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## The Severe Weather of May 12th-19th, 1935

The onset of northerly winds of polar origin on May 12th caused a rapid fall of temperature over the British Isles and there ensued, until the 19th, a spell of exceptionally cold and inclement weather for the time of year. The most severe frost occurred as a rule on the 17th, but in some northern and western districts the lowest temperatures were registered on the 15th. Widespread hail, sleet and snow were experienced between the 13th and 18th. Among the lowest minima in the screen from data at present available are 21° F. at Dalwhinnie on the 13th, 22° F. at Eskdalemuir and 25° F. at Newton Rigg, Penrith on the 15th, 17° F. at Rickmansworth, 21° F. at Dalwhinnie, 24° F. at Purley, 25° F. at Dorstone (Hereford), Marlborough, Upper Heyford and Tunbridge Wells, and 26° F. at South Farnborough on the 17th and 24° F. at Auchincruive on the 18th. Temperature on the grass fell to 14° F. at Dalwhinnie on the 13th, 10° F. at Rickmansworth, 13° F. at South Farnborough and 14° F. at Rhayader on the 17th and to 15° F. at Newton Rigg, Penrith on the 15th and at Auchincruive on the 18th. The exceptional character of the frost at certain stations with long records may be illustrated by comparison with the lowest temperatures registered in previous Mays. At Aberdeen, the minimum in the Stevenson screen on the 17th, 29° F., has only once previously been equalled in May since before 1871, namely, in 1891. At Kew Observatory, 30° F. was equalled in 1877 but no lower temperature has been recorded in May

since at least 1871. Similarly at Greenwich, in the long record back to 1841, an equally low temperature ( $28^{\circ}$  F.) was recorded only in May 1855 and 1877. At Yarmouth the minimum  $31^{\circ}$  F. on the 17th is the lowest recorded in May since before 1872, at Birmingham,  $30^{\circ}$  F. on the 17th is the lowest since before 1887 and at Falmouth,  $35^{\circ}$  F. on the 18th, is the lowest in May since before 1871.

The damage done by this frost to early vegetables, flowers, shrubs, fruit and trees was widespread and extensive. A letter from Mr. Robert Gray, of Dorstone, Herefordshire, states that "plums, pears, apples, cherries, strawberries, blackcurrants, hops, . . ." have suffered severely. In *The Times* of the 18th, reference is made to similar damage suffered in Kent, South Wales, Bedfordshire and South Lincolnshire, and in the issue of the 28th, a correspondent tells of extensive damage to fruit farms in Hampshire.

The snowfall during this period was heavy in some parts and widespread, being reported in most parts of Ireland and west Cornwall as well as in other parts of Great Britain. In Yorkshire snow fell for more than four hours at some places on the 17th; it was reported to be lying to a depth of 5 inches at Harrogate, and according to *The Times*, in some small villages in the dales two to three feet fell. At Cockle Park, in Durham, snow lay to a depth of  $4\frac{1}{2}$  inches on the morning of the 17th. It was also reported in *The Times* that a large part of Westmorland, including the Lake District and Shap Fells experienced a heavy fall of snow on the 17th, the main road north to Scotland over Shap Fells having a covering of 4 to 5 inches. The same article records a heavy snowstorm in the north of Scotland on the 16th. Snow is rare in west Cornwall in May; at the Scilly Isles it was recorded only once between 1876 and 1921; in May 1935, however, snow fell at Falmouth on the 16th and at Scilly Isles (accompanied by heavy squalls) on the 17th. We read in the Press that the grain ship *Herzogin Cecilia*, which arrived at Falmouth on the 20th, had been caught in a hurricane and snowstorm off the Lizard on the 17th. At Tiverton, Devon, snow fell heavily between 3 and 5 p.m. on the 17th, and lay to a depth of about  $4\frac{1}{2}$  inches without drifting.

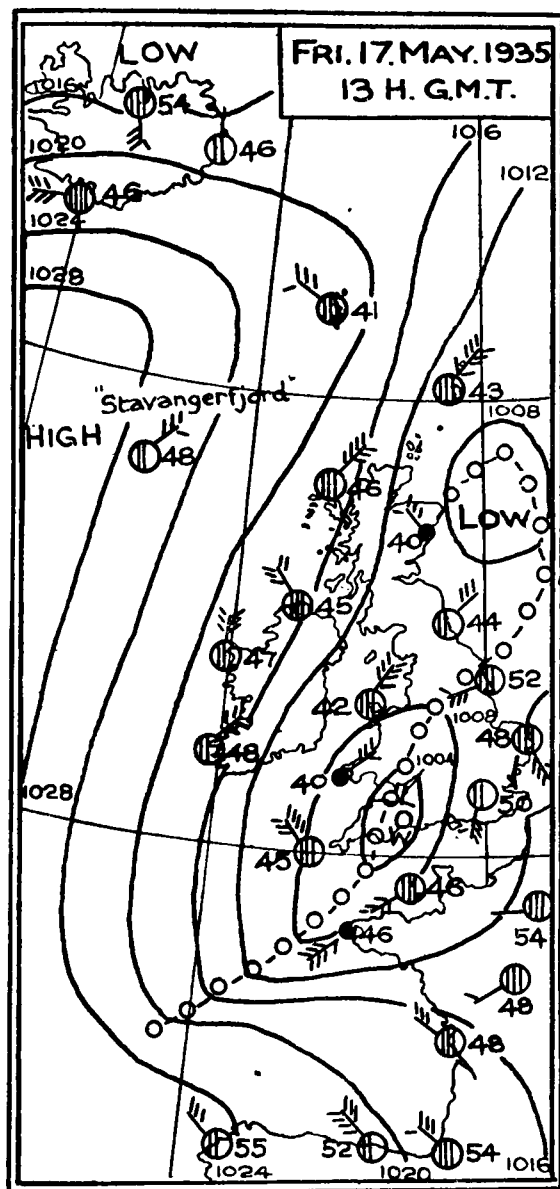
Cold spells of more or less severity are not infrequent in May. Among those which are somewhat comparable with that of the present month, may be mentioned those of the first parts of May, 1876 and 1877, May 15th–18th, 1891, the first seven or eight days of May, 1892, May 13th–15th, 1915, and May, 1923, when considerable damage was done to crops by frost on the 24th, particularly in midland and eastern counties.

