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THE DISASTER IN THE ANTARCTIC.

UNTIL now it has been the unique distinction of Antarctic exploration that though each expedition from the time of Captain James Cook onward ran risks which made success a marvel there had been no crushing disaster to record. The public naturally enough failed in the face of repeated escapes and triumphs to realize how fine is the hair that separates life and death in the Southern, as well as in the Northern, Polar regions; and though the explorers themselves can never have failed to realize the razor-edge of the bridge they crossed to fame, their friends, we fear, have too often assumed success as a result to be commanded as surely as it was deserved. Thus, the triumphant return of Captain Scott from his second expedition to the Antarctic regions was looked for with a confidence which has bitterly aggravated the terrible news that he and his surviving companions, after having reached the South Pole, had perished in a blizzard on their return within eleven miles of safety.

We write at a distance from home and in possession only of the bare fact of the tragedy so that we cannot picture in our mind the circumstances we deplore so deeply. It is clear only that Captain R. F. Scott with Dr. E. A. Wilson and their old associate of the *Discovery* expedition Petty Officer Evans, together with Captain Oates and Lieutenant Bowers, reached the South Pole on January 18th, 1912, found the Norwegian flag flying there and returned towards their winter quarters in Macmurdo Sound. Two of the party died on the way, Captain Scott, Dr. Wilson and Lieutenant Bowers perished in a blizzard about March 29th, 1912. The journey had been unfortunate in the failure of the transport animals, but the superb endurance of the explorers overcame all difficulties up to the last stage of the return when exhausted by fatigue and, we fear, by want also, they succumbed to the overmastering force of the snow-laden gale. In a journey which taxed the whole strength merely to accomplish it there was no reasonable prospect of being able to devote sufficient time to any branch of scientific study, the results of which might in the large outlook of history compensate for the loss of such lives. No doubt much work in meteorology and geology, at least,

has been accomplished by the expedition as a whole, and this will be well worth the material cost involved. The world cannot fail to appreciate to the full the unswerving courage and determination which drove the gallant band through the increasing resistance they had to encounter on their march, and we know the spirit of Captain Scott too well to suppose that he would ever dream of endeavouring to secure his own safety unless he could carry all his surviving companions with him. It is enough to remember the awful march of ten years before when Scott and Wilson between them helped back their stricken comrade Shackleton, when the delay to their progress might have brought to all three the very same fate which has now overtaken two of them. And although the scientific value of the expedition may not have been worth this sacrifice of human life no one who looks from the higher standpoint can deny that the moral worth of this supreme example of comradeship may not be rated even so high.

We knew Captain Scott and Dr. Wilson during the preparations for their first expedition in the *Discovery*, and we were shipmate with them for ten memorable days at the outset of that voyage, and although the press of different duties gave few later opportunities of meeting, the impression made at that time is ineffaceable. Captain Scott was a sailor of the type which forms the glory of the British navy, ready for any service required of him, sympathetic with all interests, and gifted with a singular rapidity of comprehension of new facts which enabled him to become proficient in all the special studies of his scientific staff. He won great and richly deserved honour by his first expedition, and as the pioneer of Antarctic land travel he linked his name indissolubly with the continent to the centre of which he ultimately penetrated. He did not fear his fate too much, and his deserts were not small, and when he put it to the touch in his last effort he was well aware of the nearly equal balance of the chance of winning or of losing. We are sure that he met death with as calm a mind as any hero of times past, and his name will always be had in honour.

Dr. Wilson was a naturalist and artist of quite exceptional ability, and his position as chief of the scientific staff of the recent expedition was a guarantee that work of a high order would be done. We look with confidence to the results of the scientific studies of the staff of the expedition, and especially to that of Dr. G. C. Simpson on meteorology in the first year, to justify the labours and mitigate the sadness which must always hang over an enterprise which has cost so much in human suffering and life.

World-wide sympathy has sprung into expression for the relatives and friends of those who fell; and we are sure that our readers will feel with us in adding a heartfelt note to the cry of sorrow and the prayer for solace.

SOME OBSERVATIONS AND REFLECTIONS UPON THE WEATHER.

By L. C. W. BONACINA.

THE remarks I shall make in this paper are mainly derived from a close study of British weather from year to year through personal experience, Meteorological Office weather reports and the newspaper press, and though the method may lack the precision of statistical investigation it enables one to form some sound generalizations upon the subject of climate.

The commencement of the century, now a decade old, saw the accession of Dr. Shaw to the directorship of the British Meteorological Office, and of Dr. Mill to that of the British Rainfall Organization, and the researches of both these investigators have brought to light many new facts concerning the physics and sequence of daily weather on the one hand, and of the distribution and practical consequences of rainfall on the other—facts which have led us to modify or altogether discard some of the old stereotyped generalisations that had crept into the text-books. To take a simple illustration:—at one time meteorologists were always giving out that an anticyclone brought clear skies and brilliant sunshine. But any casual observer with the least experience of our British weather must surely know that as a rule anticyclonic weather brings nothing of the kind, that in our moisture-laden atmosphere only about one high-pressure system in three or four is marked by conditions in any way ideal for radiation day and night.

As a matter of fact, more anticyclones than not occasion dull and frequently gloomy weather even in summer, and give rise to the tamest and most monotonous state of the atmosphere we are liable to experience in these islands. In London there is usually so much cloud overhead in a typical winter anticyclone as to preclude the formation of dense surface fogs by radiation. Owing to clouded skies and the infrequency of complete stagnation of the atmosphere dense and dangerous surface fogs are, contrary to popular opinion, comparatively rare in London, although mist, light fogs, and overhead gloom are almost constant in the winter months. Apart, however, from the particular questions of anticyclones, recent knowledge tends to show that quite different states of weather may be associated with a similar distribution of pressure. This is often brought out instructively in the variations of seasonal rainfall, which may depend as much upon variations in the absolute humidity of the atmosphere, as upon the prevalence or absence of rain-bearing depressions. Thus, in the summer of 1911 even the cyclones ran dry or nearly so, whilst in the following December they seemed overcharged with moisture. Dr. Shaw shows us in his admirable book on Forecasting Weather, that it is after all the currents of air that really matter in the physical processes of weather, rather than the centres of high and low pressure associated with them. For a long time after the birth

of isobaric charts, we had been living, so to speak, under the tyranny of cyclones and anticyclones, holding very rigid stereotyped notions concerning the weather appropriate to each; but now we are reverting on more scientific grounds to the old way of looking at things, regarding air currents as the primary realities just as our ancestors, blissfully ignorant of the existence of curved isobars, did. In an anticyclone, for instance, the air flows outwards from the centre only to a very limited extent, and the system should be regarded more as an inert lump of air taking little part in the general circulation but directing air currents along its flanks. That this is so may be inferred from a strong piece of circumstantial evidence, apart from any dynamical reasoning. It is usually found, for instance, that in winter a north-easterly current along the southern flank of an anticyclone stationed over Britain is colder than a south-westerly current along the northern, the south of England being on such occasions colder than the north of Scotland, which would not be the case if the two currents originated in the centre of the system and diverged radially outwards. These considerations lead us on to wind direction, which always seems to bring definite characteristic temperature conditions—should the currents be in any sense long-distance ones. Thus, in the British Isles south and south-west winds are warm in winter, south also very warm in summer, north-east and east winds are bitterly cold in winter, but east hot in summer; north, north-west and even west winds are cold all the year round, while south-east is always hot in summer and frequently cold in winter. A point frequently overlooked is that the north-west wind, which in point of frequency comes third after the south-west and west respectively, is taking the year through our coldest wind in the British Islands, and it is this wind which is so liable to snow up Scotland with extreme cold for several days, as just recently at the end of November, 1912.

