

Symons's Meteorological Magazine.

No. 561.

OCTOBER, 1912.

VOL. XLVII.

METEOROLOGY AT THE BRITISH ASSOCIATION, SECTION A.

By E. GOLD, M.A.

THE British Association for the Advancement of Science held its annual meeting at Dundee, from September 4th to 11th. The leading feature of meteorological interest in the proceedings was the joint discussion on Monday, September 9th, between Section A and the new Section M, Agriculture, on the Application of Meteorological Information to Agricultural Practice. Professor Middleton presided, and in introducing Dr. Shaw mentioned that the idea of that joint discussion originated in a very stiff *viva voce* examination which Dr. Shaw once conducted in his room in London with himself as the unfortunate examinee. Dr. Shaw, in opening the discussion, referred to the early work of Fitzroy in issuing forecasts and the re-introduction of the practice, after the lapse of more than a decade, in 1879. Since then they had been issued regularly for more than 30 years, and it was time to ask if they were useful and if they were used as they might be. He calculated that the annual loss to this country through unfavourable weather might be put at £20,000,000, and the saving of that sum, or part of it, was an object worthy of serious attention. But owing to the special position in which the British Empire stood, the matter was even more important, for ultimately forecasts must be forecasts for the whole globe, and the amount of money to be saved throughout the empire far exceeded the estimate mentioned. But apart from forecasts which enabled saving to be effected by preventive precautions, there was probably much to be done by the proper use of our present knowledge of climate, and in this connection the meteorologist wished to learn from the agriculturalist if he could make use of meteorological statistics, and in what form he wished the statistics to be presented to him. If the information is of no use in agriculture, the meteorologist's task is immensely lightened. If it is of use are the statistics to be quarterly, monthly, weekly, or daily? Does the agriculturist require mean temperatures, maximum temperatures, or accumulated

temperatures, rainfall or duration of rain, sunshine or intensity of radiation, or some combination of these? He had with him a copy of the questions propounded to Professor Middleton on the occasion mentioned. The agriculturist might be tempted to say that every experienced farmer was practically acquainted with the answers to the questions so far as they concerned him, but even if that were so it would be worth while to have the answers set out in a form in which they may be useful to those who have not already learned by experience. Typical questions were:—

What crops are grown in what counties and why?

What is the effect of aspect and climate upon crops?

What deviations from the normal values of the meteorological elements represent a good or a bad year?

Slides were then shown representing:—(1) The average course of the seasons in the British Isles and the values for the current year. (2) The connection between the weather and crops, using the values for the correlation co-efficients given in Mr. R. H. Hooker's valuable paper on this subject. (3) The connection between the autumn rainfall and the yield of wheat in the following year. (4) The connection between rainfall and the depth of water in a well at Ditcham Park, from which it appeared that rainfall produced very little effect upon the depth until the end of September. Reference was also made to Dr. Unstead's recent papers on the yield of wheat and the importance of an index number depending on the accumulated temperature and the duration of darkness.

Mr. A. Watt referred to the establishment of a Lectureship in Meteorology at the Edinburgh and East of Scotland Agricultural College, an event of significance both to Agriculture and to Meteorology. He then showed some results obtained for the correlation between rainfall and temperature and the yield of crops in Forfarshire. It appeared that a dry June and July were favourable for potatoes, and warmth during that period was also desirable. For oats, on the other hand, a cool June was decidedly favourable. In a recent paper on similar lines for Iowa, U.S.A., a good rainfall in June was found to be favourable to the potato crop, and a result exactly opposite to what he found for Forfarshire. The difference was probably to be attributed to the higher temperature in Iowa.

Mr. W. L. Balls showed the importance of considering temperatures nearer to the surface than the orthodox 4 feet, especially in Egypt, where the difference in the values at 1 foot and 4 feet were very large on the calm nights, which they experienced there.

Dr. E. J. Russell said that agricultural institutions were setting out to meet the Meteorologists. The effect of climate on plant-life was two-fold: it affected the plant itself, and the soil in which the plant grew. The effect on the soil might also be sub-divided into the effect on the plant food in it and the effect on its texture. A heavy

rainfall washed out the nitrates in the soil, while dry hot weather conserved them and partially sterilized the soil. At the end of the summer of 1911, the soil contained $3\frac{1}{2}$ times the usual amount of nitrates, but the heavy rains of last autumn and winter washed out $\frac{9}{10}$ ths of them. Frost conserved the nitrates, but generally these were at their minimum at the end of the winter. With the continental type of climate the increase in plant food in the spring was very rapid, but in the British type the increase was much more gradual. In conclusion, he asked Dr. Shaw if it was possible to forecast the general character of the seasons for the next five years.

Mr. R. M. Barrington, speaking as a practical farmer, testified to the great utility of local observations in conjunction with the reports of the Meteorological Office. He thought meteorology ought to be taught to every aspiring farmer. Chemistry was important, physics was important, and mathematics too in an indirect way; but meteorology was most important of all. If he were Chancellor of the Exchequer he would give Dr. Shaw all the money he wanted for the development of meteorology.

Major Craigie emphasized the importance of the steady and continuous utilization of meteorological forecasts and observations. He would like to make a more modest request than Dr. Russell, and ask for a forecast of the weather for the next five weeks.

Dr. Shaw said, in the course of his reply, that if the information for which Dr. Russell and Major Craigie asked could have been supplied, it would have been made public through the newspapers without any loss of time.

On Tuesday morning, Professor H. H. Turner gave an account of his investigation of periodicities in Earthquake phenomena. He found evidence of a real period of about 15 months, and an indication of a period of 11.76 months, which was also found in the record of rainfall at Greenwich. He communicated also a paper by Mr. J. I. Craig, in which the author showed that Professor Schuster's method of the periodogram and the method of correlation were practically identical.

Mr. E. M. Wedderburn gave an account of his investigations of the temperature conditions in the Madisee in Pomerania, a fresh-water lake with shelving sides, and in Loch Earn. In both cases the temperature changes were found to be oscillatory, and capable of explanation on the assumption that the motion of the water in the lake was in opposite directions above and below the level of maximum rate of change of density.

Miss White read two papers on the results for wind and temperature obtained at the upper air station at Glossop during 1908-1909. As regards wind, she found that the average velocity changed from 5.0 m.p.s. (metres per second) at the ground level (335 metres) to 11.8 m.p.s. at 1000 metres, and to 13.6 m.p.s. at 2000 metres above mean sea level. The velocity in winter was greater than in summer at all heights, and greater for low pressure than for high pressure.

At ground level the velocity of winds from the east was about the same as that of winds from the west, but it increased less rapidly, so that at 2000 metres the velocity for westerly winds was 16 m.p.s. compared with 12 m.p.s. for easterly winds. The theoretical value for the gradient wind calculated from the pressure chart was reached by the actual wind on the average at an altitude of 650 metres, or about 300 metres above ground level. In the second paper, on Temperature, she found that the rate of fall diminished from $8^{\circ}\cdot 5$ C. per kilometre in the first 200 metres to $4^{\circ}\cdot 3$ C. per kilometre at 2000 metres, a result in good agreement with those found by previous workers. The height at which the mean annual temperature is 0° C. is about 2100 metres. Both in winter and in summer the temperatures in the upper air were found to be higher over regions of high pressure than over regions of low pressure.

Both papers were very interesting, and contained much valuable information. Professor Petavel expressed the hope that the results would be utilized by aviators. The average values furnished a basis for forecasting the probable conditions in the upper air from the actual conditions at the surface. Miss White was to be congratulated on the manner in which she had discussed the observations, and the clear way in which she had put before them the results of her investigations.