In reading accounts of the cold spell of May 15th–18th, 1891 (see *Symon's Meteorological Magazine* for June, 1891, and "Notes on Weather at York," May 11th to 21st, 1891 by J. E. Clark from the *Report of the Yorkshire Philosophical Society* for 1891) one is struck by many similarities with the present cold spell. In 1891, extensive damage was done to vegetation and fruit of all kinds notably in

Yorkshire by the frost on the 17th and 18th and considerable snow fell on the 16th and 17th, particularly in the midland and eastern counties of England.

L. F. LEWIS.

The anticyclone which covered the British Isles from May 6th to 8th



and which was responsible for the brilliant weather of the 6th, moved slowly away towards the north-west; and by the morning of the 11th the country lay in the broad northerly air stream on its eastern side. This current, supplied from a region to the north-east or east of Spitsbergen, covered the country until the 19th, and was responsible for the unusual weather of that period.

The eastern boundary of the current was at first formed by a large depression over Russia, but, beginning on the 13th, a series of small depressions formed near the Norwegian coast and moved southwards across the North Sea. Their presence increased the northerly gradient in the main current, which was, doubtless, one reason why the weather became colder towards the end of the period. Moreover it was the

"fronts" associated with these depressions which caused the frequent rain and snow in the British Isles.

The most important of them, in its consequences to this country,

formed over southern Norway on the 16th, and grew steadily deeper, though remaining almost stationary; but an occlusion associated with it began to move southward across Scotland during the afternoon. The approach of this occlusion greatly weakened the barometric gradient over England. On the night of the 16th–17th, therefore, for the first time since the cold spell began, winds were light in England; and, as there was no protection from clouds except in a narrow belt close to the front, the severe frost already described occurred.

During the night of the 16th–17th a secondary depression formed on the occlusion near the Isle of Man, and moved southward across Wales and south-west England, bringing heavy rain and snow to all parts of the country except the extreme south-east. Unfortunately, before night this secondary had moved away over France. The clouds disappeared after dusk, and, as England was then in an area of light winds between the primary and secondary depressions, another severe frost resulted on the night of the 17th–18th.

On the 18th a depression moved south-east from Iceland to the Hebrides and at last cut off the supply of cold air. That night cloud and rain spread over Scotland, Ireland and western England, and brought the cold spell to an end; but in eastern England, still covered by the remains of the polar current, there was again a frost, though less severe than on the two previous nights.

Short cold spells with northerly winds are not uncommon in spring, but they are almost always of short duration. In no other case since 1880—the earliest year examined—has there been such a spell longer than three days, whereas in the present instance the duration was about eight days. Nor was any other case found in which the cold current originated so far north.

B. C. V. ODDIE.

From May 13th to 19th sharp frost occurred in this valley each morning. On May 16th–17th the temperature in the thermograph screen was under the freezing-point continuously for a period of  $13\frac{3}{4}$  hours, from  $17\frac{3}{4}$ h. to  $7\frac{1}{2}$ h. (G.M.T.). It remained below  $25^{\circ}\text{F.}$  from 23h. to  $6\frac{1}{2}$ h., and below  $20^{\circ}\text{F.}$  from 3h. to 6h., falling to  $18^{\circ}\text{F.}$  at about  $5\frac{1}{4}$ h., 1h. 5m. after sunrise. There was moderate to slight valley fog until  $6\frac{1}{2}$ h. In the standard screen, 15 ft. to north of the other, the minimum was  $16\cdot5^{\circ}\text{F.}$ , and at 1 in. above short grass it was  $10\cdot3^{\circ}\text{F.}$  These two latter readings closely approached the extreme minima for the past winter, which were respectively  $15\cdot5^{\circ}\text{F.}$  and  $8\cdot5^{\circ}\text{F.}$  early on January 9th.

The havoc wrought by this frost in the low-lying districts of south-west Hertfordshire and south-east Buckinghamshire can only be described as appalling. It would take less space to list the surviving members of the local flora than those which have succumbed. For once in a way it is probably safe to trust the testimony of the “oldest inhabitants,” who declare that no such destruction amongst fruit

and vegetable crops, flowers and foliage has been seen within memory. The most striking (though not the most serious) effect of the intense cold is the markedly autumnal aspect which a majority of the woods and coppices have gradually assumed since May 17th. Many of the trees in the vicinity of the climatological station, including a pedunculate oak 83 ft. high, have been stripped practically bare of foliage from top to bottom; the predominant beeches of the neighbourhood are commonly showing their November hue of russet brown, and the young leaves of the great ash trees hang dead in black and shrivelled clusters.

In the course of several tours of inspection it has been ascertained that a similar state of affairs exists along much of the eight-mile stretch of the Chess Valley between Rickmansworth and Chesham. On the adjacent high ground the damage is comparatively slight. Above an altitude of 400 ft., in fact, the trees do not appear to have suffered at all. One nurseryman at Chipperfield, four miles to the north of this place, and nearly 300 ft. higher up, reports that he has had no losses of any kind through the frost. But in the valleys on either side of the Hertfordshire-Buckinghamshire boundary it will be long before the night of May 16th-17th, 1935, is forgotten.

E. L. HAWKE.

*"Caenwood," Rickmansworth, Herts, May 29th, 1935.*

The snowstorm on May 17th, 1935, at West Kirby, Cheshire, was quite without precedent; in the life of the oldest inhabitant, aged 106, there is no recollection of such an outstanding snowstorm in May. After rain and sleet which fell from 8h. to 8h. 50m. G.M.T., the wind veered from NW. to N. and snow began to fall, at first lightly and then increasing in thickness until a full snowstorm was being experienced. This continued without a break until 14h. 30m. G.M.T., at which time the snow lay 2 to 2½ inches in depth on the low ground and 4 to 5 inches on the high ground. And this at a seaside station, on the west coast, in mid-May! The temperature was also remarkable, falling from 39° at 8h. G.M.T. to 35° at 9h., 33° at 10h. and 31° from noon to 14h., after which it rose again to 32° at 14h. 30m., 36° at 16h. and 37° at 19h. The measurement of melted snow and rain was 0.61 in.