And this brings us to consider the peculiarities of frost and snow in the British Islands. Owing to the proximity of the Atlantic to the south-west, the high surface temperature of which prevents the prevalent south-westerly winds from cooling to the neighbourhood of the freezing point, the snowfall of the kingdom as a whole is uncertain and irregular, and dependent mainly on currents of air, direct or deflected, from the northern half of the compass; but the latitude being high, the country is peculiarly liable, with its bleak, stormy climate, to experience over many months of the year heavy snowstorms, probably of a severer character than occur normally in more continental countries like Germany or Russia, where the snowfall is more regular, the cold greater, and the weather drier and more stable. Every winter we read at intervals of deep snows in Scotland and the north and midlands of England, but somehow or other these snowstorms usually fall short of the southern counties, which often get instead weather of an atrociously damp and dismal character. Times innumerable in London when one would expect snow the approach of

moisture, even with the wind still in a cold quarter, seems to be associated with so great a liberation of the latent heat of condensation that the temperature rises to somewhere near 40° , with the consequence that a cold rain falls in place of snow.

Of course it sometimes happens that an easterly draught from the continent, associated with a depression moving up channel, will confine a blizzard to the south of England, and a most interesting peculiarity of the counties south of the Thames with respect to snow is the liability to heavy falls in spring (February, March, and April) rather than in winter (November, December, and January). During the last half century the two great blizzards of the south of England which did not affect the north were January, 1881, and March, 1891. The latter storm, which raged between the 9th and 12th of March, 1891, was exceptionally severe only in the four south-western counties, Somerset, Dorset, Devon, and Cornwall, and, oddly enough, was one of the very worst snowstorms that has ever raged in Britain. West-countrymen never tire of telling one about it to this day. An account of the storm appeared in this magazine, and there are numerous fragmentary records of the destruction wrought, but the finest description extant is that afforded by Baring Gould in his "Dartmoor Idylls," which brings out in an unrivalled manner the characteristic genius of the British moorlands in time of snow, whether in Devon, Cumberland, or Inverness.

Now for a few reflections on the intensity of frost in different parts of the country. Apart from the elevated region of the Scottish Highlands, where the conditions are naturally very severe, a study of Buchan's isothermal lines for January would appear to show that, level for level, England, is on the whole, colder in that month than Scotland. Yet general experience, year by year, shows that in the south of England we rarely experience anything like the snaps of severe frost that occur, for instance, not only in the north-east of Scotland but even in those western regions which in certain other conditions are often very mild. To quote a typical instance of recent occurrence:—on the 30th of November there was something like 40° of frost in parts of Scotland, and even in the Hebrides the cold was severe. My own experience, year by year, is that the temperature falls below 20° at west-coast stations like Stornoway and Oban much more often than it does in London. There is only one part of England—the east central district around Nottinghamshire—which gets frosts comparable in intensity with those experienced in such parts of Scotland as Aberdeen or Nairn, and this, according to Buchan's charts, has a mean air temperature of 36° in January, the lowest at sea-level in the kingdom.

The explanation of the discrepancy apparent in the fact that Scotland with, on the whole, a somewhat higher mean January temperature than England, level for level, yet on the whole suffers more from intense frost, seem to be this:—Scotland, lying farther towards the North Atlantic low pressure region, experiences even

greater instability of weather, and more rapid changes, than England, and if the cold spells do hit, as one would expect, the northern country more severely, the warm spells in winter are also rather more marked than in England as a whole, so that the resulting mean temperature may be somewhat higher. For instance, the thermometer in London hardly ever exceeds 55° in December or January, but at Aberdeen, which gets incomparably more rigorous frosts, occasions when it reaches 59° or 60° are not uncommon.

Similarly in Iceland, which lies in the zone of maximum Atlantic instability of weather, occurrences of 60° in January are still more common than in Scotland, and these are invariably followed by temperatures below zero two or three days later, but the mean temperature is not so low, for well-known reasons, as the latitude near the Arctic circle would lead one to expect.

A few remarks now about the estimation of climate. Fallacies often originate through the consideration of only one among the various important elements that go to make up climate. For instance, the mildness as regards mean temperature of the winter in England is more than counterbalanced by the ugly hygrometric condition, the sunlessness, windiness, and rapid fluctuations of temperature between warmth and severe frost, with the net result that the winter in Britain is probably more truly severe, from the physiological point of view, than it is in some Continental countries where a much greater average degree of cold is mitigated by a calm, dry, and frequently bright atmosphere, and a more stable type of weather. The wet and stormy month of December, 1911, was dubbed "mild" by the official reports, because there was no frost, but with morning after morning in London dawning black and wild, with furious squalls of wind and heavy rain chilling pedestrians through and through, a more trying type of mid-winter month could hardly be endured. I often think that the damp, dismal or stormy Decembers bring out in another way the true meaning of winter as much as the cold ones, inasmuch as snow, by its light-reflecting properties, does much to dispel the gloom of winter, whether by night or day. At any rate, in England, at least in the south (for in the north of England "white" Christmases are fairly common), we see many more "green" Christmases than "white," which shows how absurd it is to call the former "unseasonable."

METEOROLOGICAL NEWS AND NOTES.

TROPICAL RAINFALL is reported to have fallen in central Ceylon during January, and the following details of the record taken at the Friends' Mission, Clodagh, Matale, have reached us:—

"From the 1st to the 18th of January inclusive upwards of 50 inches of rain fell, the usual *annual* fall being 60 to 70 inches. The wettest day was Friday the 17th: from 8 a.m. to 6 p.m., 7·05; 6 p.m. to 10.30 p.m., 5·09; 10.30 p.m. to 8 a.m., 5·10, the total in 24 hours being 17·24 in. There were several landslips. . . . The railway train ran into a landslip; then, before it could get back, a landslip came down behind it, and it was unable to get either way."

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THE "UPPER" ATMOSPHERE.

FROM the time the reports of International Balloon Ascents began to appear in *Symons's Meteorological Magazine* I have been hoping for the day to come along when samples of the atmosphere at various altitudes would be brought down for examination. The interesting letter of Mr. T. W. Backhouse in the January issue quickens this hope. It seems to me if we could find out what cosmical particles are suspended at—say—3·5 miles above sea-level, and outwards as far as possible; and how such matter seems to vary in quantity and quality from time to time, we should so obtain a key to several meteorological caprices. There should by now be no great difficulty as to the means. An exhausted vessel fitted with a valve kept in its seat by atmospheric pressure and a spiral spring could be sent up. On reaching any desired altitude the reduction of pressure should enable an inner spiral spring to lift the valve, and so allow the vessel to fill, as much as may be, at that pressure. The balloon, kept purposely captive, should then be brought down. The vessel having been automatically re-sealed by increasing pressure on the downward journey, should have the balance between inside and outside restored by the admission of air known to be clean and dry. It could then be examined for adventitious matter; and I make no doubt such examination would prove instructive.

From the time I first seriously thought over the subject until now, it has seemed to me inter-planetary space need not be so vacuous as is generally supposed. Consider the case of the earth travelling round the sun. A velocity of 18·5 miles per second seems terrific to us puny mortals, but, why miles at all?