Mr. Gold referred to the work of the Joint Upper Air Committee which had been carried out at Mungret College, Limerick, with the co-operation of the Rev. W. O'Leary, S.J., who was present at the meeting. The results obtained during the past year were given in the report of the committee, and showed that the height of the stratosphere over Ireland was about the same as over England. Father O'Leary spoke of the need which he felt for definite and precise instructions as to the type of weather in which a balloon might be liberated with a reasonable chance of recovery.

It is encouraging to know that the Association made an increased grant of £50 at Dundee to aid in investigations of the upper atmosphere over the North Atlantic Ocean during the coming year.

THE METEOROLOGICAL LUNCHEON AT DUNDEE.

By E. GOLD, M.A.

THE annual meteorological luncheon at the meetings of the British Association seems to have become an essential complement to the proceedings of Section A. At Dundee the presence of two local secretaries of the Association, the one versed in knowledge of his city, the other an expert in all things concerning the life of the sea, evidenced the interest in matters meteorological which is characteristic of the country which investigated the meteorology of Ben Nevis and was one of the most pertinacious advocates of the usefulness of

storm-warnings and daily forecasts in the early days of organized meteorology.

It is not without significance that there were also present the President of Section A, in the proceedings of which meteorology has a long and honourable record, the President of Section M, Agriculture, with which land meteorology is closely associated and will find its greatest opportunities to justify its position as a science, by economy of practice as well as by economy of thought, and the Director of the Science Museum, in which the importance of meteorological apparatus and methods in the scientific development of mankind is receiving recognition.

The following is a list of those present:—

R. M. Barrington, M.A., Trustee of the British Rainfall Organization.	T. S. Muir.
Rev. W. J. Barton, M.A.	Rev. Dr. L. Muirhead.
C. O. Bartrum.	Mrs. L. Muirhead.
Mrs. Bartrum.	James Muirhead.
Dr. H. Borns.	Miss Muirhead.
Prof. H. L. Callendar, F.R.S.	Dr. F. Grant Ogilvie, C.B., Director of the Science Museum.
Rev. A. L. Cortie, S.J.	Prof. W. Peddie.
James Cossar.	Prof. J. E. Petavel, F.R.S.
J. S. Dines.	Dr. E. J. Russell.
Prof. W. G. Duffield, D.Sc.	Dr. W. N. Shaw, F.R.S., Director of the Meteoro- logical Office.
M. McCallum Fairgrieve, M.A.	Mrs. W. N. Shaw.
Mrs. Fairgrieve.	James Smith.
Wilson Lloyd Fox.	F. J. M. Stratton, M.A.
E. Gold, M.A.	Miss Stratton.
Mrs. Gold.	Prof. W. D'Arcy Thompson, C.B.
Edward Kitto.	Andrew Watt, M.A., Secretary, Scottish Meteoro- logical Society.
Mrs. Kitto.	E. M. Wedderburn.
Rev. W. O'Leary, S.J.	F. J. W. Whipple, M.A.
Dr. W. J. S. Lockyer.	Mrs. Whipple.
F. H. Marshall, M.A.	R. S. Whipple.
W. H. Blyth-Martin, Town Clerk of Dundee.	Miss M. White.
T. H. Middleton, M.A., Assistant Secretary, Board of Agriculture and Fisheries.	
Dr. John Milne, F.R.S.	

After the toast of "The King," the Chairman, Dr. Shaw, called upon Prof. Middleton to propose a toast to "The Scottish Meteorological Society." Prof. Middleton said he envied meteorologists for many reasons. First, because of the opportunities which they had. In his subject of agriculture they had winter succeeded by spring, which in turn was followed by summer and by autumn, and they had to wait for the round of the seasons before they could judge of the success or failure of their work. The meteorologist could issue a forecast at 7 a.m., correct it at 6 p.m., and next morning take his choice of a brand new forecast or a further corrected edition of the old one. Though the agriculturist lived to the age of Methuselah, he could not hope for such a plenitude of opportunity. He also

envied the meteorologist for his caution. That very morning Dr. Russell had modestly invited Dr. Shaw to give a forecast of the general character of the weather for the next five years, but Dr. Shaw refused to be drawn; and when Major Craigie, with some diffidence, put forward an application for a forecast for the next five weeks, he was met with similar caution. Then again he envied the meteorologist his courage. Dr. Shaw had told them how during the past month he had spent his holiday in visiting different seaside resorts. He imagined that any man of ordinary courage, occupying a similar responsible position, if he found himself at a seaside resort during August of this year, would have left hurriedly by the next train. [Dr. Shaw: "I generally did."] That brought him to his last point, the philosophy of the meteorologist; which was aptly illustrated by Dr. Shaw's interruption. He had, therefore, much pleasure in proposing success to a Society of scientists with such opportunities and qualities; and he wished to couple with the toast the names of Mr. Wedderburn, and of Mr. Watt, who had put before them such interesting facts in the morning's discussion.

Mr. Wedderburn said that in connexion with Prof. Middleton's reference to grumbling farmers, he might mention that in the course of his work he had to collect rents from that class. On one occasion he remarked to a farmer that it was a good year for him, with good crops and good prices. "Ou ay," replied the farmer, "but the straw's sae guid, I dinna like to bed the beasts wi' it!" The Scottish Meteorological Society was a private society, dependent upon the voluntary support of its members; but the contributions which it had made to the progress of meteorology were not the least honourable in the annals of science. He wished to thank the company for the cordial way in which they had received the toast.

Mr. Watt associated himself with what Mr. Wedderburn had said on behalf of the Society, and added that the Society was greatly indebted to Dr. Shaw for the cordial way in which he had given advice and assistance in some of the difficulties which they had to face. Statistical work—and meteorology was very much a matter of statistics—was arduous work; but fortunately the science brought one into touch with people of very wide interests, and excellent people they were, as that gathering testified.

Dr. Shaw proposed "Bonnie Dundee," but before proceeding to the subject of the toast, he referred to the rather unsatisfactory character of the programme of Section A, as far as meteorology was concerned. Mr. Wedderburn and Miss White were keeping up the connection between the subject and the section, but no one would realize from the meetings of the section that since they had last met at Portsmouth Mr. Dines had turned our ideas upside down by his discovery that the origin of meteorological disturbances was to be sought at a height of 9 kilometres above the Earth's surface. He wished also to congratulate Father O'Leary, who had been conducting the investigation of the upper atmosphere at Mungret

College, near Limerick, and to express to him their thanks for his work in connection with the International Organization. It was also noteworthy that during the past year observations with theodolites of the motion of pilot balloons had been instituted at Aberdeen, and already valuable information had been obtained there. The meeting at Dundee was a red-letter meeting. The munificent gift by Dr. Caird of £10,000 to the funds of the Association was alone sufficient to make it so; the cordial hospitality with which the town and its citizens welcomed the Association, and the interest which they showed in the proceedings of the various sections were even more significant, for if scientific knowledge, and especially meteorological knowledge, was to be utilized fully, it could only be by each municipality or local authority undertaking the collection and discussion of data and the distribution of information. It was especially important in meteorology to get rid of the idea that observations were made in different localities for the benefit of a central office in London or Edinburgh. The *raison d'être* of such observations, if they had one, was to provide results which could receive practical application to the industry and the health of the community. The necessary contribution of this country to the meteorology of the globe could be obtained by observations at a comparatively small number of stations. He was sure that Dundee would be behindhand neither in the collection nor in the application of scientific information. He had much pleasure in proposing the toast of "Bonnie Dundee," and coupled with it the names of Mr. Blyth Martin and Prof. D'Arcy Thompson, who were largely responsible for the successful organization of that historic meeting.