E. F. ROBSON.

*St. Andrew's Vicarage, West Kirby, Cheshire, June 3rd, 1935.*

### Royal Meteorological Society

The monthly meeting of this Society was held on Wednesday, May 15th, at 49, Cromwell Road, South Kensington, Lt.-Col. E. Gold, D.S.O., F.R.S., President, in the Chair.

The following papers were read and discussed:—

*S. Chapman, F.R.S.—The lunar atmospheric tide over Canada, 1897 to 1932.*

The lunar atmospheric tide is determined for five Canadian

stations, three in the east (St. John, Montreal and Toronto) and two in the west (Vancouver and Victoria, about 60 miles apart); the material used averaged 23 years per station; the days used were not selected according to their range. The three eastern stations give similar values, the mean being  $28 \sin (2t + 77^\circ)$  microbars (probable error 2.5); this is normal for their latitude (mean  $45^\circ$ ). The two western stations have a much smaller tide, the mean being  $4 \sin (2t + 101^\circ)$ , probable error 2.4, this is abnormally low for their latitude (mean  $49^\circ$ ); the phase angle is, of course, not well determined.

The three eastern stations show a seasonal variation similar to that found at most other stations, the amplitude and phase angle both being less in December than in June.

The harmonic coefficients of the first four components of the solar diurnal variation are also given; here also, in the second component, Vancouver and Victoria agree in giving a smaller amplitude (and also a smaller phase angle) than the eastern stations.

*F. J. Scrase, M.A., B.Sc.—The sampling errors of the Aitken nucleus counter.*

It is deduced theoretically and confirmed by observation that the frequency distribution of nucleus counts made with the Aitken counter conforms to Poisson's exponential limit to the binomial expansion. The standard deviation of a series of counts is given by the square root of the mean number of nuclei in a count, and the standard error of the mean is inversely proportional to the square root of the total number of nuclei counted. When the total number is 100 the standard error is about 9 per cent. of the mean.

It is shown how the results of the investigation can be applied to distinguish between genuine fluctuations and random errors in observations of nucleus content. The results also show that the stirring vane fitted to the Aitken counter is an unnecessary complication; a random distribution of nuclei is produced in the apparatus without the aid of the device.

*C. S. Durst, B.A., and W. H. Bigg, B.Sc.—The diurnal variation of the maximum gusts occurring in each hour at Worthy Down (Winchester).*

From a statistical consideration of the maximum gusts measured at Worthy Down the opinion is formed that frictional gusts are directly proportional to the speed of the wind and that those due to convection have a speed of about 9 m.p.h.

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## Correspondence

To the Editor, *Meteorological Magazine*

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### Lunar Cross and Halo at Scilly

A lunar halo observed at Scilly on March 22nd, 1935, was associated with some interesting optical phenomena. The upper two-thirds

of the halo (apparently the halo of  $22^\circ$ ) first appeared at 23h., and at 23h. 15m. two mock moons appeared, nearly as bright as the moon, on the halo on either side of the moon at the same height; these remained throughout the display. At 23h. 40m. a lunar cross appeared for ten minutes, after which the remainder of the halo formed. Another observer stated that for a brief period the horizontal arms of the cross extended to connect the two mock moons. The halo faded at midnight but the cross was again observed from 0h. 10m. to 0h. 40m. on the 23rd.

Dr. F. J. W. Whipple remarks that "the cross was presumably at the intersection of a moon pillar and the mock-moon circle. This is confirmed by the observation of the latter circle by the independent observer. It is remarkable that the cross was seen from 0h. 10m. to 0h. 40m. without the mock-moons. That the pillar should persist was to be expected but the occurrence of the horizontal arm of the cross without the mock-moons implies that the crystals responsible for them, the hexagonal crystals with vertical axes, were localised in a small part of the atmosphere."

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### **Moon Pillar seen from Sussex**

On May 15th, between the hours of 22h. 45m. and 23h. 0m. G.M.T., I observed a rare lunar phenomenon for these latitudes. The sky to the south was covered with a thinnish cirrus haze, through which Jupiter and Mars were visible. Parallel rays stretched out from the moon to form a cross; the horizontal beams being the longest and most persistent; those to my left extending three diameters from the moon; those to my right, about  $1\frac{1}{2}$  diameters; while the beams above and below the moon were about one diameter in length. The phenomenon lasted roughly six minutes. There was a surface calm, and the high clouds, which were gradually becoming denser, were drifting slowly towards the east-south-east.

I have not observed anything in the nature of a moon pillar since the winter of 1918-9, while serving in north Russia, just south of the Arctic Circle. In this case there were no lateral beams, but a pillar of the moon's diameter reached from its lower rim to within  $5^\circ$  of the horizon; through about  $45^\circ$  in all.

D. S. HANCOCK.

*Greenways School, Bognor Regis, Sussex, May 16th, 1935.*

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### **Halo Phenomena at Barton, Manchester**

On March 28th, 1935, at 14h. 30m. G.M.T. there was visible here the most complete halo phenomena I have ever witnessed. Mr. Bell, of this station, saw it also and confirms my observations.