Even at that she requires more than seven minutes to cover her equatorial diameter; and it seems to me this motion of such a body might be maintained for ages through a medium as dense as the atmosphere twenty-eight miles above sea-level without sensible diminution. Very well, then—after either a vigorous terrestrial or solar outburst the upper atmosphere or intervening space should be more or less charged with attenuated matter qualified to intercept the effect of the sun's radiation. Some of it ought to filter through to within reach of our apparatus. Since sans sun we should get no weather at all, it seems certain that any interference with his manifest radiant energy must modify meteorological phenomena.

I hope some of our enterprising investigators will carefully consider the possibilities attaching to this line of research.

WILLIAM GODDEN.

20, Richmond Avenue, Willesden, N.W., 25th January, 1913.

METEORIC STREAKS AND VELOCITIES OF UPPER AIR CURRENTS.

THE paper by Mr. J. Edmund Clark, read at the meeting of the Royal Meteorological Society on December 18th, deals with an interesting feature, and one which has only recently been seriously studied. Balloon ascents have taught us something of the atmosphere up to about 15 miles in height, but the luminous debris of meteors can carry us 40 or 50 miles higher.

During the past half century some hundreds of meteoric streaks or trains have been seen and roughly described, but very few have been fully and exactly recorded. They have persisted for intervals ranging from a few seconds to a few hours, and in many instances their contortions and rapid drifts have caused astonishment. They appear to have moved with velocities varying from 30 to 300 miles per hour, and their elevations have usually been from 65 to 50 miles. The November Leonids leave streaks from about 70 to 50 miles in height, while those of the August Perseids are a little lower, viz., 65 to 45 miles. As long ago as 1870 Prof. A. S. Herschel wrote, "The largest August meteors commonly develop a very long-enduring, phosphorescent streak about 55 miles above the level of the sea." B.A. Report, 1870, p. 86.

The streaks are mainly the outcome of the great velocity, and are only generated by the swifter class of meteors, the slower ones leave trains of sparks which are seldom very durable. There may be no special attributes of the air at elevations of 65 to 50 miles favouring the production of these glows, but it is at about this height that the swifter meteors are rendered incandescent and dissipated. The slower meteors traverse the same air strata in the earlier section of their flights, but leave no phosphorescence. Whenever they generate any lasting glow it is at a less altitude, 35 to 25 miles, for they penetrate much lower in the air than the more rapid objects. Occasionally at their final explosions and disruption they leave a luminous residue for some time, but meteors with a speed below 25 miles per second rarely, if ever, project phosphorescent streaks of the character displayed by the Leonids and Perseids.

The significant evidence afforded by the more durable meteoric phenomena alluded to, on the direction and velocity of our more lofty wind currents was recognised many years ago, but no serious effort made to extend our knowledge. The time has now come when the subject is being attentively studied, and Professor C. C. Trowbridge, of New York, is to be commended for his painstaking researches in this field.

He is collecting all available materials bearing on the subject, and it is hoped that observers generally will assist in elucidating the interesting problems involved. Large fireballs often blaze out at unexpected moments and are apt to elude regular observers.

Astronomers have, therefore, frequently to rely upon such observations as are made by casual spectators, who are usually quite incompetent to record all the necessary details. Whenever a brilliant meteor is seen its apparent path amongst the stars in the same region should be noted and its duration of flight estimated as correctly as the circumstances allow. If there is a persistent streak its direction and rate of drift should be noted by reference to stars. In the case of a person unacquainted with the constellations it will be advisable to make a diagram, at short intervals, putting the place of the streak relatively to a few bright stars in the same region, for the latter might easily be identified afterwards. Such data must prove of great value, and a wide-spread effort ought to be made to obtain it, whenever occasion offers, by scientific observers in all parts of the world.

Our lower cloud bearing layers of atmosphere show great variety at slightly different levels, and much higher still there appears to be even greater diversity. At an elevation of about 55 miles the usual velocity of meteoric afterglows seems to be about 124 miles per hour, but there are great differences in the same objects both in direction and rate of the drift. A streak lying at heights varying from say 60 to 50 miles sometimes exhibits a curiously tortuous or snake-like form under the action of widely-differing wind currents.

W. F. DENNING.

Bristol, January 22nd, 1913.

DEFINITION OF A SHOWER.

IN *Symons's Meteorological Magazine* for last December there were several interesting Meteorological queries by J.R.G.J. The first question, "What is the standard for what we call a shower," appears to be unanswerable, as there is, apparently, no standard. Walker's dictionary, published in 1831, defines a shower as "Rain, either violent or moderate," but a modern dictionary (Annandale's), gives the following definition:—"A fall of rain of short or not very great duration, also of snow or hail." This is doubtless the modern conception of a shower, but ideas may vary greatly as to what is a "short duration." My own practice is to record as a shower any downfall lasting not longer than one hour, and it would be interesting to know the practice of other rainfall observers. A recognized standard for a shower seems to be a meteorological requirement, and the British Rainfall Organization is a fitting authority to establish such a standard.

DAVID HILL OWEN.

Sparkhill, February 4th, 1913.

THE WIND INSTRUMENTS AND THE NOVEMBER HURRICANES IN JAMAICA.

By MAXWELL HALL, Government Meteorologist.

At the Negril Lighthouse, Mr. Brownhill had a Robinson anemometer which was well exposed on the lighthouse with electric wires attached, so that every mile of wind was recorded on a drum revolving by clock-work, the recording apparatus being inside his dwelling-house. By these means 80 miles an hour was registered from 10 p.m. on the 17th to 1 a.m. on the 18th November, and the instrument even registered the commencement of the violent hurricane of 120 miles an hour at 2 a.m., but the centrifugal force was now so great that a pair of the arms broke and flew away.

At Kempshot the Robinson anemometer* had no such recording apparatus, and merely measured the miles of wind in any interval of time. As soon as the wind had increased to 70 miles, with no doubt stronger gusts, the knob at the top became unscrewed and the arms and the cups flew away uninjured. The arms were pressed down by the knob-screw on to the slightly tapering cylindrical rod or axis; and the knob, arms, and rod were all thus firmly held together, but if extreme violence caused the arms to revolve round the axis, causing "slip" in the registration, the arms from their direction of motion would unscrew the knob. Up to this time the estimated miles of wind agreed with the measured miles, so that the estimated velocity of 80 miles an hour between noon and 2 p.m. may be fairly correct.

There was also a large Osler pressure-plate anemometer† on a very heavy wooden structure, 30 feet high, which stood on high ground. It had been an expensive instrument, costing in England about £80, and it had registered pressure and direction continuously in Kingston for many years; but when the service was disestablished in 1902 it was moved to Kempshot, and there it registered only the maximum pressure in any interval of time. By means of it and the Robinson the formula had been deduced of

$$v^2 = 280 P,$$

where v is the velocity of the wind in miles per hour, and P the pressure in pounds per square foot.

On this occasion as the mid-day hurricane came on, the pressure-plate was seen to be jerked back continually as far as it could go. The registering part had been arranged at Kempshot to register only 30 lbs., but I believe it could have gone back to 40 lbs.; but this was clearly not enough. However, a violent gust caught the massive vane sideways and broke it in two; the wind then took advantage of this wreckage on top of the wooden structure and hurled the whole

* Fig. 89, p. 82, of Negretti & Zambra's large catalogue of about 1880.

† Fig. 92, page 85, *minus* the rain-gauge, of Negretti & Zambra's large catalogue of about 1880.

out of the ground, although the four feet had been embedded in mason-work.