Mr. Blyth Martin said that Dundee was a fitting place both historically and industrially to welcome a great scientific association, and he had very great pleasure in thanking them for the cordial way in which they had received the toast. He was sure that if as many pleasant memories were carried away as were left behind, the Dundee meeting of the Association would not soon be forgotten.

Prof. D'Arcy Thompson associated himself with Mr. Blyth Martin in expressing thanks on behalf of Dundee. There were certainly many unexpected duties which a local secretary was expected to perform, some of them simple in form but difficult in execution. During the previous week he was approached by a visiting member of the Association, who inquired respectfully, "Are you Prof. D'Arcy Thompson?" "I am," said he. "Oh! could you find me my hat and my umbrella?" There were many such amusing episodes, and the best of all occurred that very morning.

ATMOSPHERIC DISTURBANCES AND DEEP-SEA FISH.

By REV. D. C. BATES, *Dominion Meteorologist, New Zealand.*

ON the coast of the South Island of New Zealand, during and after severe frosts, a curious deep-sea fish known as the "Frost-fish" (*Lepidopus Caudatus*) is found lying dead upon the shore. It is a long ribbon-like silvery fish, and is delicious eating, and much sought after, so that men will scour the sands at night to find them. They are killed by the bursting of their air bladders, and the curious circumstance is their connection with hard frosts, particularly under anticyclonic conditions. They rise from very great depths, and yet are killed apparently by frosty weather.

Another remarkable occurrence occasionally accompanies storms on the New Zealand coasts, when tons of deep-sea fish are thrown up dead, and this not in parts subject to thermal or volcanic action, but in stormy periods. One Captain Doyle, in former days, reported sailing through miles of dead fish, between Cape Palliser and Kaikoura; but it is no new occurrence for the beaches to be strewn with fish from depths of over a hundred fathoms during a storm. We are accustomed to think of the depths of the ocean as still and free from the waves that ruffle the surface; but is it so? The late Government Geologist, Mr. Alexander McKay, assures me that there are no volcanic or thermal regions where these fish come ashore; and though these parts do experience earthquakes, which may release poisonous subterranean gases, yet he attributes the cause to the storm. His explanation of such an occurrence at Island Bay, Wellington, on 18th July, 1912, is: "This is not the first time, nor the tenth time, that fish have been landed on the shores of Cook Strait in precisely the same fashion, always in every case subsequent to a storm. Therefore, we must look for the cause in the storms, unless it is that storms may produce what we call fumes, by stirring up the bottom of the sea. Immediately off shore we have comparatively deep sea, inhabited by fishes which are not usually met on the immediate coast-line. If from any cause during a high storm deep-sea fishes hug close to the land, then it only requires a very heavy sea, in which waves strike the bottom, to involve the fish, rush them ashore, and kill them by hundreds."

At the time of the occurrence a low pressure system ruled northwards, while an antarctic anticyclone was reported in the south, and a south-easterly gale swept through Cook Strait and on the shores in its vicinity. North and south of the Straits the weather was not so intense; and the gradient was not remarkably high where the storm was most felt, but just where the fish came ashore.

The report in the *Wellington Evening Post*, of the 18th, was as follows:—"A curious phenomenon was observed at Island Bay this morning. The beach was strewn with fish, some dead, some still alive—tons and tons of ling, hapuka, hake—every kind. One enterprising person collected a lorry load and brought it into town, and

dozens secured smaller quantities, ranging from a barrow-load to a "string." The phenomenon has been observed previously in New Zealand. Some thirty years ago the beach at Okarito, on the West Coast of the South Island, was strewn for seventy miles with fish of all sorts and sizes, and an old resident of Wellington remembers several occasions on which the same thing happened at Lyall Bay. As to the cause nothing is known, but it is conjectured that it may be a submarine volcanic disturbance."

THE COLD AUGUST AND SEPTEMBER IN LONDON.

THE temperature of August and September was so unusually low in London, that the long record at Camden Square, dating from 1858, contains no instance of any previous August or September with a lower mean temperature. The mean temperature of August, $57^{\circ}9$, was $4^{\circ}4$ below the average; and it was the coolest August in the 55 years' record. In September the mean temperature was $54^{\circ}1$, or $3^{\circ}6$ below the average, and only in 1877 can September show so low a record. The combined difference from the average is thus $-8^{\circ}0$, and though there are 10 instances of two months together showing a greater deficiency, all 10 instances are confined to the months November to February.

Temperature remained consistently low throughout the two months, but the shade maxima records are rather more remarkable than the minima. In August the mean shade maximum was $66^{\circ}6$, and only in 1860 was it so low for that month. August, 1860 and 1912, are also the only months of that name in which the shade temperature failed to reach 77° . In 1912 the highest recorded was $73^{\circ}2$ on the 4th. In September the records were even more remarkable, the mean maximum, $62^{\circ}4$, being the lowest ever recorded for that month; and the absolute maximum, $69^{\circ}4$ on the 4th, was also the lowest ever recorded in September.

The records are in striking contrast to those for August–September, 1911, two months of extraordinary brilliance and warmth. In August–September, 1911, the temperature rose to 80° , or above on 22 days and exceeded 90° on 5 days. The mean shade maximum for August, 1911, was $80^{\circ}8$, or $14^{\circ}2$ above the corresponding mean for 1912; and in September, 1911, it was $73^{\circ}0$, or $12^{\circ}5$ above that of September, 1912.

It is of considerable interest that 15 consecutive months with mean temperatures above the average, May, 1911, to July, 1912, should be followed by two months of unprecedentedly low temperature.

Summary of Maximum Temperatures of the 61 days, August 1st—September 30th.

	Number of days with max. temp above:—												
	60°	65°	70°	75°	80°	85°	90°						
1911.....	91	...	55	...	44	...	36	...	22	...	13	...	5
1912.....	53	...	28	...	3	...	0	...	0	...	0	...	0

THE WEATHER OF SEPTEMBER.

By FRED. J. BRODIE.

THE abnormally bad weather of August was attributed, *inter alia*, to an unusual prevalence of winds blowing from the Atlantic, where the mean temperature of the sea surface was considerably below the average. The explanation seemed plausible enough, but in the light of recent events it can scarcely be regarded as adequate. In September the winds were more variable, but over England, and especially in the latter half of the month, they were most commonly from some easterly quarter, and originated in the farther regions of the continent. The absence of seasonable warmth was, nevertheless, as noticeable almost as in the previous month, very few places in any part of the kingdom experiencing a shade maximum temperature as high as 70° . In the London district the thermometer did not once touch that level, the absolute maximum of 69° , on the 4th of the month, being the lowest recorded in September since the year 1887, or, with that exception, in any of the previous 40 years.

In the opening week the southern half of the country was influenced by a large anticyclone lying to the south-westward of our islands, and the weather in those parts was therefore mostly fair and dry. Between the 1st and 4th the thermometer rose above 65° in many parts of England, a reading of 69° being recorded at Dublin on the 3rd, and at Greenwich, Camden Square and Clacton-on-Sea on the 4th. In the more northern districts the weather was affected by cyclonic disturbances moving from Iceland to Scandinavia. These systems produced frequent rains, the fall in Scotland on the 3rd being very heavy, and strong winds from the westward and north-westward. After the 8th, and until very nearly the close of the month, the conditions over the whole country were markedly anticyclonic, the wind being at first from some north-westerly (west to north) quarter, but afterwards from the eastward in all the more southern districts. For about three weeks the country experienced an almost entire absence of rain, and at some stations in the south of England, where the early part of the month had also been fair, the absolute drought extended over as many as 25 or 26 days. Until the fourth week the sky was usually more or less cloudy, and even in the intervals of fine weather the thermometer scarcely ever rose to its normal level, maximum readings below 60° being common in nearly all parts of the country. On the 9th and 10th the thermometer in many districts failed to reach 55° , and in the north of Scotland it did not touch 50° . The highest temperatures recorded over the United Kingdom during the entire month occurred on the 16th, not in what are usually regarded as the warmer parts of the country, but in the west and north. At Alnwick Castle and Bath the thermometer on this occasion rose to 70° , while at Crieff, Cullompton and Killarney it touched 72° . Ground frost was experienced from time to time in

THAMES VALLEY RAINFALL—SEPTEMBER, 1912.



