27	4·77	4·12
Feb.	5·82	9·48	1·45	2·92	2·10	2·69	·30	3·92	1·17	2·59	2·95
March	1·92	5·78	2·53	4·84	3·00	1·61	2·87	1·74	1·04	5·03	3·36
April	·40	1·36	3·12	1·11	4·97	·35	1·69	·80	3·45	2·67	1·78
May	·15	...	·42	3·47	·29	2·36	2·69	1·45	·66	2·03	1·26
June	...	...	1·76	·94	·13	·01	·18	...	·09	1·84	·49
July	...	...	·54	·11	·40	...	·04	·10	...	·07	·21
Aug.	...	...	...	·36	·63	...	...	...	...	·50	·13
Sept.	...	·02	·15	·08	·61	1·22	1·38	1·32	...	2·45	·90
Oct.	·30	2·87	·94	4·00	...	2·71	·60	5·47	1·02	·47	1·78
Nov.	10·31	4·86	5·75	6·09	·44	4·06	4·09	·15	7·89	1·43	4·24
Dec.	8·99	3·96	8·48	5·98	8·50	1·81	2·49	4·72	4·56	7·05	4·42
Total	28·03	32·91	28·02	32·98	27·34	21·10	17·94	25·82	21·15	30·90	25·64

Seasonal Mean—Winter, 11·49; Spring, 6·40; Summer, 0·83; Autumn, 6·92; being Régime IV., or that of MONTPELLIER.

THE FROST OF JANUARY, 1886.

THE temperature of January 7th and 8th having been considerably lower at many stations in the neighbourhood of London than on any occasion since the memorable frost of 1881, we have thought it of sufficient interest to supplement the returns published in the Table of Rainfall and Temperature by the following minima in air and on grass.

The degree of cold, though considerable, bears no comparison to the frost before mentioned, and perhaps one of its most remarkable features is the limited area over which the temperature was at all exceptional, the minima over the greater part of the United Kingdoms being of quite a normal character.

The great irregularity of the minima on grass is no doubt due to the varying exposure of the thermometers, some observers placing them on the flat surface of the snow, which at the time covered the ground to the depth of about six inches, while others cleared portions of ground of various sizes for the thermometers to rest upon, some being no more than holes in the snow just large enough to admit the thermometer.

STATION.	AIR MIN.		GRASS MIN.	
	7th. °	8th. °	7th. °	8th. °
Dungeness	27·0	14·0	...	...
Tenterden	22·0	15·0	23·0	15·0
Canterbury	15·0	...	...	...
Weybridge	16·2	16·0	12·1	6·9
Beddington	13·3	9·2	1·7	2·0
Wallington	11·3	12·3	16·1	14·8
Beckenham	21·5	11·8	...	..
Norwood	16·7	19·2	3·0	6·6
Isleworth	19·4	12·6	...	16·6
Kew	16·0	16·5	12·3	10·9
Greenwich	16·5	20·5	16·5	20·0
Old Street	26·1	24·1	...	...
Regent's Park (Roy. Bot. Soc.)	21·5	22·0	22·0	20·0
Camden Square (Glaisher screen)	24·4	20·8	15·3	8·3
,, ,, (Stevenson screen)	25·0	21·6	...	...
Oxford	18·0	14·0	...	...
Bennington Lodge	14·9	14·7	13·2	12·1
Aspley Guise	18·7	11·8	...	...

SCHOTT'S RAINFALL TABLES, 1872.

WE have just stumbled on an error in these tables so droll that we think it well to call attention to it. In the year 1840, Mr. R. Mossman, of Thurston, near Dunbar, Haddingtonshire, Scotland, commenced a series of observations of rainfall which was continued for many years. An abstract of these records for the 12 years, 1841–52, is quoted in the United States tables as having been made in *York County, New Brunswick!*