The evening hurricane was much more violent, but lasted a very short time. At the side of an exposed terrace there were a large number of cubical flower-pots placed on the grass, out of which the plants had been blown by the mid-day hurricane. These flower-pots were made out of the tins in which kerosine oil is imported, and they were full of wet soil; they were 9 inches square and $6\frac{1}{2}$ inches high, so that the diagonal of the square base was 13 inches, and they might have exposed as much as six-tenths of a foot of surface to the wind; they weighed on an average 25 lbs. These flower-pots were blown by the evening hurricane here and there; some were upside down, some were far removed from the terrace. They were subsequently replaced, and I found by means of a spring-balance that it required a force of 30 lbs. to move them from their position on the grass, and 20 lbs. to keep them moving, so that the wind must have had a greater force than 30 lbs. on six-tenths of a square foot, or a greater force than 50 lbs. on a square foot; and this would give more than 118 miles per hour according to the above formula.

I have given this account at some length, because no instrument can apparently be depended on to register a "violent" hurricane, which would be 16 on the Beaufort scale if one were permitted to enlarge that scale.

ROYAL METEOROLOGICAL SOCIETY.

AN ordinary General Meeting was held on February 19th at the Surveyors' Institution, Great George Street, Westminster, Mr. C. J. P. Cave, president, in the chair. A resolution of sympathy with the Royal Geographical Society, in the loss which they and the nation have sustained in the death of Captain R. F. Scott and his comrades in the Antarctic, was proposed by the president and seconded by Dr. W. N. Shaw, who spoke with high admiration of the splendid spirit which still lives in our race.

A paper on "Periodical Variations of the Velocity of the Wind at Oxford," by Mr. W. H. Robinson, was read in the absence of the author. The results from various anemometers in use showed the same essential features. The mean monthly velocity for 10, 27, and 30 years indicated (1) a rapid fall between March and June, (2) an equally rapid rise between September and December, (3) a minimum in September, (4) a range in the annual variation of 3 or 4 miles per hour. By means of curves a comparison was made showing correlation with temperature and atmospheric pressure. The diurnal variation taken at intervals of 2 hours showed a maximum at 1 p.m. and a minimum at 5 a.m. The comparison with the mean diurnal

inequalities of temperature indicated a marked parallelism. In both curves the falls are comparatively slow, while the rises are rapid and the times of maximum and minimum of temperature and velocity sensibly agree. The author expressed the opinion that the relation of the two curves was, with the exception of a period in the afternoon, in support of the Espy-Köppen convection theory.

Dr. Shaw said that with regard to the relation of the wind-velocity to pressure he considered that comparison should rather have been made with the pressure *gradient*. A steep gradient was generally associated with a low barometer and *vice versa*; yet January and February with high pressure had also high wind velocities. He criticised the breakdown in parallelism in the curves of temperature inequalities and wind velocity as a support and not a contradiction of the Espy-Köppen theory.

Mr. Bryant remarked on the relationship between the monthly velocity curves at Oxford and those for Greenwich, and Mr. Brodie spoke of the Kew results.

A paper on the "Rate of Ascent of Pilot Balloons," by Mr. J. S. Dines, described experiments which he had made at the Royal Aircraft Factory, Farnborough, in order to determine the rate of ascent of small pilot balloons of the type which he has used for the past two years in his work for the Advisory Committee for Aeronautics.

A paper on "Meteorological Conditions in a Field Crop with a description of two simple recorders," by Mr. W. L. Balls, was also read. A simple form of anemograph and a differential thermograph for recording clouds at night were devised by the author in an endeavour to explain the decreased yield of cotton in Egypt. The instruments showed in a remarkable manner the effect of the wind on the humidity, a fall of the wind being accompanied by a rise in the humidity which again dropped to normal when the wind resumed. The argument that these effects might be due to clouds was confuted by experiments with the differential thermograph which served the purpose of cloud recorder.

Captain Lyons expressed regret that the author did not give details of his observations in July, in which month there was usually more water near the surface of the ground, and in September when the crops are ready to be picked.

Colonel Rawson said that humidity was an all important factor in such a country as Egypt, where plants often die solely as a result of the choking effects of dust.

The following were elected Fellows of the Society:—Messrs. H. E. Carter, J. H. Hull, S. P. Scott.



INTERNATIONAL BALLOON ASCENTS.

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

August 8th, 1910.

Starting Point.	Country.	A miles.	B ° F.	C miles	D ° F.	E miles.	F
Manchester	England ...	6·9	—69	10·6	—58	27	N.W.byW.
Pyrtton Hill	„ ...	7·0	—62	10·0	—56	13	N.E.byN.
„	„ ...	6·8	—71	11·4	—60	18	N.N.W.
Crinan	Scotland ..	7·1	—67	9·7	—49	16	N.N.E.
„	„ ..	7·0	—72	11·3	—58	27	N. by W.
Brussels	Belgium ..	7·1	—62	10·6	—67	38	E.N.E.
Paris	France	*7·2	—60	10·1	—60	58	E.N.E.
Hamburg	Germany ..	6·3	—53	10·4	—63	48	S.E.
Strassburg	„ ..	*7·8	—65	8·6	—69	60	N.
Munich	„ ..	*6·9	—45	9·5	—62	58	S.S.E.
Vienna	Austria	6·4	—53	11·7	—40	47	S.E. by S.
Pavia	Italy	*8·4	—72	8·8	—72	44	E. by S.
Pavlovsk	Russia	6·9	—67	11·2	—47	80	W.
Nizhni Olchedaëff	„	5·6	—49	7·6	—45	42	N. by E.

August 9th, 1910.

Pyrtton Hill	England ...	6·9	—72	10·8	—49	18	S.W.byW.
Petersfield	„ ...	6·9	—62	10·6	—49	20	N.
Crinan	Scotland ...	7·2	—67	10·9	—45	71	N. by W.
Brussels	Belgium ...	7·6	—78	11·1	—54	26	E.N.E.
Paris	France	7·5	—74	10·5	—56	43	N.N.E.
Hamburg	Germany ..	6·3	—63	9·8	—62	11	S.S.E.
Lindenberg	„ ..	6·8	—60	9·6	—54	23	S.E. by E.
Strassburg	„ ..	8·1	—67	8·8	—65	17	N.E.
Munich	„ ..	7·7	—76	9·7	—56	48	E.
Ekaterinberg...	Russia	6·1	—62	9·7	—54	84	S.E. by E.

August 10th, 1910.

Pyrtton Hill	England ...	7·1	—69	8·5	?	55	S. by E.
Brussels	Belgium ...	7·4	—74	13·6	—72	22	S. by E.
Paris	France	7·2	—71	10·3	—58	38	S.W.byW.
Lindenberg	Germany ..	7·1	—62	12·0	?	27	E.S.E.
Strassburg	„ ..	6·4	—58	10·6	—56	26	S.E. by S.
Munich	„ ..	7·3	—71	8·0	—54	3	N.W.
Vienna	Austria	6·8	—62	11·3	—47	15	E.N.E.
Pavia	Italy	6·3	—63	9·0	—56	44	N.E. by E.
Pavlovsk	Russia	5·7	—49	8·6	—47	7	N. by E.

A * denotes that the value of H_c is indefinite.

On all three days pressure was lowest to the north of the Black Sea, but quite average summer conditions prevailed over the west and mid-European stations. The only noticeable features are the discrepancies shown at Strassburg.

- 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.
-

THE WEATHER OF FEBRUARY.