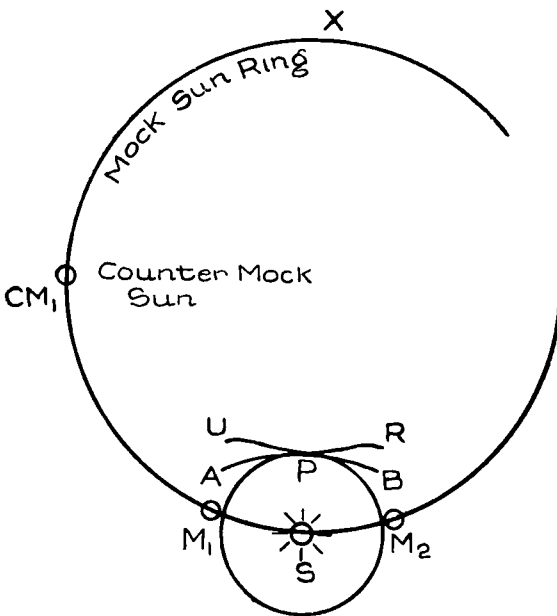
At 14h. 30m. G.M.T. there was a complete halo,  $22^\circ$ , with a mock sun on either side of it, a mock sun ring extending to seven-eighths of the horizontal circle, a counter mock sun to the left of the sun, and

two arcs of contact. All these were seen simultaneously and together; they persisted for about half-an-hour, after which the mock sun ring began to fade, then the counter mock sun; but the halo with its arcs of contact and mock suns lasted intermittently till about 18h. 15m.

The following measurements were made with a theodolite :—

Elevation of the sun	... ..	29°.
Bearing of sun's centre from true North	... ..	226°.
Bearing of mock suns from true North	196° and 256°.	
Bearing of counter mock sun from true North	... ..	106°.

These bearings were taken at 14h. 45m. and confirmed bearings taken at 14h. 35m. as regards relative positions of the phenomena.



The mock suns were particularly brilliant, all the colours from red to blue being quite clear; the counter mock sun was white, as was the mock sun ring. The latter, however, was seen clearly to pass through the halo to the sun. The arc of upper contact had its extremities bent downwards, while the other arc of contact was part of the circumscribed elliptical halo.

When the phenomena were first observed the sky was almost

covered with cirrostratus which was denser in the vicinity of the halo and thinned somewhat to the east and north-east, and there was a patch of blue sky where the other counter mock sun would have been situated. The cirrostratus continued to vary in density and accounted for the intermittent view of the halo and mock suns.

This cirrostratus was the advance guard of a cold front. The situation at 7h. on March 28th was as follows :—A cold front extending from Utsire to Wick was moving slowly southwards and during the next twelve hours its orientation changed from roughly east—west to east-south-east—west-north-west.

In the accompanying diagram, which is similar to that in the "Meteorological Observer's Handbook," p. 65. *S* is the sun's



position,  $M_1$  and  $M_2$  are the mock suns,  $CM_1$  the counter mock sun,  $X$ ,  $CM_1$ ,  $M_1$ ,  $S$ ,  $M_2$  is the mock sun ring,  $UPR$  the arc of upper contact,  $APB$  the other arc of contact, while the  $22^\circ$  halo is shown.

T. H. APLEGATE.

*Barton Airport, Manchester, April 4th, 1935.*

### Solar Halo witnessed at Sealand

On Wednesday, April 3rd, 1935, a brilliant solar halo was witnessed at Sealand. It was first observed at 14h. 20m. and persisted until about 18h. 30m. when the sky became covered with altostratus. The halo was well developed.

At 16h. 23m. two mock suns together with the arc of contact and the mock sun ring were visible. The inner edge of the halo was reddish brown in colour while the remainder was a brilliant white. Red, yellow and green were plainly visible on the mock suns with red the nearest to the sun.

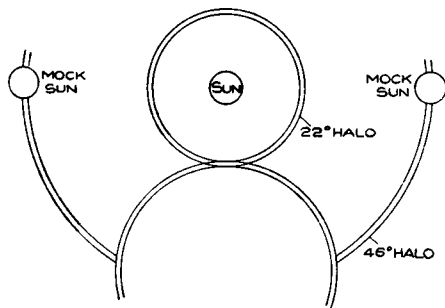
Angular measurements of the phenomenon showed that the width of the halo was  $2^\circ$ , and the distance from centre of sun to the centre of a mock sun was  $25^\circ$ . The mock sun ring increased in width as it approached the sun and disappeared in the glare about  $5^\circ$  from the sun.

GEO. R. READ.

*Roker, Station Road, Gt. Saughall, Chester, May 2nd, 1935.*

### Unusual Solar Halos seen at Sealand

Interesting and unusual examples of solar halos were observed at Sealand on May 3rd and 4th, 1935. The halo observed on the 3rd was first visible at 9h. G.M.T. and persisted with slight variations in form until 17h. G.M.T. At 12h. 30m. a complete halo of  $22^\circ$  was visible together with the lower arc of contact from which ran the halo of  $46^\circ$  on which mock suns were well developed. The remarkable feature of this halo was that mock suns were plainly discernible on the  $46^\circ$  halo although none was apparent on that of



$22^\circ$ . The phenomenon is shown roughly in the attached sketch.

The halo observed on the 4th was of unusual dimensions. At 10h., when the halo was first observed, the sky was covered with moderately thick cirrostratus and angular measurements showed that the distance from the centre of the sun to the inner edge of the halo was  $32^\circ$ . The lower arc of contact was clearly visible for a

distance of about  $50^\circ$  while a faint upper arc of contact appeared for a few minutes about 10h. 5m. The colours observed in the halo were red, yellow, green and blue with red nearest the sun.

WILLIAM D. FLOWER.

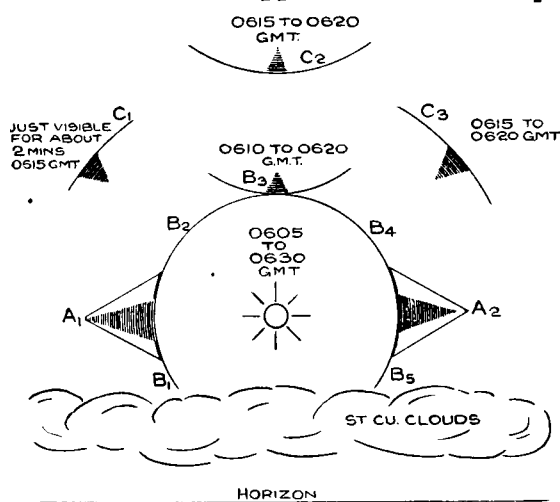
GEO. R. READ.

R.A.F., Sealand, Chester, May 10th, 1935.