ALTITUDE Below 250 feet 250 to 500 feet 500 to 1000 feet Above 1000 feet

SCALE OF MILES 0 5 10 15 20

most districts, the sharpest nights occurring between the 24th and 27th, when the thermometer in many parts of Great Britain sank below the freezing point even in the shelter of the screen; on the surface of the grass it fell to 23° at Balmoral, West Linton and Hampstead, and 24° at Greenwich, Wisley, Marlborough and Cheadle.

On the 28th a radical, though purely temporary, change in the weather was brought about by the extension over these islands of a barometrical depression from the southward. The easterly wind now increased greatly in strength on nearly all coasts, and rain set in over our southern districts. Two other disturbances afterwards came in from the south-westward and on the 29th and 30th exceedingly heavy falls of rain were experienced in nearly all parts of Great Britain. In spite of the long drought which had hitherto prevailed, the rainfall on these two days was, in many places, sufficient to raise the monthly total to a point equal to, or even slightly in excess, of the average.

Owing to the absence of midday warmth the mean temperature of the month was considerably below the average, the deficit amounting, in many districts, to between 3° and 4° . Over the country generally the coldest August was, in fact, followed by the coldest September experienced for at least 40 years past. The duration of bright sunshine was below the normal in all but the extreme western and northern parts of the kingdom. In the London district the deficiency was small, but over the eastern half of Great Britain it was considerable, Aberdeen recording only 87 hours, as against an average of 123 hours, and Yarmouth only 120, as against an average of 169.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

SKY SIGNS OF THE RAINY AUGUST.

A POINT worth noting in connection with the rainfall last August is the absence of sunset or sunrise glows, very generally, if not universally. Such has been the case here, and my attention has been called to it from Somerset and Cumberland. Associated with this has been an extreme wateriness of the "blue sky" whenever visible, naturally associated with the coldest appearance of the sunshine within two or three hours of sunrise and sunset.

J. EDMUND CLARK.

Riddlesdown Road, Purley.

THE VALLOT OBSERVATORY ON MONT BLANC.

IN your August issue, Mr. Dansey, in his paper, "June in the Pyrenees," asks for enlightenment as to whether M. Vallot's observatory is still existent on Mont Blanc.

It will interest him, and I trust your other readers, to know that this Observatory *is* existent, and does excellent work. Every year M. Vallot stays up at the Observatory through the greater part of August, and the Observatory is then open to a restricted number of scientific men desirous of investigating high altitude phenomena.

The Observatory strikes the visitor as a most cosy and comfortable high mountain chalet of considerable dimensions. It is well equipped with a variety of the best meteorological apparatus. There are also biological and photographic laboratories. M. Vallot and his assistants are at present occupied in the detailed survey of the "Massif du Mont Blanc"; it is a most difficult task, carried out principally by triangulation and telephoto work.

The confusion concerning the Mont Blanc Observatories frequently arises through the disappearance of the old Janssen Observatory which was situated on the very top of Mont Blanc. It inclined to one side and gradually sank, it is believed, into a fissure due to an earthquake. The turret of this observatory may now be seen in the Alpine Museum at Chamonix; the rest of the building was mostly used up as firewood for the Vallot Observatory, which is not quite at the summit.

M. Vallot has now ascended Mont Blanc 34 times, and, notwithstanding that he is a grandfather, it is remarkable to see the agility with which he will run across ladders bridging glacier crevasses. He is an eminent meteorologist, and his work is not limited to high altitudes, but also extends to the sub-tropical climate of the Riviera, for he winters in Nice. It is mainly to him that the present *systematic* investigation of Riviera meteorology and climate is due, the Riviera being one of those "most observed" fields of which there exist no reliable observations, or practically none.

With reference to the Mont Blanc Observatory, its work is summarised in a "Bulletin," which Mr. Dansey will find in any Meteorological Society's library. Last year's work included most interesting investigations on the "artificial," or non-pulmonary oxidization of blood. At high altitudes the arterial blood has very much of a venous appearance, but the experiments carried out at the observatory demonstrated that the subcutaneous injection of oxygen gas rapidly restored a brilliant red colour to arterial blood and consequently that blood corpuscles were able to fix oxygen without the phenomena necessarily taking place in the intimacy of the lung. M. Vallot, with his customary enthusiasm, was the first human being to submit to the "treatment" and its uncertain consequences. In point of fact there was no harmful result, but the oxygen gas, travelling along in the subcutaneous tissue, localised in the most

unexpected places, causing some pain, and particularly a malformation, which gave rise to great hilarity, in which "the subject," notwithstanding considerable discomfort, heartily joined. As you see, the Vallot Observatory is not a dull place! Experience has now settled where these injections can be made without such inconvenience and they afford considerable relief when the lungs, through morbid conditions, are unable to do their work.

It is a great pity that more visitors do not ascend Mont Blanc, which practically is not a dangerous climb. Of the 180,000 tourists who went through Chamonix last year, only 180 odd went up the mountain, an average of one in a thousand.

MARC DE LEVIS,

Villa Goiran, Place Sasserno, Nice.

M.D., B.Sc., F.R.Met.Soc

EARLY SNOW.

SHARP snow showers were experienced here on the evenings of September 10th and 11th. On the former date, at 7 p.m., a well-defined pallium of mammato-cumulus spread over the sky from the north, accompanied by a keen northerly wind. Between 7.15 and 7.20 p.m., snowflakes of considerable size fell. Throughout the 11th the sky bore that peculiar appearance, hard, steely blue-black in colour, that one commonly associates with a snowfall in winter, and between 9.0 and 9.10 p.m. there was a fall of fine powdery snow. Two balloonists who made a journey from Battersea to Brighton on the evening of the 10th, experienced a very heavy snowstorm at an altitude of 5,000 feet.

During the last 11 years in the Southern Counties the earliest record that I have of snow was at Epsom, Surrey, at 10.20 p.m. on September 19th, 1910.

SPENCER C. RUSSELL.

Southwater, Sussex, September 16th, 1912.

LARGE AGGREGATE RAINFALL IN DEVON.

THE rainfall here from January 1st to August 31st has amounted to 34.69 in. The mean annual rainfall is about 33 in., so that the present year has exceeded its whole allowance by nearly two inches, with some of the usually wettest months to come. The total fall for the twelve months ending August 31st is no less than 55.12 in., or more than 22 in. in excess of a normal 12 months fall, and very nearly double the total fall for the year 1908, *i.e.*, 28 in. There was more rain during the month of August than fell from May to September, inclusive, last year, the present August producing 7.27 in., while August of last year only yielded .56 in. The number of rain days has been, since January 1st, 155, compared with 74 days last

year, and in August this year it rained on 24 days, compared with 6 in August last year. At my Somerset station, Edington, the rainfall during August amounted to 9·65 in. on 26 days. This is the greatest amount of rain I have registered there in any month during 22 years, the next greatest being 7·75 in. in October, 1891. The rainfall there since January 1st has been 29·80 in., or about an inch above the normal for a whole year, and the twelve months since last September give 44·07 in., or more than 15 in. in excess of an average rainfall.