TEMPERATURE throughout February was generally lower than in January, but in spite of this it was slightly above the normal in most parts of the British Isles. The excess over the normal was unusually great during the first week, and amounted to more than 6° in the east and south-east of England, and to more than 4° over the greater part of the kingdom. On the 4th readings of 50° and above were recorded in most parts of England and Ireland, and 55° or 56° in London and stations in the southern and midland counties. On the 7th a very deep secondary depression moved north-eastwards over the north-western and northern districts, and occasioned a severe gale on many parts of the coast. At Southport several squalls reached a velocity of 86 miles per hour. Rain fell generally, but the amounts were not great. Temperature remained high, being above 50° at many stations and reaching 55° at Shields. Unsettled, humid conditions continued during the days following, and many stations recorded the highest temperatures of the month between the 9th and 11th. At Jersey a shade maximum temperature of 60° occurred on the 11th, and 58° was recorded in the eastern counties of England, in Wales and in the south of Ireland. Fogs were experienced in the London district each day from 11th to 15th. On the latter day an unusually heavy fog hung over the metropolis, causing unnatural darkness throughout the morning and early afternoon. Less intense fogs also occurred in many parts of the kingdom. Temperature fell during the 15th, and was below the average during the week following, the greatest divergence occurring in the south-west of England. Hardly any of the rain fell over the whole of the British Isles, and fair weather prevailed generally over England, but over Scotland and Ireland it was cloudy. An anticyclonic system lay to the north of Scotland for some days, causing bleak easterly winds over practically the whole of Great Britain. At many places the temperature never rose to 45° , and shade minima readings of 23° were recorded at West Linton, Bettws-y-Coed and Llangammarch Wells on the 22nd, Similar readings occurred further south on the 23rd, but on the 24th a decided rise of temperature took place, and maximum readings

THAMES VALLEY RAINFALL — FEBRUARY, 1913.



Watershed of River Thames above Teddington, and River Lee above Feltham Vale

Rainfall Stations reporting isohyets

Symons's Meteorological Magazine.

of 50° were recorded at a few widely distributed stations. The weather was of a changeable type during the last few days, and the temperature fluctuations, though very irregular, were not remarkable.

The month was unusually dry over practically the whole of England, the east of Scotland, and the greater part of Ireland. An area in the west of Ireland had a fall approximating to the normal, and the precipitation in the west of Scotland was slightly in excess of the average. The general rainfall over the great divisions of the Kingdom expressed as a percentage of the average was as follows:—England and Wales, 52: Scotland, 77: Ireland, 68: British Isles, 63.

The duration of sunshine was far below the average at many stations, and only at a few places was it exceeded. The total recorded at Camden Square, London, was 44 hours, and at Kew 37 hours were recorded. Nottingham had 41 hours, Bath 71 hours, Scilly 80 hours, Newquay 94 hours, and Jersey had as much as 109 hours or 17 hours in excess of the average.

REVIEWS.

Il Clima di Roma esame delle osservazioni meteorologiche eseguite dal 1782 al 1910. Studio del dottor [The Climate of Rome according to the Meteorological observations carried out from 1782 to 1910. A study by Dr.] *FILIPPO EREDIA.* Rome, 1911. Size 13½ × 9½. Pp. 102.

A COMPREHENSIVE discussion of the climate of Rome, based on nearly 130 years' observations. The work was undertaken in connection with the intended visit of the tenth International Geographical Congress to Rome in 1911, which was postponed on account of the outbreak of the war between Italy and Turkey.

Ueber das Erscheinen der Seebrise an der Schwedischen Ostküste. Inaugural-Dissertation, von [On the appearance of the sea-breeze on the east coast of Sweden. Inaugural Dissertation by] *SVEN GRENANDER.* Uppsala, 1912. Size 9½ × 6. Pp. 104.

A STUDY of the winds on the east coast of Sweden facing the Gulf of Bothnia for the months from April to September, based on the comparison of data from a number of coast and inland stations for the decade 1900-1909. The observations on many light-houses and light-ships lying well off the coast were also considered, and the assistance of a large number of voluntary observers on shore was utilized. An interesting feature connected with the winds off the east coast of Sweden is that the wind often blows from opposite directions, and a vessel running before a north wind comes abruptly to a narrow belt of calm beyond which it encounters an equally strong south wind.

RAINFALL TABLE FOR FEBRUARY, 1913.

STATION.	COUNTY.	Lat. N.	Long. W. [°E.]	Height above Sea. ft.	RAINFALL OF MONTH.	
					Aver. 1875— 1909. in.	1913. in.
Camden Square.....	London	51 32	0 8	111	1'66	·79
Tenterden.....	Kent	51 4	*0 41	190	1'90	·94
Arundel (Patching).....	Sussex	50 51	0 27	130	2'17	1'59
Fawley (Cadland)	Hampshire	50 50	1 22	52	2'28	1'26
Oxford (Magdalen College).....	Oxfordshire	51 45	1 15	186	1'62	·80
Wellingborough (Croyland Abbey).....	Northampton.....	52 18	0 41	174	1'69	·72
Shoeburyness.....	Essex	51 31	*0 48	13	1'19	·57
Bury St. Edmunds (Westley).....	Suffolk	52 15	*0 40	226	1'59	·75
Geldeston [Beccles].....	Norfolk.....	52 27	*1 31	38	1'41	·68
Polapit Tamar [Launceston].....	Devon	50 40	4 22	315	2'95	1'71
Rousdon [Lyme Regis]	"	50 41	3 0	516	2'50	·93
Stroud (Upfield)	Gloucestershire..	51 44	2 13	226	2'12	1'15
Church Stretton (Wolstaston).....	Shropshire	52 35	2 48	800	2'17	1'34
Coventry (Kingswood)	Warwickshire ..	52 24	1 30	340	2'01	1'02
Boston	Lincolnshire.....	52 58	0 1	11	1'53	·60
Worksop (Hodsock Priory).....	Nottinghamshire	53 22	1 5	56	1'64	·77
Macclesfield	Cheshire	53 15	2 7	501	2'30	1'27
Southport (Hesketh Park).....	Lancashire	53 38	2 59	38	2'07	1'15
Arncliffe Vicarage	Yorkshire, W.R.	54 8	2 6	732	4'88	4'08
Wetherby (Ribston Hall)	"	53 59	1 24	130	1'71	·91
Hull (Pearson Park)	" E.R.	53 45	0 20	6	1'78	·68
Newcastle (Town Moor) ...	Northumberland	54 59	1 38	201	1'63	·40
Borrowdale (Seathwaite) ...	Cumberland.....	54 30	3 10	423	10'96	10'53
Cardiff (Ely).....	Glamorgan	51 29	3 13	53	3'07	1'45
Haverfordwest.....	Pembroke	51 48	4 58	90	3'42	2'46
Aberystwyth (Gogerddan).....	Cardigan	52 26	4 1	83	3'09	1'42
Llandudno	Carnarvon	53 20	3 50	72	2'11	·76
Cargen [Dumtries]	Kirkcudbright...	55 2	3 37	80	3'42	3'02
Marchmont House	Berwick	55 44	2 24	498	2'15	1'13
Girvan (Pinnore).....	Ayr	55 10	4 49	207	3'87	2'21
Glasgow (Queen's Park) ...	Renfrew	55 53	4 18	144	2'70	3'21
Inveraray (Newtown)	Argyll	56 14	5 4	17	5'71	5'73
Mull (Quinish).....	"	56 34	6 13	35	4'45	3'28
Dundee (Eastern Necropolis).....	Forfar	56 28	2 57	199	1'91	·66
Braemar	Aberdeen	57 0	3 24	1114	2'55	1'54
Aberdeen (Cranford)	"	57 8	2 7	120	2'36	·77
Cawdor	Nairn	57 31	3 57	250	2'06	2'91
Fort Augustus (S. Benedict's).....	E. Inverness ..	57 9	4 41	68	4'20	5'61
Loch Torridon (Bendamph).....	W. Ross	57 32	5 32	20	7'53	5'54
Dunrobin Castle	Sutherland	57 59	3 56	14	2'58	1'52
Wick	Caithness	58 26	3 6	77	2'23	1'16
Killarney (District Asylum).....	Kerry	52 4	9 31	178	4'99	3'84
Waterford (Brook Lodge).....	Waterford	52 15	7 7	104	3'18	2'37
Nenagh (Castle Lough).....	Tipperary.....	52 54	8 24	120	2'89	2'01
Ennistymon House	Clare	52 57	9 18	37	3'44	2'57
Gorey (Courtown House) ..	Wexford	52 40	6 13	80	2'75	2'05
Abbey Leix (Blandsfort).....	Queen's County..	52 56	7 17	532	2'55	1'64
Dublin (Fitz William Square).....	Dublin	53 21	6 14	54	1'93	·60
Mullingar (Belvedere)	Westmeath	53 29	7 22	367	2'67	1'09
Crossmolina (Enniscoe).....	Mayo.....	54 4	9 16	74	4'20	3'93
Cong (The Glebe).....	"	53 33	9 16	112	3'72	3'88
Collooney (Markree Obsy.).....	Sligo	54 11	8 27	127	3'20	2'23
Seaforde	Down.....	54 19	5 50	180	2'81	1'60
Bushmills (Dundarave)	Antrim	55 12	6 30	162	2'56	1'32
Omagh (Edenfel).....	Tyrone	54 36	7 18	280	2'68	1'87