### Unusual halo phenomena seen at Wick

ON April 24th, 1935, Mr. T. J. McGuinness of Wick (Caithness) observed the optical phenomena shown in the attached diagram.  $A_1$  and  $A_2$  were the first parts to appear then the small halo marked  $B_1$   $B_2$   $B_4$   $B_5$  and finally the arcs of the halo  $C_1$   $C_3$  (probably the  $22^\circ$  halo) with the upper arc of contact  $C_2$ . Mr. McGuinness reports

that the whole was brightly coloured "like a rainbow with the shaded part white" and that the radius of the inner halo and the difference between the radii of the two halos were both equal to approximately  $4\frac{1}{4}$  inches measured with a pencil at arm's length. The brilliant colours at so many points are exceptional and confirm that this was not an ordinary display. The



halos faded from left to right and in the reverse order to their appearance.  $A_1$  faded about 5 minutes before  $A_2$  which finally faded out at 7h. 25m.

Halos differing in size from the  $22^\circ$  and  $46^\circ$  halos are occasionally observed and some of them have been accurately measured. A list is given by L. Besson in the *Comptes Rendus*, 170, 1920, p. 334. Among the better known ones are Van Buijsen's with radius of  $7^\circ 30'$  to  $10^\circ$  and Rankin's with radius of  $17^\circ$  to  $18^\circ$ . Mr. McGuinness's measurements were approximate.

### Optical phenomena seen at Hastings

This morning, May 6th, at 6h. 25m. G.M.T., the circumzenithal arc was visible, well-developed and beautifully coloured. There was no other trace of halo phenomena save a short segment of the  $22^\circ$  halo above the sun and two patches each side on a level with the sun.

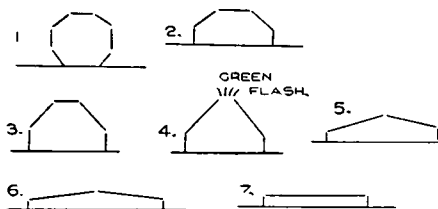
CICELY M. BOTLEY.

Guildables, 17, Holmesdale Gardens, Hastings, May 6th, 1935.

### The Green Flash seen from Anacapri

On the 22nd, we had what I suppose amounted to a sort of tornado here. The Scirocco is always our dangerous wind, but in the 8 years I have lived here I have seen nothing of this kind. The landscape was obscured with dust and the sea was torn up into the air in white squalls. A great deal of damage was done to trees, vines and other crops; but as usual, worse in some localities than others.

On the following day the 23rd the sun was observed to sink in the fashion sketched herewith beginning as an octagon which gradually narrowed to a point and flashed green, then flattening out until it became oblong. The stages numbered 5, 6, 7, seemed to take a long time.



M. RAWNSLEY.

*Dil-Aram, Anacapri, Italy, May 25th, 1935.*

### The Green Flash seen from Crinan

Last night I had ascended a small knoll to see the sun set over Scarba a bare and rocky island, which rises to 1,500 feet, 8 miles to the north-west of Crinan. Apart from a few fleecy clouds overhead the sky was clear, and as the last limb of the sun disappeared it changed momentarily from red to green. The phenomenon was so definite that it left no doubt in my mind as to its reality. Although I have often looked for the green flash I only remember seeing it once before, in the Scilly Islands, with the sun setting over the sea which is, I believe, the horizon most favourable to its appearance. The atmosphere last night was not exceptionally clear. The mountains of Mull, 30 miles distant, stood out sharply, but an east wind had brought a slight haze which showed as a brownish colouration for a few degrees above the horizon and through which the sun set.

J. S. DINES.

*Crinan Hotel, Crinan, Argyllshire, May 28th, 1935.*

### Peculiar gloom of March 3rd, 1935, and electric phenomena of April 18th, 1935

On page 67 of your April issue I see it stated that the peculiar gloom of Sunday, March 3rd, was not observed as far north as Harrow. I write from memory and without notes as to date and time, but I remember being greatly struck on a Sunday evening early in March by a peculiar darkness. Long before lighting-up time, and I think actually before sunset, the darkness was like midnight, while by

about 6.0 p.m. conditions were about normal again. If I am right in identifying this with the "black-out" described by your correspondent, it is interesting to note that the effects were observed here about an hour later than at Slough. There was little rain recorded here on March 3rd, .07 in. for the 24 hours.

On Thursday, April 18th, I had an opportunity of witnessing an effect often recorded in the Alps, but comparatively rare, I think, on British hills. I was one of a party of four which was descending the ridge of Liatbach, above Glen Torridon, in Ross-shire. We had had an extremely beautiful day of sunshine and clear visibility with occasional hail. At about 3,000 ft. we ran into a short sharp hail-storm approaching from the north-east. All four of us were carrying ice-axes, and suddenly all began hissing like grasshoppers. No thunder was heard or lightning seen, but the hissing of the axes continued for several minutes, proceeding from both metal ends of the axes and increasing in intensity when they were pointed into the hail. We were none of us conscious of any other electric symptoms. There was a fair depth of accumulated snow on the mountains.

HUGH GARDNER.

*Oakhurst, Mount Park, Harrow-on-the-Hill, May 26th, 1935.*

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### Drizzle falling from a Clear Sky

I read with interest the article by J. S. Dines on this occurrence in the February *Meteorological Magazine*. I have one or two records of the same kind of thing occurring at Grayshott. On December 29th, 1929, following on a very stormy day, with gale, hail, sleet, heavy rain and lightning, the evening was fine, and the stars brilliant. At 21h. 40m. with the stars as bright as ever and not a trace of cloud visible, palpable drizzle fell for a few minutes. Again on January 3rd, 1933, after a similar kind of day, the evening provided a beautiful display of middle-level cloud, which disappeared before 18h. At 19h. 19m. light drizzle as in the previous case, occurred, and it was some time before cloud reappeared.

The best case was one of which I have unfortunately lost the date, but I am fairly certain that it was during the first ten days of January, 1931. The evening was practically cloudless since sunset, and the temperature near freezing point. At 19h. 35m. copious drizzle fell, enough to wet the face and clothing. A gentleman on coming out of church put up his umbrella, and persisted in keeping it up even when it was pointed out to him that the stars were shining as on the most brilliant of winter evenings.