I should be interested to hear if any of your correspondents have experienced such an enormous excess at their stations.

A. C. F. LUTTRELL.

Lea Combe House, Axminster, Devon, September, 1912.

THE RAINFALL OF SEPTEMBER 29th TO OCTOBER 2nd, 1912.

AFTER twenty-eight nearly rainless days, rain began at 4.30 p.m., with a S.E. wind, on September 29th, and there was measured on September 30th at 9 a.m. 1·64 in. Wind S.E. Rain stopped at 11 a.m. Wind gradually veered to N.W. Rain began again at 7 p.m. on the 30th; and on October 1st rain stopped at an early hour; that measured at 9 a.m. was ·75 in. Wind S.W.; beautifully fine. Wind gradually veered to N.W. and rain began again at 2.30 p.m. On October 2nd the measurement at 9 a.m. was ·35 in.; wind N.E. Rain stopped at 11.30 a.m., producing ·03 in. more rain. Bitterly cold. The wind was slight throughout.

	RAINFALL.		TEMPERATURE.	
	in.		Max.	Min.
September 29th	1·64	... ..	60	50
„ 30th	·75	.....	60	45
October 1st	·35	.....	61	47
„ 2nd.....	·03	.....	49	33
	2·77			

The wind is now N.E., fresh and fine.

GILBERT A. CLAYTON EAST.

Hall Place, Maidenhead, 3rd October, 1912.

METEOROLOGICAL NEWS AND NOTES.

DR. H. R. MILL will lecture on Natural Sources of Power, for the Gilchrist Educational Trust, at Kidderminster, on Monday, October 21st; at Oldbury, near Dudley, on the 22nd; at Sowerby Bridge, near Halifax, on the 23rd; at Clayton-le-Moors, near Accrington, on the 24th; and at Padiham, near Burnley, on Friday, October 25th.

ABANA AND PHARPAR, rivers of Damascus, were, it would appear, no more jealous of the Jordan than is the Wensum of the Yare, to judge from the following complaint:—

“I, the river Wensum, which am the largest river in Norfolk, do hereby make just complaint of the neglect with which I have been treated in the printed accounts of the Norfolk deluge. The Bure, the Yare, and the Waveney have all been mentioned, but of me, beside whom the Yare is but a muddy brook, never a word! Mine is the longer course; I drain the larger area; and my clear, broad, swift stream is better than Bure and Yare combined. In the name of the bridges that I swept away in my fury I feel tempted to seek a remedy in the Court of Arches.”

This reached us with an illegible water-mark, and we can only plead in extenuation of our neglect that the Wensum has allowed the Yare to give its name to the seaward end of the joint stream and so to place the longer partner in the position of a tributary.

INTERNATIONAL BALLOON ASCENTS.

By W. H. DINES, F.R.S.

April 14th, 1910.

Starting Point	Country.	A miles.	B ° F.	C miles	D ° F.	E miles.	F
Manchester....	England	5·9	—62	13·8	—60	122	N.
Pyrton Hill....	„ 7 a.m. ..	5·6	—63	8·8	—58	86	N.N.E.
„	„ 5 p.m. ..	5·9	—76	9·4	—64	88	N. by E.
Petersfield	„	5·6	—67	9·4	—67	?	?
Brussels	Belgium	6·4	—74	13·1	—60	89	N.E. by N.
Lindenberg ...	Germany....	6·6	—78	6·7	—78	54	E.N.E.
Paris	France	6·5	—73	11·5	—71	92	N.E. by E.
Strassburg	Germany....	6·5	—73	8·3	—63	59	N.E.
Munich	„	6·8	—76	12·4	—65	52	N.E. by E.
Nizhni Olchedaeff	Russia	5·5	—63	10·1	—68	51	S.E. by E.

- A Height in miles of commencement of isothermal column.
 B Temperature, F°, at bottom of column.
 C Greatest height of reliable record in miles.
 D Temperature, F°, at greatest height.
 E Distance in miles of point where balloon fell.
 F Bearing of falling point from starting point.

A low pressure area with the barometer below 29°00 lay in the west, and an anticyclone over the south-east of Europe. There is considerable uniformity about the figures, but it will be noticed how the height of the isothermal column increased from west to east, in accordance with the usual rule by which a low isothermal column is associated with a low barometer.

RAINFALL TABLE FOR SEPTEMBER, 1912.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	RAINFALL OF MONTH.	
					Aver. 1875— 1909. in.	1912. in.
Camden Square.....	<i>London</i>	51 32	0 8	111	2'00	2'14
Tenterden.....	<i>Kent</i>	51 4	*0 41	190	2'25	3'17
Arundel (Patching).....	<i>Sussex</i>	50 51	0 27	130	2'58	3'21
Fawley (Cadland).....	<i>Hampshire</i>	50 50	1 22	52	2'60	2'37
Oxford (Magdalen College).	<i>Oxfordshire</i>	51 45	1 15	186	1'98	1'03
Wellingborough (Croyland Abbey).	<i>Northampton</i>	52 18	0 41	174	2'14	1'16
Shoeburyness.....	<i>Essex</i>	51 31	*0 48	13	1'70	2'02
Bury St. Edmunds (Westley)	<i>Suffolk</i>	52 15	*0 40	226	2'18	2'62
Geldeston [Beccles].....	<i>Norfolk</i>	52 27	*1 31	38	2'13	2'50
Polapit Tamar [Launceston]	<i>Devon</i>	50 40	4 22	315	3'11	1'19
Rousdon [Lyme Regis].....	".....	50 41	3 0	516	2'69	1'39
Stroud (Upfield).....	<i>Gloucestershire</i> ..	51 44	2 13	226	2'39	'93
Church Stretton (Wolstaston)..	<i>Shropshire</i>	52 35	2 48	800	2'40	'90
Coventry (Kingswood).....	<i>Warwickshire</i> ...	52 24	1 30	340	2'35	'97
Boston.....	<i>Lincolnshire</i>	52 58	0 1	25	2'07	1'44
Worksop (Hodsock Priory).	<i>Nottinghamshire</i>	53 22	1 5	56	1'84	1'35
Macclesfield.....	<i>Cheshire</i>	53 15	2 7	501	2'92	1'98
Southport (Hesketh Park)..	<i>Lancashire</i>	53 38	2 59	38	3'09	1'39
Arneliffe Vicarage.....	<i>Yorkshire, W.R.</i>	54 8	2 6	732	4'55	2'85
Wetherby (Ribston Hall)...	".....	53 59	1 24	130	2'11	...
Hull (Pearson Park).....	<i>E.R.</i>	53 45	0 20	6	2'05	1'91
Newcastle (Town Moor)...	<i>Northumberland</i>	54 59	1 38	201	2'00	2'00
Borrowdale (Seathwaite)...	<i>Cumberland</i>	54 30	3 10	423	11'28	6'51
Cardiff (Ely).....	<i>Glamorgan</i>	51 29	3 13	53	3'61	'93
Haverfordwest.....	<i>Pembroke</i>	51 48	4 58	95	3'91	'61
Aberystwyth (Gogerddan)..	<i>Cardigan</i>	52 26	4 1	83	3'89	'60
Llandudno.....	<i>Carnarvon</i>	53 20	3 50	72	2'50	1'11
Cargen [Dumtries].....	<i>Kirkcudbright</i> ...	55 2	3 37	80	3'34	2'25
Marchmont House.....	<i>Berwick</i>	55 44	2 24	498	2'67	3'26
Girvan (Pinmore).....	<i>Ayr</i>	55 10	4 49	207	4'30	3'38
Glasgow (Queen's Park)...	<i>Renfrew</i>	55 53	4 18	144	2'99	1'38
Inveraray (Newtown).....	<i>Argyll</i>	56 14	5 4	17	6'15	4'32
Mull (Quinish).....	".....	56 34	6 13	35	5'20	2'45
Dundee (Eastern Neeropolis)	<i>Forfar</i>	56 28	2 57	199	2'34	2'56
Braemar.....	<i>Aberdeen</i>	57 0	3 24	1114	2'73	2'72
Aberdeen (Cranford).....	".....	57 8	2 7	120	2'69	2'14
Cawdor.....	<i>Nairn</i>	57 31	3 57	250	2'55	1'17
Fort Augustus (S. Benedict's)	<i>E. Inverness</i> ...	57 9	4 41	68	3'54	2'25
Loch Torridon (Bendamph)	<i>W. Ross</i>	57 32	5 32	20	7'28	3'96
Dunrobin Castle.....	<i>Sutherland</i>	57 59	3 56	14	2'51	1'03
Wick.....	<i>Caithness</i>	58 26	3 6	77	2'57	'96
Killarney (District Asylum)	<i>Kerry</i>	52 4	9 31	178	3'79	'81
Waterford (Brook Lodge)...	<i>Waterford</i>	52 15	7 7	104	3'19	'28
Nenagh (Castle Lough).....	<i>Tipperary</i>	52 54	8 24	120	3'16	'47
Miltown Malbay.....	<i>Clare</i>	52 52	9 26	400	4'18	...
Gorey (Courtown House)...	<i>Wexford</i>	52 40	6 13	80	2'78	'37
Abbey Leix (Blandsfort)....	<i>Queen's County</i> ..	52 56	7 17	532	2'93	'47
Dublin (Fitz William Square)	<i>Dublin</i>	53 21	6 14	54	2'06	'57
Mullingar (Belvedere).....	<i>Westmeath</i>	53 29	7 22	367	3'02	'41
Cong (The Glebe).....	<i>Mayo</i>	53 33	9 16	112	4'05	'71
Crossmolina (Enniscooe).....	<i>Mayo</i>	54 4	9 16	74	4'42	'62
Collooney (Markree Obsy.).	<i>Sligo</i>	54 11	8 27	127	3'65	1'31
Seaforde.....	<i>Down</i>	54 19	5 50	180	3'25	'83
Bushmills (Dundarave).....	<i>Antrim</i>	55 12	6 30	162	3'49	1'68
Omagh (Edenfel).....	<i>Tyrone</i>	54 36	7 18	280	3'39	1'53