RAINFALL TABLE FOR FEBRUARY, 1913—*continued.*

RAINFALL OF MONTH (<i>con.</i>)					RAINFALL FROM JAN. 1.				Mean Annual 1875-1909. in.	STATION.
Diff. from Av. in.	% of Av.	Max. in 24 hours.		No. of Days	Aver. 1875-1909. in.	1913. in.	Diff. from Aver. in.	% of Av.		
— .87	48	.25	1	12	3.49	3.36	— .13	96	25.11	Camden Square
— .96	49	.33	1	10	4.04	5.52	+1.48	137	27.64	Tenterden
— .58	73	.70	1	10	4.76	6.79	+2.03	143	30.48	Patching
—1.02	55	.38	1	12	5.03	6.08	+1.05	121	31.87	Cadland
— .82	49	.22	9	11	3.40	3.41	+ .01	100	24.58	Oxford
— .97	43	.26	9	9	3.58	3.86	+ .28	108	25.17	Croyland Abbey
— .62	48	.24	1	8	2.52	2.65	+ .13	105	19.28	Shoeburyness
— .84	47	.24	9	10	3.29	3.33	+ .04	101	25.40	Westley
— .73	48	.33	1	8	2.94	3.31	+ .37	113	23.73	Geldeston
—1.24	58	.57	7	10	6.54	8.92	+2.38	136	38.27	Polapit Tamar
—1.57	37	.29	7	10	5.44	7.80	+2.36	143	33.54	Rousdon
— .97	54	.25	7	13	4.45	6.13	+1.68	138	29.81	Stroud
— .83	62	.34	9	15	4.68	5.11	+ .43	109	32.41	Wolstaston
— .99	51	.29	9	7	4.23	5.70	+1.47	135	28.98	Coventry
— .93	39	.26	9	12	3.07	3.39	+ .32	110	23.35	Boston
— .87	47	.20	9	15	3.34	3.72	+ .38	111	24.46	Hodsock Priory
—1.03	55	.40	9	12	4.96	4.66	— .30	94	34.73	Macclesfield
— .92	56	.19	6, 7	13	4.62	4.95	+ .33	107	32.70	Southport
— .80	84	1.23	7	13	11.14	12.61	+1.47	113	61.49	Arncliffe
— .80	53	.27	8	16	3.60	3.27	— .33	91	26.87	Ribston Hall
—1.10	38	.27	9	15	3.48	4.45	+ .97	128	26.42	Hull
—1.23	25	.12	9	9	3.53	5.84	+2.31	165	27.94	Newcastle
— .43	96	3.25	3	15	24.40	26.21	+1.81	107	129.48	Seathwaite
—1.62	47	.34	2	14	6.72	9.21	+2.49	137	42.28	Cardiff
— .96	72	.55	9	10	8.11	10.37	+2.26	128	46.81	Haverfordwest
—1.67	46	.33	9	10	7.00	8.20	+1.20	117	45.46	Gogerddan
—1.35	36	.18	9	9	4.62	4.38	— .24	95	30.36	Llandudno
— .40	88	.54	7	14	7.52	9.21	+1.69	122	43.47	Cargen
—1.02	53	.18	10	16	4.55	4.24	— .31	93	33.76	Marchmont
—1.66	57	.44	7	15	8.65	8.33	— .32	96	49.77	Girvan
+ .51	119	.76	3	14	6.23	6.35	+ .12	102	35.97	Glasgow
+ .02	100	1.45	2	16	13.05	11.25	—1.80	86	68.67	Inveraray
—1.17	74	.53	4	14	10.00	9.49	— .51	95	56.57	Quinish
—1.25	35	.09	6, 7	11	3.92	4.09	+ .17	104	28.64	Dundee
—1.01	60	.39	5	10	5.47	6.22	+ .75	114	34.93	Braemar
—1.59	33	.22	7	11	4.72	3.96	— .76	84	32.73	Aberdeen
+ .85	141	1.00	3	9	4.34	3.38	— .96	78	29.33	Cawdor
+1.41	134	1.15	3	18	9.78	8.66	+1.12	89	44.53	Fort Augustus
—1.99	74	1.02	2	16	16.95	13.19	—3.76	78	83.93	Bendamp
—1.06	59	.30	5	12	5.33	2.00	—3.33	38	31.90	Dunrobin Castle
—1.07	52	.23	7	17	4.71	2.48	—2.23	53	29.88	Wick
—1.15	77	.80	6	13	10.93	13.13	+2.20	120	54.81	Killarney
— .81	75	.56	9	12	6.96	9.60	+2.64	138	39.57	Waterford
— .88	70	.51	1	11	6.77	7.97	+1.20	118	39.43	Castle Lough
— .87	75	.62	1	14	7.74	9.01	+1.27	116	46.52	Ennistymon
— .70	75	.46	7	13	5.94	9.55	+3.61	193	34.99	Courtown Ho.
— .91	64	.39	24	13	5.70	8.67	+2.97	152	35.92	Abbey Leix
—1.33	31	.15	24	13	4.07	6.18	+2.11	152	27.68	Dublin
—1.58	41	.19	7	11	5.77	7.67	+1.90	133	36.15	Mullingar
—1.27	94	.89	4	16	9.55	12.04	+2.49	126	52.87	Enniscoe
+ .16	104	.78	3	14	8.51	11.87	+3.36	140	48.90	Cong
— .97	70	.45	7	12	7.07	9.11	+2.04	129	42.71	Markree
—1.21	57	.49	24	12	6.22	8.15	+1.93	131	38.91	Seaforde
—1.24	52	.32	7	12	5.75	3.77	—1.98	66	37.56	Dundarave
— .81	70	.40	3	15	6.14	7.44	+1.30	121	39.38	Omagh

SUPPLEMENTARY RAINFALL, FEBRUARY, 1913.