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JULY, 1885.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum.		Absolute. Minimum.		Average.				Absolute.		Total Rain.		Aver.
	Temp.	Date.	Temp.	Date.	Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	Cloud.
	°		°		°	°	°	0–100	°	°	inches		
England, London	90·4	26	47·6	9	76·6	54·7	49·8	67	129·3	40·5	·52	6	5·4
Malta	94·8	6	65·2	3*a*	87·3	69·6	65·7	66	147·6	...	·05	1	0·4
Cape of Good Hope	77·8	27	37·8	18	...	50·0	...	...	...	...	2·06	5	3·9
Mauritius	76·4	14	57·4	25	73·8	64·3	59·7	74	125·3	46·4	2·18	21	5·0
Calcutta	92·8	1	76·2	7, 9	88·7	78·5	78·8	86	160·5	75·0	8·12	28	8·5
Bombay	87·8	1, 5	74·7	17	85·1	77·5	76·3	83	145·0	73·7	21·81	30	8·6
Ceylon, Colombo	87·0	30	73·0	14	84·8	76·5	73·6	80	145·0	64·6	4·16	16	6·1
Melbourne	61·2	24	29·9	15	53·6	40·0	40·8	82	110·6	21·3	1·13	10	6·6
Adelaide	64·2	24	35·0	15	58·6	43·9	42·0	71	125·0	28·0	2·38	15	4·5
Wellington	57·5	8	33·0	22	51·6	42·0	42·6	86	115·0	30·0	4·32	22	4·9
Auckland	64·0	9	40·0	15	58·7	47·4	47·0	80	119·0	32·0	5·67	18	6·0
Jamaica, Kingston	93·2	23	70·8	3	88·9	73·3	72 1	73	...	...	1·03	...	4·3
Barbados	84·0	var.	70·0	8	83·0	73·0	75·5	85	147·0	...	2·26	12	5·0
Toronto	88·6	17	44·9	2	77·6	57·9	59·8	74	...	38·5	2·10	9	4·3
New Brunswick, Fredericton	88·7	25	46·5	3	79·0	55·0	57·8	74	...	...	3·61	13	4·9
Manitoba, Winnipeg	89·8	29	42·3	17	75·0	53·2	58·4	76	...	...	2·65	18	5·2
British Columbia, Victoria	83·0	7	43·0	17	71·6	50·3	...	...	...	...	·06	3	...

a And 11.

REMARKS, JULY, 1885.

MALTA.—Mean temp. 77°·8 ; mean hourly velocity of wind 5·8 miles ; sea temp. rose from 76° to 83°. TS on 8th ; temp. rose above 90° on ten days. J. SCOLES.

Mauritius.—Rainfall ·38 in., temp. 0°·3, and mean hourly velocity of wind 1·1 miles below average ; extremes of velocity 25·5 miles and 1·7 miles. C. MELDRUM, F.R.S.

Melbourne.—Rainfall ·61 in., mean temp. of air 1°·4 and of dew point 0°·6 below their respective averages ; humidity, pressure, and amount of cloud slightly above the averages ; prevailing winds N. and N.E., strong on 3 days ; L on 2nd, H on 28th, ice on 14th and 15th ; hoar frost on 7 days, dense fog on 6. R. L. J. ELLERY, F.R.S.

Adelaide.—A beautiful month, rainfall and mean temp. slightly, and amount of cloud considerably below average ; mean pressure unusually high. W. E. COOKE.

Wellington.—Very showery weather almost throughout, and cold with frequent fogs ; some bright pleasant mornings, but wet mostly during the nights ; prevailing winds S.E. and E., usually light or calm. Rainfall 2·03 in., and mean temp. 0°·9 below, mean pressure ·209 in. above average ; H on 13th and 14th, sleet on 14th, slight earthquakes on 18th and 26th ; fog on 7 days. R. B. GORE.

Auckland.—A stormy and rainy month, the rainfall being rather more than an inch above the average ; mean temp. slightly above the average. T. F. CHEESEMAN.

JAMAICA.—The rainfall was only one half the average, and the continued drought was severely felt over the greater part of the Island. In the northern division, springs dried which are known to have flowed continuously for 40 years, cattle died in large numbers for want of grass and water, and cane fields were damaged, and in some instances destroyed. MAXWELL HALL.

BARBADOS.—Mean temp. slightly higher than the average ; pressure somewhat lower ; rainfall the smallest recorded in July. Prevailing wind N.E. ; mean hourly velocity 14·1 miles, 25 per cent. above the average ; extremes 25·8 miles on 4th and 5th, and 7·1 miles on 28th, 29th, and 30th. L on 5th and 6th ; TSS on 21st ; 5 days cloudy. R. BOWIE WALCOTT