RAINFALL TABLE FOR SEPTEMBER, 1912—continued.

RAINFALL OF MONTH (var.)				RAINFALL FROM JAN. 1.				Mean Annual 1875-1909.	STATION.	
Diff. from Av. in.	% of Av.	Max. in 24 hours.	No. of Days	Aver. 1875-1909.	1912.	Diff. from Aver. in.	% of Av.			
		in. Date.		in.	in.			in.		
+ .14	107	1.04	29	6	17.92	21.45	+3.53	120	25.11	Camden Square
+ .92	141	1.67	30	8	18.32	23.41	+5.09	128	27.64	Tenterden
+ .63	124	1.68	29	5	20.02	29.02	+9.00	145	30.48	Patching
- .23	91	1.25	29	6	21.18	27.77	+6.59	131	31.87	Cadland
- .95	52	.63	29	8	17.45	23.04	+5.59	132	24.58	Oxford
- .98	54	.54	29	8	18.20	23.75	+5.55	130	25.17	Croyland Abbey
+ .32	119	1.18	30	8	13.17	14.99	+1.82	114	19.28	Shoeburyness
+ .44	120	.81	30	13	18.14	24.38	+6.24	134	25.40	Westley
+ .37	117	.98	30	13	16.33	22.78	+6.45	139	23.73	Geldeston
-1.92	38	.64	29	9	24.90	35.43	+10.53	142	38.27	Polapit Tamar
-1.30	52	.80	29	5	22.54	30.39	+7.85	135	33.54	Rousdon
-1.46	39	.52	29	7	21.12	34.00	+12.88	161	29.81	Stroud
-1.50	38	.59	29	10	22.71	28.97	+6.26	128	32.41	Wolstaston
-1.38	41	.59	29	8	20.51	29.60	+9.09	144	28.98	Coventry
- .63	70	.52	29	12	16.67	23.51	+6.84	141	23.35	Boston
- .49	73	.59	29	8	17.54	26.31	+8.77	150	24.46	Hodsock Priory
- .94	68	.46	7	13	24.85	27.40	+2.55	110	34.73	Macclesfield
-1.70	45	.31	3	10	22.70	27.70	+5.00	122	32.70	Southport
-1.70	63	1.36	3	10	42.14	49.81	+7.67	118	61.49	Arncliffe
...	...	...	...	...	19.08	...	...	...	26.87	Ribston Hall
- .14	93	.54	29	10	18.57	25.25	+6.68	136	26.42	Hull
- .00	100	.46	29	11	19.65	25.19	+5.54	128	27.94	Newcastle
-4.77	58	2.41	3	11	88.04	89.56	+1.52	102	129.48	Seathwaite
-2.68	26	.55	29	5	28.63	39.76	+11.13	138	42.28	Cardiff
-3.30	16	.18	28	12	30.96	38.77	+7.81	125	46.81	Haverfordwest
-3.29	15	.18	29	9	30.92	37.18	+6.26	120	45.46	Gogerddan
-1.39	44	.22	29	9	20.55	23.63	+3.08	115	30.36	Llandudno
-1.09	67	1.33	3	8	29.83	37.51	+7.68	126	43.47	Cargen
+ .59	122	1.76	30	6	23.89	24.09	+ .20	101	33.76	Marchmont
- .92	79	1.22	3	13	33.67	36.31	+2.64	108	49.77	Girvan
-1.61	46	.36	7	9	25.03	23.67	-1.36	95	35.97	Glasgow
-1.83	70	2.26	3	10	46.21	44.15	-2.06	96	68.67	Inveraray
-2.75	47	1.23	3	9	37.87	34.28	-3.59	91	56.57	Quinish
+ .22	109	1.38	30	7	20.54	20.78	+ .24	101	28.64	Dundee
- .01	100	1.60	30	...	24.16	25.75	+1.59	107	34.93	Braemar
- .55	80	1.05	30	12	22.78	23.41	+ .63	103	32.73	Aberdeen
-1.38	46	.39	4	6	21.25	18.46	-2.79	87	29.33	Cawdor
-1.29	64	.98	3	9	30.26	27.02	-3.24	89	44.53	Fort Augustus
-3.32	54	1.47	4	12	56.79	48.24	-8.55	85	83.93	Bendamph
-1.48	41	.40	3	8	22.41	23.35	+ .94	104	31.90	Dunrobin Castle
-1.61	37	.27	5	14	20.68	21.74	+1.06	105	29.88	Wick
-2.98	21	.16	1	13	36.76	39.08	+2.32	106	54.81	Killarney
-2.91	9	.15	29	5	27.45	33.11	+5.66	121	39.57	Waterford
-2.69	15	.23	3	9	27.73	28.19	+ .46	102	39.43	Castle Lough
...	...	...	...	...	31.46	...	...	...	45.11	Miltown Malbay
-2.41	13	.29	29	3	24.41	34.91	+10.50	143	34.99	Courtown Ho.
-2.46	16	.14	29	7	25.70	28.93	+3.23	112	35.92	Abbey Leix
-1.49	28	.24	29	8	19.89	22.67	+2.78	114	27.68	Dublin
-2.61	14	.15	3	6	26.19	30.76	+4.57	117	36.15	Mullingar
-3.34	17	.46	3	8	33.88	30.72	-3.16	91	48.90	Cong
-3.80	14	.33	3	6	35.74	...	...	...	52.87	Enniscoe
-2.34	36	.45	3	12	30.14	33.09	+2.95	110	42.71	Markree
-2.42	26	.23	29	10	27.63	35.60	+7.97	129	38.91	Seaforde
-1.81	48	.75	3	8	26.32	27.76	+1.44	105	37.56	Dundarave
-1.86	45	.79	3	7	28.05	32.17	+4.12	115	39.38	Omagh

SUPPLEMENTARY RAINFALL, SEPTEMBER, 1912.