Div.	STATION.	Rain inches	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road..	1·29	XI.	Lligwy	1·34
„	Ramsgate	·69	„	Douglas	1·71
„	Hailsham	1·28	XII.	Stoneykirk, Ardwell House...	1·29
„	Totland Bay, Aston House...	1·35	„	Dalry, The Old Garroch.....	5·58
„	Stockbridge, Ashley.....	1·07	„	Beattock, Kinnelhead	5·60
„	Grayshott	1·45	„	Langholm, Drove Road	3·81
„	Caversham, Rectory Road ...	·85	XIII.	Meggat Water, Cramilt Lodge	3·85
III.	Harrow Weald, Hill House...	·93	„	North Berwick Reservoir.....	·62
„	Pitsford, Sedgebrook.....	·77	„	Edinburgh, Royal Observaty.	1·26
„	Woburn, Milton Bryant.....	·75	XIV.	Maybole, Knockdon Farm ...	2·00
„	Chatteris, The Priory.....	·70	XV.	Ballachulish House	9·30
IV.	Colchester, Hill Ho., Lexden	·56	„	Campbeltown, Witchburn ..	2·26
„	Newport, Belmont House ...	·56	„	Holy Loch, Ardnadam.....	7·53
„	Ipswich, Rookwood, Copdock	·51	„	Islay, Eallabus	2·86
„	Blakeney	·44	„	Tiree, Coraigmore	2·95
„	Swaffham	·68	XVI.	Dollar Academy	2·96
V.	Bishops Cannings	1·19	„	Balquhider, Stronvar.....	6·59
„	Winterbourne Steepleton.....	1·86	„	Glenlyon, Meggernie Castle..	7·69
„	Ashburton, Druid House.....	3·03	„	Blair Atholl	2·57
„	Cullompton	·94	„	Coupar Angus	1·13
„	Lynmouth, Rock House ...	1·96	„	Montrose, Sunnyside Asylum.	·84
„	Okehampton, Oaklands.....	1·79	XVII.	Alford, Lynturk Manse	·58
„	Hartland Abbey	1·17	„	Fyvie Castle	·68
„	Probus, Lamellyn.....	1·14	„	Keith Station ..	1·06
„	North Cadbury Rectory.....	1·03	XVIII.	Alvey Manse.....	2·36
VI.	Clifton, Pembroke Road.....	1·14	„	Loch Quoich, Loan	17·80
„	Ross, The Graig	1·15	„	Drumnadrochit	3·62
„	Shifnal, Hatton Grange.....	·79	„	Skye, Dunvegan	4·41
„	Droitwich	1·05	„	N. Uist, Lochmaddy	2·90
„	Blockley, Upton Wold.....	1·01	„	Glencarron Lodge	7·09
VII.	Market Overton.....	·91	XIX.	Invershin	2·40
„	Market Rasen.....	·77	„	Melvich	2·11
„	Bawtry, Hesley Hall	·62	„	Loch Stack, Ardhullin	4·49
„	Derby, Midland Railway.....	·87	XX.	Skibbereen Rectory	3·24
„	Buxton	2·12	„	Dunmanway, The Rectory ...	4·90
VIII.	Nantwich, Dorfold Hall	1·25	„	Glanmire, Lota Lodge, No. 1	2·34
„	Chatburn, Middlewood	1·83	„	Mitchelstown Castle.....	2·10
„	Cartmel, Flookburgh	2·48	„	Darrynane Abbey.....	2·66
IX.	Langsett Moor, Up. Midhope	1·39	„	Clonmel, Bruce Villa	1·87
„	Scarborough, Scalby	·82	„	Newmarket-on-Fergus, Fenloe	1·67
„	Ingleby Greenhow	1·02	XXI.	Laragh, Glendalough	4·57
„	Mickleton	2·46	„	Ballycumber, Moorock Lodge	1·01
X.	Bellingham, High Green Manor	1·75	„	Ballbriggan, Ardgillan	·70
„	Ilderton, Lilburn Cottage ...	·94	XXII.	Woodlawn	2·21
„	Keswick, The Bank.....	4·38	„	Westport, St. Helens ...	3·88
XI.	Llanfrehfa Grange	2·61	„	Dugort, Slievemore Hotel ...	4·54
„	Treherbert, Tyn-y-waun	4·76	„	Mohill Rectory ..	1·86
„	Carmarthen, The Friary	2·79	XXIII.	Enniskillen, Portora.....	2·02
„	Castle Malgwyn [Llechryd]...	2·49	„	Dartrey [Cootehill]	1·58
„	Crickhowell, Tal-y-maes.....	4·20	„	Warrenpoint, Manor House ..	1·69
„	New Radnor, Ednol	2·10	„	Banbridge, Milltown	·85
„	Birmingham WW., Tyrmynydd	3·09	„	Belfast, Cave Hill Road	1·48
„	Lake Vyrnwy	3·02	„	Glenarm Castle.....	2·66
„	Llangyhanfal, Plâs Draw.....	1·08	„	Londonderry, Creggan Res...	2·34
„	Dolgelly, Bryntirion.....	2·42	„	Dunfanaghy, Horn Head ...	3·38
„	Bettws-y-Coed, Tyn-y-bryn...	3·27	„	Killybegs	3·24

METEOROLOGICAL NOTES ON FEBRUARY, 1913.

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.—The early part of the month was generally cloudy with occasional light R and high temp. Fogs were very prevalent from the 11th to the 15th and temp. was much lower. The latter part was fair or fine and dry, only .07 in. of R falling after the 15th. Mean temp. $41^{\circ}0$ or $1^{\circ}3$ above the average. Duration of sunshine $44^{\circ}4^*$ hours, & of R 28.0 hours. Evaporation .32 in. Shade max. $55^{\circ}1$ on 4th; min. $24^{\circ}1$ on 23rd. F 12, f 17.

TENTERDEN.—The first week was wet, but the rest was dry with fogs from 11th to 15th. The latter half was cold but sunny. Duration of sunshine 89.0† hours. Shade max. $54^{\circ}5$ on 11th; min. $27^{\circ}0$ on 19th. F 7, f 17.

TOTLAND BAY.—Duration of sunshine $84^{\circ}5^*$ hours. Shade max., $52^{\circ}6$ on 27th; min., $30^{\circ}1$ on 19th. F 7, f 12.

PITSFORD.—A fine dry month and good for farming operations. Shade max. $56^{\circ}4$ on 9th; min. $22^{\circ}6$ on 23rd. F 18.

IPSWICH, COPDOCK.—A fine dry month with plenty of sunshine after the middle, previous to which there were several days of mist and fog. Duration of sunshine $80^{\circ}7^+$ hours. Mean temp. $40^{\circ}0$ or $1^{\circ}0$ above the average. Shade max. $53^{\circ}3$ on 11th; min. $28^{\circ}2$ on 22nd. F 10, f 23.

ROUSDON.—The first 10 days were rough and stormy. After the 10th the weather was fine and dry, but with cold E. winds.

NORTH CADBURY.—Warm, windy and cloudy from 2nd to 9th; dense fogs from 11th to 15th; bitter N.E. winds, dry and clear from 16th to 21st, and then S.E. winds with warmer weather. Shade max. $57^{\circ}2$ on 4th and 25th; min. $25^{\circ}5$ on 12th. F 11, f 20.