SUPPLEMENTARY TABLE OF RAINFALL, JANUARY, 1886.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger	4·22	XI.	Castle Malgwyn	5·94
,,	Margate, Birchington	4·51	,,	Rhayader, Nantgwillt	8·39
,,	Littlehampton	4·47	,,	Carno, Tybrith	5·75
,,	Hailsham	5·58	,,	Corwen, Rhug	5·55
,,	I. of W., St. Lawrence	4·59	,,	Port Madoc	6·35
,,	Alton, Ashdell	4·33	,,	I. of Man, Douglas	4·37
III.	Winslow, Addington	3·15	XII.	Stoneykirk, Ardwell Ho.	3·73
,,	Oxford, Magdalen Col.	4·08	,,	Melrose, Abbey Gate	4·33
,,	Northampton	2·60	XIII.	N. Esk Res. [Penicuick]	5·95
,,	Cambridge, Beech Ho.	2·41	XIV.	Ballantrae, Glendrishaig	3·76
,,	Wisbech, Bank House	2·81	,,	Glasgow, Queen's Park.	3·37
IV.	Southend	2·56	XV.	Islay, Gruinart School	5·48
,,	Harlow, Sheering	2·69	XVI.	St. Andrews, PilmourCot	2·46
,,	Rendlesham Hall	3·01	,,	Balquhidder, Stronvar	11·29
,,	Diss	2·52	,,	Dunkeld, Inver Braan	4·53
,,	Swaffham	2·69	,,	Dalnaspidal H.R.S.	6·46
V.	Salisbury, Alderbury	3·33	XVII.	Keith H.R.S.	·63
,,	Warminster	4·03	,,	Forres H.R.S.	2·19
,,	Calne, Compton Bassett	3·82	XVIII.	Strome Ferry H.R.S.	6·57
,,	Ashburton, Holne Vic.	8·61	,,	Tain, Springfield	2·77
,,	Holsworthy, Clawton	5·78	,,	Loch Shiel, Glenaladale	13·05
,,	Hatherleigh, Winsford.	3·90	,,	S. Uist. Ardkenneth	3·94
,,	Lynmouth, Glenthorne.	7·52	,,	Invergarry	5·96
,,	Probus, Lamellyn	6·22	XIX.	Lairg H.R.S.	...
,,	Wincanton, Stowell Rec.	3·90	,,	Forsinard H.R.S.	3·43
,,	Taunton	4·74	,,	Watten H.R.S.	3·17
,,	Wells, Westbury	4·42	XX.	Dunmanway, Coolkelure	6·30
VI.	Bristol, Clifton	4·92	,,	Fermoy, Gas Works	2·60
,,	Ross	5·10	,,	Tralee, Castlemorris	4·16
,,	Wem, Sansaw Hall	3·05	,,	Tipperary, Henry Street	4·38
,,	Cheadle, The Heath Ho.	4·02	,,	Newcastle West	5·29
,,	Worcester, Diglis Lock	3·36	,,	Miltown Malbay	4·66
,,	Coventry, Coundon	2·73	,,	Gorey, Courtown House	4·22
VII.	Melton, Coston	2·63	XXI.	Navan, Balrath	4·08
,,	Ketton Hall [Stamford]	3·07	,,	Mullingar, Belvedere	3·66
,,	Horncastle, Bucknall	2·69	,,	Athlone, Twyford	3·53
,,	Mansfield, St. John's St	4·32	,,	Galway, Queen's Col.	4·31
VIII.	Macclesfield, The Park.	5·78	XXII.	Clifden, Kylemore	7·02
,,	Walton-on-the-Hill	3·39	,,	Tuam, Gardenfield	...
,,	Lancaster, South Road.	4·14	,,	Crossmolina, Enniscoe	4·98
,,	Broughton-in-Furness	5·92	,,	Collooney, Markree Obs.	4·71
IX.	Wakefield, Stanley Vic.	2·89	,,	Carrick-on-Shannon	2·66
,,	Ripon, Mickley	3·98	XXIII.	Rockcorry	3·32
,,	Scarborough	3·84	,,	Warrenpoint	3·37
,,	EastLayton[Darlington]	1·94	,,	Newtownards	3·53
,,	Middleton, Mickleton	4·27	,,	Belfast, New Barnsley	5·46
X.	Haltwhistle, Unthank	6·20	,,	Cushendun	8·26
,,	Shap, Copy Hill	7·46	,,	Bushmills	4·75
XI.	Llanfrechfa Grange	6·52	,,	Stewartstown	3·45
,,	Llandovery	6·10	,,	Buncrana	5·65