Div.	STATION.	Rain inches	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road.	3·85	XI.	Lligwy	·79
„	Ramsgate	2·89	„	Douglas	1·46
„	Hailsham	3·79	XII.	Stoneykirk, Ardwell House...	2·84
„	Totland Bay, Aston House...	2·50	„	Dalry, The Old Garroch.....	3·10
„	Stockbridge, Ashley	2·32	„	Langholm, Drove Road	3·84
„	Grayshott	4·21	„	Beattock, Kirnclhead	2·28
„	Caversham, Rectory Road ...	2·47	XIII.	St. Mary's Loch, Cramilt Ldge	3·11
III.	Harrow Weald, Hill House...	2·29	„	North Berwick Reservoir...	2·99
„	Pitsford, Sedgebrook.....	·88	„	Edinburgh, Royal Observaty.	2·60
„	Woburn, Milton Bryant.....	1·61	XIV.	Maybole, Knockdon Farm ...	2·11
„	Chatteris, The Priory.....	1·39	XV.	Campbeltown, Witchburn ..	2·34
IV.	Colchester, Lexden	2·54	„	Holy Loch, Ardnadam.....	4·82
„	Newport.....	2·50	„	Ballachulish House	4·57
„	Ipswich, Copdock	2·58	„	Islay, Eallabus	3·01
„	Blakeney.....	2·58	„	Tiree, Cornaigmore	2·82
„	Swaffham	2·64	XVI.	Dollar Academy	2·89
V.	Bishops Cannings	1·37	„	Balquhider, Stronvar.....	3·49
„	Winterbourne Steepleton.....	1·72	„	Coupar Angus	2·12
„	Ashburton, Druid House.....	1·40	„	Glenlyon, Meggernie Castle..	3·44
„	Cullompton	1·57	„	Blair Athol	1·68
„	Lynmouth, Rock House	·91	„	Montrose, Sunnyside Asylum.	2·40
„	Okehampton, Oaklands.....	1·59	XVII.	Alford, Lynturk Manse	3·07
„	Hartland Abbey.....	·74	„	Fyvie Castle	2·03
„	Probus, Lamellyn.....	...	„	Keith Station	1·81
„	North Cadbury Rectory.....	1·14	XVIII.	Skye, Dunvegan	2·72
VI.	Clifton, Pembroke Road.....	·60	„	N. Uist, Lochmaddy	2·03
„	Ross, The Graig	·67	„	Glenquoich, Loan.....	11·05
„	Shifnal, Hatton Grange.....	·83	„	Alvey Manse	1·30
„	Droitwich.....	·75	„	Loch Ness, Drumnadrochit ..	1·89
„	Blockley, Upton Wold.....	1·05	„	Glencarron Lodge	5·15
VII.	Market Overton.....	1·25	XIX.	Invershin	2·22
„	Market Rasen.....	1·40	„	Loch Stack, Ardochullin	5·00
„	Bawtry, Hesley Hall	1·05	„	Melvich	1·73
„	Derby, Midland Railway.....	1·02	XX.	Skibbereen Rectory	1·41
„	Buxton	2·57	„	Dunmanway, The Rectory ..	1·53
VIII.	Nantwich, Dorfold Hall	1·65	„	Glanmire, Lota Lodge.....	1·14
„	Chatburn, Middlewood	1·96	„	Mitchelstown Castle.....	·93
„	Cartmel, Flookburgh	2·82	„	Darrynane Abbey.....	2·87
IX.	Langsett Moor, Up. Midhope	1·92	„	Clonmel, Bruce Villa	·49
„	Scarborough, Scalby	2·71	„	Newmarket-on-Fergus, Fenloe	·53
„	Ingleby Greenhow	2·16	XXI.	Laragh, Glendalough	1·56
„	Mickleton	2·35	„	Ballycumber, Moorock Lodge	·23
X	Bellingham, High Green Manor	3·02	„	Balbriggan, Ardgillan	·75
„	Ilderton, Lilburn Cottage	2·78	XXII.	Woodlawn	·37
„	Keswick, The Bank.....	1·83	„	Westport, St. Helens	·54
XI.	Llanfrecfa Grange	·96	„	Achill Island, Dugort	1·35
„	Treherbert, Tyn-y-waun	1·76	„	Mohill, The Rectory	·57
„	Carmarthen, The Friary	·75	XXIII.	Enniskillen, Portora.....	·66
„	Castle Malgwyn [Llechryd]...	·57	„	Dartrey [Cootehill]	·76
„	Crickhowell, Tal-y-maes.....	1·70	„	Warrenpoint, Manor House ..	·70
„	New Radnor, Ednol	1·22	„	Banbridge, Milltown	·70
„	Rhayader, Tyrmynydd	1·23	„	Belfast, Cave Hill Road	1·44
„	Lake Vyrnwy	1·18	„	Glenarm Castle.....	1·84
„	Llangyhanfal, Plas Draw.....	1·36	„	Londonderry, Creggan Res...	2·32
„	Dolgelly, Bryntirion.....	...	„	Killybegs	1·93
„	Bettws-y-Coed, Tyn-y-bryn...	2·04	„	Horn Head	2·36

METEOROLOGICAL NOTES ON SEPTEMBER, 1912.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Temp. for Temperature; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow; F for number of days Frost in Screen; f on Grass.

LONDON, CAMDEN SQUARE.—Fair to fine and dry weather prevailed throughout the month until the last two days, in which 2·03 in., or 95 per cent. of the total R of the month, fell. There were 16 days' absolute drought from 12th to 27th. Temp. was low throughout, the mean temp. being 54°·1, or 3°·6 below the average, and with September, 1877, the lowest for that month in the 55 years' record (see p. 181). Duration of sunshine 112·1* hours, and of R 25·7 hours. Evaporation 1·41 in. Shade max. 69°·4 on 4th; min. 35°·7 on 27th. F 0, f 1.

TENTERDEN.—Dry and cold until 29th and 30th, when 2·97 in. fell in two days. Duration of sunshine 149·0† hours. Shade max. 68°·5 on 4th; min. 38°·0 on 27th. F 0, f 1.

TOTLAND BAY.—Absolute drought from 1st to 27th, and heavy R with S. gale on last two days. Mean temp. 54°·4, or 3°·8 below the average, and the lowest for September in 26 years. Shade max. 67°·1 on 15th; min. 39°·5 on 25th. F 0, f 9.

PITSFORD.—R 1·72 in. below the average. Mean temp. 51°·8. Shade max. 65°·4 on 16th; min. 31°·0 on 27th. F 1.

IPSWICH, COPDOCK.—As dull, cold and cheerless as August, but very dry until the last two days, when more than the average R for the whole month fell in about 30 hours. Mean temp. 52°·7. Duration of sunshine 123·0† hours. Shade max. 65°·2 on 4th; min. 41°·0 on 20th and 26th. F 0, f 0.