HODSOCK PRIORY.—A dry and mild month with no severe frost. The first week was very blustery, and the second week was foggy. Shade max. $55^{\circ}1$ on 9th; min. $25^{\circ}0$ on 23rd. F 15, f 23.

SOUTHPORT.—Duration of sunshine $54^{\circ}6^*$ hours, and of R 28.3 hours. Mean temp. $41^{\circ}2$ or $1^{\circ}9$ above the average. Evaporation .41 in. Shade max. $53^{\circ}0$ on 4 days; min. $28^{\circ}0$ on 19th. F 7, f 19.

HULL.—Duration of sunshine $27^{\circ}0^*$ hours. Shade max. $55^{\circ}0$ on 11th; min. $28^{\circ}0$ on 22nd. F 11, f 21.

HAVERFORDWEST.—Sunshine $77^{\circ}8^*$ hours. Shade max. $54^{\circ}0$ on 18th; min. $24^{\circ}2$ on 21st.

LLANDUDNO.—Shade max. $57^{\circ}0$ on 25th; min. $32^{\circ}0$ on 23rd.

CARGEN.—The first 10 days were wet and stormy with a severe S.W. gale in the night of 7th. Dry and calm from 11th to 28th. Owing to absence of sun and drying winds, ploughing was somewhat retarded on low lying fields. Shade max. $51^{\circ}5$ on 26th; min. $24^{\circ}0$ on 23rd. F 9.

EDINBURGH.—S.W. gales and generally unsettled until 10th. Calm later with high bar. and a deficiency of bright sunshine. Shade max. $52^{\circ}1$ on 11th; min. $30^{\circ}4$ on 23rd. F 3, f 11.

COUPAR ANGUS.—Temp. high; sunshine and frost deficient. An ideal month whereby the farmer has brought up arrears of work. Shade max. $51^{\circ}0$ on 4th; min. $26^{\circ}0$ on 19th.

LOCH STACK.—Duration of sunshine $37^{\circ}5^*$ hours.

WATERFORD.—Mean temp. $42^{\circ}5$; 13 days without R from 11th to 23rd. Shade max. $53^{\circ}0$ on 7th; min. $29^{\circ}0$ on 28th. F 7.

DUBLIN.—Although R fell daily on the first 9 days the month proved dry on the whole. No R fell from 10th to 23rd, but dense fogs on 11th and 3 following days yielded .01 in. This foggy period was followed by a spell of cold and dry E. winds. Shade max. $56^{\circ}1$ on 7th; min. $32^{\circ}3$ on 14th. F 1, f 4.

WARRENPOINT.—Excepting the first 10 days it was a fine month, 13 consecutive days being dry. The prevailing winds were from the E. and S.W. and at times reached gale force. Temp. was about normal.

* Campbell-Stokes.

† Jordan.

Climatological Table for the British Empire, September, 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	69·4	4	35·7	27	62·4	46·6	47·7	81	117·6	31·8	2·14	6	6·0
Malta	79·7	12	62·1	7	75·3	67·7	64·7	81	146·0	..	3·11	11	5·1
Lagos	86·0	27, 30	71·0	11, 12	83·4	73·9	71·4	76	158·0	69·0	2·12	17	7·1
Cape Town	78·3	13	40·6	10	63·6	49·2	49·9	77	...	...	4·21	14	6·3
Johannesburg	80·3	18	31·4	11	70·1	46·2	29·7	44	135·8	28·1	·32	2	...
Mauritius	82·0	28	57·1	18	77·7	63·1	60·9	74	149·0	50·2	1·56	20	6·0
Bloemfontein	83·9	17	29·7	1	71·5	40·3	31·8	44	...	...	·02	1	2·5
Calcutta... ..	94·1	13	76·3	27	90·2	78·8	77·2	81	...	72·5	5·11	10	6·9
Bombay... ..	90·2	24	74·6	7	86·7	77·3	75·1	81	128·7	70·6	3·09	17	5·0
Madras	98·2	13	71·1	17	94·5	78·4	75·6	77	149·2	72·7	1·36	5	4·7
Kodaikanal	70·6	11	50·0	3	66·2	52·2	51·9	81	150·9	37·6	7·04	13	6·8
Colombo, Ceylon	90·0	23	74·6	28	87·7	78·0	73·0	73	151·6	69·3	3·87	12	6·4
Hongkong	92·5	10	68·0	17	85·5	75·5	69·6	71	145·9	...	3·88	11	5·3
Sydney	88·0	30	41·8	2	69·8	52·6	42·5	49	132·6	32·9	·40	12	3·5
Melbourne	81·2	29	36·0	1	62·9	45·8	42·5	61	134·9	29·4	2·35	20	6·1
Adelaide	81·2	28	39·3	19	65·6	49·0	47·4	67	140·7	32·3	2·64	17	4·8
Coolgardie	92·8	22	38·0	18	72·4	46·3	43·0	40	155·0	31·2	·33	4	2·7
Hobart, Tasmania ..	76·0	29	38·0	16, 17	58·3	43·6	39·7	63	127·8	29·6	3·82	20	6·9
Wellington	62·6	8	40·4	24	58·1	48·9	46·1	76	125·0	31·0	5·78	24	7·3
Auckland	64·5	17	45·0	29	60·5	49·6	49·3	81	127·0	40·0	5·53	26	6·9
Jamaica, Kingston ..	92·7	7	71·8	1	90·4	73·9	71·4	78	...	...	1·58	6	4·9
Grenada	90·0	24	72·0	15	86·5	75·4	76·4	...	140·0	...	6·35	22	3·0
Toronto	92·7	10	36·3	30	70·9	54·4	...	...	137·8	30·0	3·28	14	6·0
Fredericton	76·0	15	32·2	22	65·8	43·7	...	79	...	...	4·05	9	6·6
St. John, N.B.	71·2	11	38·5	22	61·5	48·6	...	77	...	...	3·45	11	5·7
Edmonton, Alberta ...	77·6	11	22·0	26	61·0	36·6	...	76	125·4	15·2	·76	5	3·6
Victoria, B.C.	78·4	14	41·7	24	66·5	47·9	...	77	...	...	·66	7	4·0

MALTA.—Mean temp. of air 71°·0. Average hours of daily sunshine 8·0.

Johannesburg.—Bright sunshine 312·9 hours.

Mauritius.—Mean temp. of air 0°·4 and R ·03 in. above averages. Mean hourly velocity of wind 11·1 miles or 0·5 miles above average.

Bloemfontein.—Drought bad, nothing for cattle to graze, thousands have died. Fountains dried up, and a scarcity of water nearly everywhere.

KODAIKANAL.—Bright sunshine 120 hours. TSS on 17 days.

COLOMBO.—Mean temp. of air 82°·9 or 2°·2 above, of dew point 0°·3 below, and R ·78 in. below, averages. Mean velocity of wind 7·4 miles per hour. TSS on 14th and 26th.

HONGKONG.—Mean temp. of air 79°·6. Mean hourly velocity of wind 10·9 miles. Bright sunshine 220·5 hours.

Sydney.—Mean temp. of air 2°·4 above, and R 2·45 in. below, averages.

Adelaide.—Mean temp. of air 0°·3 above, and R ·82 in. above, averages.

Hobart.—Mean temp. of air 0°·2 above, and R 1·71 in. above, averages.

Wellington.—Mean temp. of air 3°·5 above, and R 1·52 in. above, averages. Bright sunshine 137·2 hours.

Auckland.—A stormy and showery month. R more than two inches above average.