JANUARY, 1886.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1870–9	Greatest Fall in 24 hours. Dpth	Greatest Fall in 24 hours. Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Max. Date	Min. Deg.	Min. Date.	No. of Nights below 32°. In shade.	On grass.
			inches	inches.	in.								
I.	ENGLAND.	London (Camden Square)	4·02	+ 1·67	·52	5	23	51·3	2	20·8	8	19	28
II.		Maidstone (Hunton Court)	4·15	+ 1·58	·70	5	22	...	...	...	...	...	...
,,		Strathfield Turgiss	3·22	+ ·67	·58	5	22	52·3	2	17·5	7	20	28
III.		Hitchin	3·10	+ ·88	·29	24	23	49·0	2	17·0	7	29	...
,,		Banbury	2·79	+ ·41	·35	12	24	51·0	2, 3	15·5	8	24	...
IV.		Bury St. Edmunds (Culford)	2·71	+ ·87	·28	30	24	49·0	1*a*	20·0	18	28	...
,,		Norwich (Cossey)	2·59	+ ·89	·33	20	22	51·0	3	20·5	20	21	...
V.		Weymouth (Langton Herring)	3·58	...	·48	27	22	...	...	...	...	...	...
,,		Barnstaple	6·06	+ 1·80	·90	25	24	54·0	3, 4	17·0	21	...	...
,,		Bodmin	8·02	+ 1·51	·92	28	29	51·0	3	20·0	21*b*	12	22
VI.		Stroud (Upfield)	4·97	+ 1·98	·76	25	22	51·0	2	20·0	15	25	...
,,		Church Stretton (Woolstaston)	4·24	+ ·81	·50	3	26	50·0	3	22·5	7	23	27
,,		Tenbury (Orleton)	4·17	+ 1·18	·55	27	24	54·2	2	13·0	8	20	24
VII.		Leicester	2·56	...	·37	25	19	51·0	3	25·2	19	19	30
,,		Boston	2·49	+ ·77	·35	10	19	50·0	1, 3	25·0	8*c*	20	...
,,		Grimsby (Killingholme)	3·11	+ 1·35	·39	10	23	50·0	1	19·0	20	13	...
,,		Hesley Hall [Tickhill]	3·03	...	·56	11	19	...	...	...	...	...	...
VIII.		Manchester (Ardwick)	4·92	+ 1·68	·83	12	23	50·0	1, 3	23·0	20	21	...
IX.		Wetherby (Ribston Hall)	3·92	+ 1·70	·64	31	20	...	...	...	...	...	...
,,		Skipton (Arncliffe)	9·51	+ 2·58	1·66	3	25	49·0	4	9·0	20	19	...
X.		North Shields	2·70	+ ·86	·40	9	19	54·8	1	17·5	19	19	20
,,		Borrowdale (Seathwaite)	15·79	— 2·96	4·00	3	23	51·8	1	19·0	7	16	...
XI.	WALES.	Cardiff (Ely)	5·44	+ ·73	1·15	30	23	...	...	...	...	...	...
,,		Haverfordwest	6·42	+ ·15	·93	7	14	51·0	3	17·0	20	12	19
,,		Plinlimmon (Cwmsymlog)	7·21	...	1·82	3	19	...	...	...	...	...	...
,,		Llandudno	3·57	+ ·61	·69	3	22	52·5	3	24·5	25	9	...
XII.	SCOTLAND.	Cargen [Dumfries]	4·83	— 1·28	·51	7	20	51·6	3	14·0	19	19	...
,,		Jedburgh (Sunnyside)	2·65	+ ·57	...	...	...	53·0	1	13·0	20	17	...
XIV.		Douglas Castle (Newmains)	...	...	...	...	...	...	...	...	...	...	...
XV.		Lochgilphead (Kilmory)	6·84	— 1·03	·71	25	20	...	...	...	...	...	...
,,		Oban (Craigvarren)	4·89	...	·56	8	20	51·8	1	22·0	18	14	...
,,		Mull (Quinish)	6·17	...	·82	7	20	...	...	...	...	...	...
XVI.		Loch Leven Sluices	5·10	+ 1·28	·80	26	21	...	...	...	...	...	...
,,		Arbroath	2·76	+ ·31	·51	23	18	51·0	1, 3	17·0	19	17	...
XVII.		Braemar	3·17	+ ·39	1·00	24	20	51·8	2	-2·0	19	28	31
,,		Aberdeen	2·33	...	·32	23	20	57·0	1	15·0	6	17	...
XVIII		Lochbroom	6·80	...	1·39	1	27	...	...	...	...	...	...
,,		Culloden	2·26	+ ·49	...	...	...	51·0	1	11·0	19	17	28
XIX.		Dunrobin	...	...	...	...	...	...	...	...	...	...	...
,,		Kirkwall (Swanbister)	4·89	...	·72	1	29	49·1	1	20·0	18	13	...
XX.	IRELAND.	Cork (Blackrock)	3·64	— 2·38	·54	29	20	53·0	1*d*	22·0	6	15	...
,,		Dromore Castle	6·88	...	·80	3*e*	22	55·0	13	25·0	25	...	...
,,		Waterford (Brook Lodge)	2·47	...	·57	28	16	51·5	1	21·5	7	15	25
,,		Killaloe	4·80	...	·85	3	20	51·0	3	23·0	21	20	...
XXI.		Carlow (Browne's Hill)	3·43	— ·19	·67	5	22	...	...	...	...	...	...
,,		Dublin (FitzWilliam Square)	3·24	+ ·98	·90	25	26	53·4	3	24·9	7	10	25
XXII.		Ballinasloe	4·00	— ·36	·65	3	23	49·0	3, 4	14·0	7	22	...
XXIII		Waringstown	3·97	+ ·56	·51	12	24	52·0	1*f*	16·0	6*g*	23	26
,,		Londonderry (Creggan Res.)	6·49	...	·70	12	30	...	...	...	...	...	..
,,		Omagh (Edenfel)	4·26	+ ·49	·45	3	27	50·0	1*a*	17·0	6*g*	21	26