I think these three observations tend to support Dines's assumption that it is not a very uncommon occurrence for rain to form in clear air without passing through the intermediate stage of cloud particles.

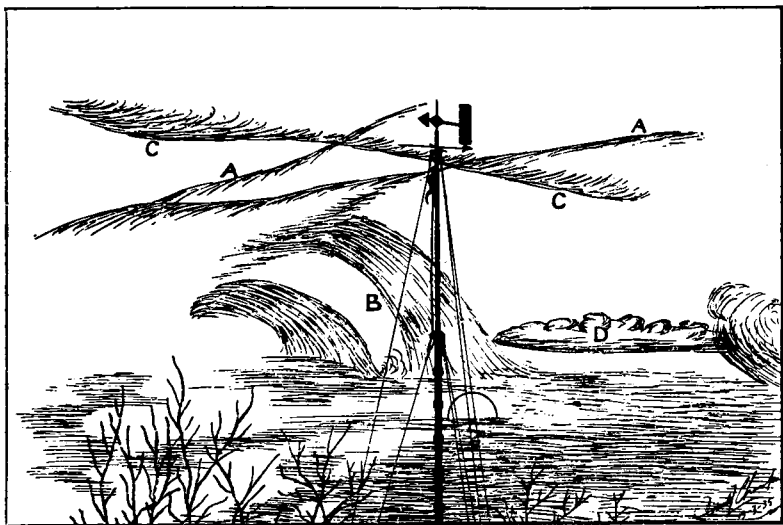
S. E. ASHMORE.

*14, Villa Road, Handsworth, Birmingham 19, March 9th, 1935.*

### Cirrus Clouds at Different Heights

It has been occasionally noted in this magazine that cirriform cloud moving in different directions has been observed simultaneously at different levels and the following note may be of interest.

At 17h. 50m. on March 18th at Goff's Oak, Herts, I was enjoying the view of the setting sun behind the wind vane mast when my attention was drawn to the cirrus clouds in the western sky. There were three distinct layers of cirrus which I have attempted to depict in the attached sketch. The nearer clouds were moving fairly fast and on this account the original sketch was somewhat hastily made and the result does not do justice to the beauty of the scene.



The cirrus bands, marked A, were moving from a northerly point and were the lowest of the cirriform types. The "cascade" of cirrus, B, which appeared as a waterfall quenching the setting sun, was also moving from the north but at a lower speed than the bands A and the movement appeared to bring this cloud between the bands A and C. The latter, C, was advancing from west-south-west towards the station and was the highest in the sky. The cloud D was apparently alto-stratus and was lenticular at first but later became slightly castellated on its upper edge. This cloud followed the cirrus bands A towards the south. The surface wind was SW., force 1. The sun itself finally set behind an advancing sheet of alto-stratus which, later on, covered the whole sky but passed away eastwards, leaving the sky cloudless at 23h. 0m., to be followed by mist, which at 7h. 0m. the next morning had become a moderate fog.

As a guide to the altitude of the clouds in the sketch, I may mention that the angle subtended at eye level (at the point of observation) by the centre of the wind vane was about  $10^{\circ} 5'$ .

DONALD L. CHAMPION.

7, Robinson Avenue, Goff's Oak, Waltham Cross, Herts, March 21st, 1935.

### Blue Snow and Inky Rain in the Shetlands

Rain which fell on the forenoon of March 16th was quite dark-coloured. My attention was called to the colour of the water in the pools and when I got home I at once examined the water in the rain-gauge and found it too was tinted; looked as if it had been slightly diluted with black ink. The sky looked thundery, but I did not hear any thunder, though a thunderstorm was reported from Lerwick, about 40 miles distant.

T. EDMONDSTON SAXBY.

*Halligarth, Baltasound, Shetland, April 2nd, 1935.*

[According to the *Shetland Times* of March 23rd, following a spell of very fine bright weather, the sky was overcast after daylight on Saturday, March 16th, and there were showers of wet snow. Thunder was heard shortly after 9h. and by 10h. the morning was becoming darker, with an ominous looking sky and a peculiar greenish light. Heavy thunder and several bright flashes of lightning followed between 10h. and 11h. and about 10h. 30m. exceptional darkness was experienced. In some districts heavy rain fell and in Lerwick the thunderstorm was followed by a heavy shower of wet snow and later rain. By noon weather conditions were normal and the afternoon and evening were fine. A peculiar feature in several districts during the thunderstorm was that the snow which fell was of a dirty bluish colour and rain water which was collected in tanks and barrels was something of the colour of ink. Dr. Harrison, of Lerwick Observatory, states that black rain was reported from Bressay, "but we saw nothing of this or of blue snow here." The pressure gradient on March 15th and 16th was such that air from industrial districts might have reached Shetland.—Ed., *M.M.*]

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### Frequency of Calms in Winter

Having read Mr. S. E. Ashmore's interesting note on the above in the May issue of the *Meteorological Magazine*, may I be permitted to add the following remarks to my previous note?

The frequency curve for Waltham Cross is the result of plotting the actual percentages and is not in any way smoothed out. The observations used were taken twice a day; the morning reading being at 9h. G.M.T. throughout the year and the afternoon at 15h. G.M.T. in winter, and at 14h. G.M.T. during "Summer Time". It is true that the curve might, and probably would be modified by the passage of time, but if only a coincidence, it is remarkable that the values for ten years should give so smooth a curve. In the month of June, five years gave zero calms and five only one calm each. In the month of December only one year failed to give ten calms.

Considering the great difference in exposure between Grayshott and Waltham Cross, which latter place lies in a valley, there is fair agreement between the two curves.

I should imagine the curve for Waltham Cross is a fair representation of the normal, because the local topography is such that with a flat barometric gradient and clear night skies in winter, the air on the surrounding hills being cooled by radiation probably drifts katabatically down the many small valleys converging on this station and forms a quasi-stationary pool of cold air. This cold air in slowly drifting down the Lea Valley may partly be the cause of the valley fogs, which, as noted by Mr. J. Fairgrieve, frequently invade London from the north-east in winter.