WINTERBOURNE STEEPLTON.—Absolute drought of 24 days from 4th to 27th. Shade max. 67°·6 on 15th; min. 31°·4 on 25th. F 1, f 8.

NORTH CADBURY.—The lowest mean temp. for September in 16 years, but a marked absence of extremes. Absolute drought of 24 days from 4th to 27th. Shade max. 75°·5 on 16th; min. 37°·5 on 11th and 25th. F 0, f 5.

ROSS.—Shade max. 67°·8 on 15th; min. 36°·7 on 27th. F 0, f 0.

HODSOCK PRIORY.—The coldest September since 1887, when the mean temp. was the same. Shade max. 67°·9 on 16th; min. 30°·8 on 27th. F 1, f 4.

SOUTHPORT.—Duration of sunshine 109·1* hours, or 34·0 hours below the average. Duration of R 34·0 hours. Evaporation 1·68 in. Mean temp. 52°·1, or 3°·3 below the average. Shade max. 64°·0 on 18th; min. 38°·0 on 1st and 22nd. F 0, f 7.

HULL.—Unsettled and rainy to the 10th, then fine autumn days following clear dewy nights to 27th. The last three days again unsettled with R and high winds. Shade max. 69°·0 on 2nd; min. 38°·0 on 25th. F 0, f 1.

HAVERFORDWEST.—A fine month but cold and stormy at times. Much corn harvested in good condition. Duration of sunshine 154·1* hours.

LLANDUDNO.—Shade max. 66°·0 on 3rd; min. 42°·0 on 27th.

CARGEN.—More than half the R of the month fell on 3rd. Absolute drought from 9th to 28th. Excellent harvest weather, but crops owing to "twist" and laid condition were difficult to reap. Shade max. 66°·0 on 13th; min. 33°·5 on 27th.

EDINBURGH.—Shade max. 64°·6 on 16th; min. 36°·9 on 9th. F 0, f 1.

ARDNADAM.—Storms of wind and R in the first week. The 3rd was the wettest and the 4th the windiest day for years. Last three weeks were fine and dry. Shade max. 65°·2 on 18th; min. 32°·2 on 27th.

WATERFORD.—The driest September for 60 years. Absolute drought from 3rd to 26th. Shade max. 67°·0 on 3rd and 15th; min. 36°·0 on 13th.

DUBLIN.—Very fine month. Slight R at beginning and heavier R at close, but only ·01 in. between 5th and 28th. Mean temp. 53°·7, or 2°·2 below the average. Shade max. 68°·8 on 3rd; min. 43°·3 on 13th. F 0, f 0.

OMAGH.—No R fell for 23 days from 6th to 28th, which proved a godsend to the farmers and enabled the harvest to be secured in good order.

* Campbell-Stokes.

† Jordan.

Climatological Table for the British Empire, April, 1912.

STATIONS. (Those in italics are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain		Aver. Cloud.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
London, Camden Square	78°1	21	30°3	12	61°5	40°0	42°1	76	119°7	25°1	inches ·04	3	4·7
Malta	71·1	18	49·0	5	63·5	54·8	55·6	80	136·0	...	1·34	10	6·5
Lagos	93·0	5	70·5	19	89·7	78·0	75·3	71	157·0	70·0	3·97	8	...
Cape Town	95·6	20	47·8	6	72·6	57·1	58·3	81	...	...	3·32	11	5·2
Johannesburg	74·4	4	45·2	29	68·4	51·4	49·5	76	138·2	42·0	2·93	12	4·4
Mauritius	84·7	1	66·1	10	82·1	70·1	68·4	79	153·9	60·6	5·69	22	5·3
Bloemfontein	81·9	12	39·3	9	70·2	49·5	49·3	75	...	...	3·04	13	4·2
Calcutta... ..	98·7	8	63·0	1	93·4	75·0	72·6	72	...	57·1	2·46	4	3·7
Bombay... ..	94·2	25	74·6	1	91·3	78·6	74·3	72	132·0	67·8	·00	0	2·3
Madras	97·2	30	72·5	3	92·9	77·4	75·4	77	141·8	69·6	·00	0	2·0
Kodaikanal	75·8	9	50·6	2	71·0	53·4	50·1	68	146·9	41·7	10·05	14	4·2
Colombo, Ceylon	90·6	1	73·4	4	89·2	76·3	74·4	77	150·8	66·7	10·45	23	5·7
Hongkong	85·5	24	56·3	11	74·9	65·6	64·2	81	134·4	...	4·00	7	6·3
Sydney	82·2	18	50·8	25	70·8	56·8	53·1	74	135·9	42·8	5·87	23	4·5
Melbourne	80·4	16	39·2	14	65·4	51·1	48·6	67	129·0	34·5	2·33	16	6·9
Adelaide	86·2	3	45·8	28	69·7	52·8	49·8	65	145·0	35·1	1·75	9	5·7
Perth	89·9	25	53·6	14	78·5	58·1	52·1	55	143·9	44·8	·16	2	3·9
Coolgardie	88·4	13	47·0	8	74·0	54·6	48·8	55	147·8	43·4	1·11	7	6·0
Hobart, Tasmania	70·0	17	38·7	30	60·7	47·4	44·8	69	126·9	31·7	1·60	14	6·6
Wellington	69·8	3	42·8	27	62·6	51·5	47·9	71	120·0	34·0	4·18	15	6·9
Auckland	71·5	9	47·0	27	65·8	54·1	54·7	84	101·0	44·0	5·58	22	7·0
Jamaica, Kingston ..	90·5	5	68·1	7	87·7	70·7	74·0	70	...	...	·51	5	...
Grenada	88·0	(*)	73·0	(*)	85·2	75·1	...	70	140·0	...	1·19	12	3·6
Toronto	71·0	15	19·2	3	50·0	33·5	...	...	137·4	13·2	2·47	15	5·8
Fredericton	65·2	16	7·5	5	47·7	25·4	...	73	...	...	3·12	10	5·4
St. John, N.B.	56·5	17	16·7	9	45·0	30·8	...	...	...	...	3·35	13	4·9
Edmonton, Alta.	67·2	2	22·0	6	54·3	31·1	...	61	122·6	16·2	1·65	14	6·3
Victoria, B.C.	61·8	24	30·2	5	55·8	41·4	...	72	...	...	1·30	13	8·0
Dawson	55·0	19†	0·0	5	44·8	17·2	...	...	...	...	·00	0	8·0

(*) Several. + And 27.

MALTA.—Mean temp. of air 58°·7. Bright sunshine 8·2 hours per day.

Johannesburg.—Bright sunshine 219·6 hours.

Mauritius.—Mean hourly velocity of wind 9·4 miles or 0·3 above, R 1·3 in. above, averages.

KODAIKANAL.—Bright sunshine 232 hours; TSS on 15 days.

COLOMBO.—Mean temp. of air 82°·8 or 0°·2 above, of dewpoint 0°·1 below, and R ·50 in. above, averages. Mean hourly velocity of wind 3·4 miles. TSS on 21 days.

HONGKONG.—Mean temp. of air 69°·9. Bright sunshine 196·5 hours. Mean hourly velocity of wind 12·9 miles.

Sydney.—Mean temp. of air 0°·8 below, and R ·62 in. above, averages.

Perth.—Mean temp. of air 1°·9 above, and R 1·53 in. below, averages.

Coolgardie.—Mean temp. of air 2°·9 above, and R ·50 in. above, averages.

Hobart.—Mean temp. of air 1°·3 below, and R slightly below, averages.

Auckland.—Wet and stormy, mean temp. rather more than a degree under average, and R nearly double the average for previous 45 years.