a And 2, 3. *b* And 23. *c* And 19, 20, 24. *d* And 3, 12. *e* And 19. *f* And 3, 22. *g* And 20.

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

METEOROLOGICAL NOTES ON JANUARY, 1886.

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

ENGLAND.

STRATHFIELD TURGISS.—The weather of the month was very variable. The heavy fall of S of 5th and 6th, thawed rapidly, but the night frosts retained it; turnips were damaged by rotting—the effect of frost after wet; a trying lambing season. On 8th the grass min. registered 6°·9. S on 8 days.

BANBURY.—A cheerless inclement month; S with alternating frost and thaw making the roads heavy and dangerous. Mean temp. (35°·9) slightly above the average. T, L and H on 13th, S on 11 days, fog on 4 days, high wind on 25th and 30th.

CULFORD.—There was a good deal of high wind during the month, and frost almost every night; on 5th, at 7 p.m., a short but severe storm of S and R with very high wind occurred, S fell also on 4 other days, sleet on 29th and 31st, fog on 26th.

LANGTON HERRING.—The weather of the month was most variable, the changes being very sudden. The rainfall was ·49 in. above the average for the last 11 years, and the mean temp. nearly three degrees below the average of 14 years. The ground was never covered with S, but the hills three miles away were white on 6th. On the morning of 13th a gale did considerable damage to the boats on the Chesil Beach, and uprooted trees inland. T and L on 17th, 18th, 19th and 25th, with very high wind on 25th; fog on 3rd, 4th and 11th.

BODMIN.—More S fell this month than has been seen since January, 1881, but the depth is difficult to ascertain as it was mixed with R. Mean temp. 37°·8. S and H on 17th and 18th, S on 7 other days.

STROUD.—A very cold wet month; snowdrops and aconites only just coming out at the close. H and T on 13th, S fell to the depth of 5 inches on 6th, and daily from 20th to 25th.

WOOLSTASTON.—A severe frost accompanied by frequent falls of S set in on 5th, and continued during nearly the whole of the remainder of the month. On the morning of 13th a terrific hurricane occurred lasting from 8.25 a.m. to 8.40 a.m., during which time the darkness was intense, little damage however was done. Mean temp. 34°·3. H on 4th, S on 14 days.

ORLETON.—The first three days were dry and warm; a steady fall of R then occurred, and the remainder of the month was very stormy and cold, with frequent S and R. The hills were covered with S the greater part of the month, although the depth of each fall was rarely more than one or two inches. Pressure very low and unsteady. Mean temp. 1°·7 below the average of 25 years.

LEICESTER.—The weather of the month was very changeable, but very cold and severe. A short but heavy storm occurred at 9.15 a.m. on 13th, and a heavy fall of S on 25th.

KILLINGHOLME.—There was much frost (though never intense), with alternate thaws more or less partial.