Unfortunately the station at Waltham Cross is now closed, as far as regular observations are concerned; and it will not be possible to ascertain if the distribution of calms as shown by the curve is normal or merely transitory.

DONALD L. CHAMPION.

7, Robinson Avenue, Goff's Oak, Waltham Cross, Herts, May 22nd, 1935.

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## NOTES AND QUERIES

### Honour for Dr. G. C. Simpson

The Honours List, issued on the occasion of His Majesty's Birthday on June 3rd, includes the announcement that Dr. G. C. Simpson, C.B., Director of the Meteorological Office, is promoted to K.C.B.

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### The Ideal Weather Home\*

This little book is an expansion of a short series of broadcast talks on weather under the same title early last year. Its subject matter is more or less that of any popular book on the weather, but it is not like other popular books. The author draws a parallel between the atmosphere and an all-electric house, and then produces the parallel lines to infinity. Even the frontispiece showing the "floors" of the weather house is drawn like a sky-scraper.

The house is No. 3 Sun Street, lighting, heating and power are delivered by "wireless" from the sun, the clouds are the "stair carpets" and a thunderstorm is an express lift, while unkind swarms of meteors throw stones at the sky-scraper, and the higher floors are furnished with the rich draperies of aurora. The author even carries the analogy into history, two chapters on the "picture gallery"—the "old masters" and the "moderns."

The idea was an excellent one for a series of broadcast talks, and it makes a very readable book. The general reader will absorb a good deal of meteorology without any tears; to the meteorologist the chief interest lies in the method of presentation, but many even among professional meteorologists will profit by the author's expert

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\* Through the weather house or the wind, the rain and six hundred miles above. By R. A. Watson Watt. London, Peter Davies, 1935, pp. xi + 192, illus. Price 7s. 6d.

knowledge of the "ionosphere". In less skilled hands there would have been the danger that the facts might be distorted to fit the allegory; Watson Watt avoids this trap, but at times one does feel that he overworks his model. The chapter on "The Servant's Quarters," which describes the realities behind the preparation of a daily weather chart, is one of the most interesting in the book, in spite of the fact that after the first paragraph the author has to descend from his hobby-horse and walk. The chapters, "Saws, saints and sages," and "Controlling the weather," though short, contain much good sense, and the final "Further outlook—?" points out that if a book on meteorology finishes "in the air" it is because the subject has not yet produced the Newton who is so urgently needed.

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### BOOKS RECEIVED

*Deutsches Meteorologisches Jahrbuch für Bayern, 1933.*

The Bavarian Meteorological Yearbook for 1933 contains as usual a number of valuable appendices, among which may be mentioned "Verhalten der relativen Feuchtigkeit auf der Zugspitze," by A. Schmauss. "Bericht über die Arbeiten des Kalmitobservatoriums in den Jahren 1932 and 1933," by K. Sonntag. "Feldstärke- und Schwundmessungen im Rundfunkwellenbereich auf dem Zugspitzgipfel," by A. Agricola. "Über einen lokalen Kälteeinbruch in München und seine Ursachen," by R. Geiger, and "Die München Registrierballonfahrten im Jahre, 1933," by P. Zistler and H. Zierl.

*Nautisk-Meteorologisk Aarbog, 1933.* The Danish Meteorological Institute, Copenhagen, 1934.

In addition to the tables, charts and description of the state of the ice in the Arctic Seas published each year, the *Nautisk-Meteorologisk Aarbog* for 1933 contains an appendix by J. Egedal, entitled "On the determination of the normal height of the sea-level round the Danish coasts."

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### OBITUARY

*Vilhelm Carlheim-Gyllensköld.*—The death of Dr. V. Carlheim-Gyllensköld at Stockholm on December 13th, 1934, robs Sweden of a great magnetician and geophysicist. Born at Stockholm on October 17th, 1859, he studied at the University of Uppsala. In 1882-3 he joined the Swedish Polar Year expedition to Spitsbergen, where he made a series of auroral observations of great value, including spectrum measurements of remarkable accuracy. After the completion of his work on the Polar Year data, he became an assistant astronomer at Pulkova, but after a few years he returned to terrestrial magnetism and began a series of magnetic surveys in southern Sweden, the results of which, reduced to the epoch 1892,



he discussed in a number of papers, culminating in 1895 in his "Mémoire sur le magnétisme terrestre dans la Suède meridionale" (Stockholm, K. Svenska Vetensk. Akad., Handl. 27, No. 8). In the following year he published his best known paper, "Sur la forme analytique de l'attraction magnétique de la terre exprimée en fonction du temps" (Stockholm, Astron. iaktt. och unders. på Stockholms Observatorium, 5, No. 5, 1896).

In 1898 Carlheim-Gyllensköld went again to Spitsbergen with the expedition to measure an arc of the meridian, and made magnetic observations there. Returning to Sweden he carried out pioneer work on the geophysical prospecting of iron-ore deposits and also urged the establishment of a detailed magnetic survey of Sweden, which after many years was carried out by the Geological Survey in 1928-34. Meanwhile, in 1907, he became lecturer in physics at the University of Stockholm and received the title of Professor in 1911. In 1927 he became Vice-president of the section of Terrestrial Magnetism and Atmospheric Electricity of the International Union for Geodesy and Geophysics, and he presided at the meetings in Stockholm in 1930. He organised the magnetic work at the Swedish station in Spitsbergen during the Second International Polar Year of 1932-3, and his active scientific career which began with the first Polar Year, was rounded off by the second.

We regret to learn of the death, at Santiago, on March 26th, 1935, of Capitan de Corbeta en retiro Don Waldo Nuño, aged 52 years. When the Meteorological services of Chile were reorganised in 1929, Capitan de Corbeta Nuño was the founder and first director of the Oficina Meteorologica de Chile, which became the sole official meteorological service, and he retained this position until 1931.