ARNCLIFFE.—More than the average number of S storms occurred during the greater part of the month, S having fallen on 15 days, and lying on 30th some 12 inches deep. L at night on 30th.

NORTH SHIELDS.—S on 12 days; H on 10th; fog on 27th and 28th.

SEATHWAITE.—Very heavy R on 3rd, causing floods. H on 4th. T and H on 15th. T, H and L on 29th. L on 23rd. Sleet on 7th, 8th, 16th and 28th.

WALES.

HAVERFORDWEST.—The month was characterized by sudden and abrupt changes of temperature, moisture, frost and thaw; it was impossible to predict what might happen even in a few hours; it was one of the most unpleasantly cold periods remembered. S fell frequently, and at times in large quantities, the depth of the first heavy fall being 5 inches, and of the second 7 inches. Short periods of severe frost occurred, followed by sudden and rapid thaw. The wind was principally N.W., N.E., and E.S.E.

LLANDUDNO.—The month was exceptionally dull and cold, and the aggregate amount of bright sunshine was only 33 hours, 13 absolutely sunless days being recorded. The mean temp., 38°·6, was 2°·8 below the average. There were occasional H showers and several falls of S, notably on 20th and 24th, the depth on the latter date being three and a half inches; the S, however, soon melted. The coldest period was from 17th to 27th. The extreme range of temp. (28°) was exactly the average, and the mean diurnal range (8°·4) half a degree below the average.

SCOTLAND.

CARGEN.—A dull gloomy month, with only 39 hours of sunshine, the average being 61 hours. Sudden and great fluctuations both of temp. and pressure prevailed to an unusual extent. Mean temp. (34°·4) 3°·9 below the average; H showers on 4th; S on 10th, 16th, and 25th; T and L on 30th.

JEDBURGH.—The weather was dull and cold, except on the first four or five days, with little sunshine. S on 10 days.

KILMORY.—T and L on several days; S on 12 days.

OBAN, CRAIGVARREN.—A cold month, singularly free from gales, and with a very moderate rainfall. It is believed that more S fell, and remained longer on the ground, than in any year of the previous quarter of a century. The temp. also was low.

BRAEMAR.—After the 4th frequent falls of S occurred, with continuous very severe frost; only 14 hours of sunshine were recorded.

ABERDEEN.—The weather during the month was of the usual wintry character, S, sleet, H and cold R prevailing. The R was just the average. Aurora on two nights; L on one.

LOCHBROOM.—The wildest January remembered here. Since the beginning of September last there have been only 37 dry days.

KIRKWALL, SWANBISTER.—An unusually severe month with S on 9 days; great gale on 8th; T on 15th.

IRELAND.

BLACKROCK.—A seasonable month, with much less S and severe frost than is reported from many parts. Mean. temp. (41°·1) one degree above the average for ten years.

DROMORE.—The weather generally was very cold and hard; about 3 inches of S fell on 6th, and lay for a considerable time; prevailing winds N.E. to N.W.

WATERFORD.—Mean temp. 36°·5. T and H on 13th.

KILLALOE.—A month of severe weather; from 11th to 26th the eight falls recorded were all S; frost was frequent. A heavy TS with vivid L occurred on 16th.

DUBLIN.—Although the new year opened with very mild dull weather, January will be remembered as a cold snowy month, but without severe frosts. S or sleet fell on 18 days, and H on 14; both the R and number of rainy days were much above the average, while temp. and pressure were as much below it, the max. temp. not exceeding 40° from 17th to 27th inclusive. Fog prevailed on 7 days, high winds on 13 days; a solar halo was seen on 28th. Mean temp. (37°·1) 3°·7 below the average; mean humidity 87; mean amount of cloud 6·6; prevailing winds W., S.W., and N.W.

BALLINASLOE.—S on 8 days. Heavy R, with L and T about noon on 16th; H and sleet on 30th.

WARINGSTOWN.—A very cold month, with almost continuous S.

EDENFEL.—The mild weather which marked December gave way on January 4th to S, and frost, which, with one or two short rainy intervals, continued throughout the month. The S which fell on 16th and 17th, and again on 30th and 31st, covered the ground to the depth of 6 and 9 inches respectively, being the heaviest falls for several years. A rather curious feature of the weather was that all the S came from the S.S.W., and when subsequently the wind settled in the N., it affected the night temp. only, which oscillated constantly between 17° and 32°, the day temp. of the same period being some degrees above freezing point.