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## The Weather of May, 1935

Pressure was above normal over most of Europe, the north-east North Atlantic, west and central Canada, north and south-east United States and west Mexico, the greatest excesses being 9.6 mb. at Thorshavn and Lerwick and 5.4 mb. south of the Great Slave Lake, while pressure was below normal over Spitsbergen, the extreme north of Norway, the Iberian peninsula, south France, most of the North Atlantic, Alaska, east Canada, north-east and south-west United States, the greatest deficits being 8.0 mb. near St. Johns, Newfoundland, 4.0 mb. at Point Barrow and 3.9 mb. at Waigatz.

A conspicuous feature of the weather of May over the British Isles was the marked contrasts experienced; high temperatures on the 6th were followed about a week later by a reversion to wintry conditions to be succeeded in turn by mild weather towards the end of the month. A marked feature was the prevalence of high pressure. In Scotland generally there was a pronounced excess of sunshine, but in south England there was a considerable deficiency; at

Eskdalemuir the month's sunshine total of 108 hours above the normal, was the highest since records began there in 1910. Rainfall was deficient in most parts and absolute droughts occurred in several areas within the period April 21st to May 12th. The low pressure area to the south of Iceland on the 1st moved south-east to France during the first five days of the month giving generally unsettled cool weather at first, getting milder later. Some rain occurred locally in the south on the 3rd, but elsewhere there was little or none. By the 6th the Azores anticyclone had spread north-east and become established over Scotland giving brilliantly fine warm weather over the whole country that day—77° F. was recorded at Tottenham, Westminster, Brighton, Portsmouth and Collumpton, while Lympne had 13·5 hrs. bright sunshine, Liverpool 12·7 hrs. and Stornoway 11·2 hrs. On the 7th the wind current became north-easterly in the east and south and temperature there dropped considerably. For the next few days from the 8th to 11th easterly winds prevailed over the country, light in the north but moderate to fresh in the south and temperature was about or below normal on the 8th and 9th rising somewhat later. Sunshine records were generally good on the 10th and 11th, Aldergrove having as much as 14·6 hrs. bright sunshine on the 11th. A thunderstorm was reported from Auchincruive on the 11th. On the 11th the winds backed to N. and on the 12th wintry conditions set in and were maintained from then to the 20th. During this period the winds were mainly between N. and E., fresh to strong locally, reaching a gale in places on the 15th and 17th, snow, heavy locally, was experienced over a wide area even as far south as Cornwall while severe ground frosts occurred generally\*. Temperature did not rise above 41° F. at Inverness on the 16th and 42° F. at Nairn and Manchester on the 16th and Harrogate on the 17th. Thunderstorms occurred locally in England on the 18th and 20th. From the 21st to the end of the month pressure was high to the north with mainly easterly winds in the south, moderate to strong at first becoming lighter later while in the north the winds were more variable and lighter. In the north the weather was fine and sunny with temperature about normal, 16·2 hrs. bright sunshine were recorded at Stornoway on the 27th and 16·0 hrs. at Dalwhinnie on the 28th and at Stornoway on the 26th and 30th, while in the south the weather was unsettled, rain occurring on many days but with some long bright periods. As the easterly winds diminished in force the temperature rose and on the 29th, 72° F. was recorded at Tottenham, Brighton and Portsmouth. Thunderstorms occurred locally in south England from the 27th to 30th and in Ireland on the 29th and 30th; 1·46 in. of rain were measured during a thunderstorm at Bognor and 1·16 in. at Blockley, Gloucester on the 30th. The distribution of bright sunshine for the month was as follows :—

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\* See p. 105.

		Diff. from				Diff. from	
		Total	normal			Total	normal
		(hrs.)	(hrs.)			(hrs.)	(hrs.)
Stornoway	...	274	+93	Liverpool	...	241	+42
Aberdeen	...	172	- 1	Ross-on-Wye	...	193	0
Dublin	...	225	+38	Falmouth	...	194	-21
Birr Castle	...	226	+52	Gorleston	...	264	+35
Valentia...	...	256	+67	Kew	...	190	-13

*Miscellaneous notes on weather abroad culled from various sources.*

A severe snowstorm occurred in Poland on the 1st and 2nd, making the roads impassable in many places and doing much damage to the orchards and gardens. Severe frosts also caused serious damage in the orchards and vineyards in Hungary at the beginning of the month and near Hochheim about the middle of the month. Heavy rain and low temperatures prevailed in north Italy from about the 13th-17th; a gale occurred in Venice on the 16th and snow fell on the mountains round Lake Maggiore while floods were reported from Venetia and Piedmont. Snow occurred in most of central Europe and France about the middle of the month, the snowfalls in Switzerland being reported as the heaviest in May for 80 years. Much damage was done to property early on the 28th at Amiens by a cloudburst which in a few minutes flooded many streets. It was reported from Uleaborg (Finland) on the 31st that the whole district was ice free (*The Times*, May 3rd-June 1st).

A slight fall of snow occurred in Johannesburg and other Reef towns on the 27th (*The Times*, May 28th).

Severe heat occurred in Calcutta during the week ending the 11th, 110° F. being reported on the 11th, the highest reading since May, 1924. It is reported that during a hailstorm at Sann and Amri in Sind early in May some of the hailstones weighed nearly  $\frac{1}{2}$  lb. and injured men and crops, even killing small cattle. A hailstorm accompanied by thunder and torrential rain swept across central Japan on the 21st damaging the mulberry crop and breaking the telephone wires (*The Times*, May 13th-22nd).

Cool weather with rain or snow showers delayed farming operations in many districts of Canada about the middle of the month and later the weather continued cool and cloudy. Dust storms were again experienced in the south central United States early in the month. Sixteen people were killed in a storm over the south-east States on the 3rd. Twenty people in Texas and Oklahoma were killed on the 19th by flooded rivers and tornadoes which did material damage estimated at a million dollars. Alabama and Mississippi were struck by another tornado which killed 5 people on the 20th; floods were also reported along the Red river in Louisiana. Floods in east Wyoming and north-east Colorado resulting from cloudbursts on the 30th caused the deaths of 10 people; and hurricanes and floods occurred in Nebraska on the 31st when it was estimated that 250

(continued on p. 128).

## Rainfall : May, 1935 : England and Wales

Co.	STATION.	In.	Per cent of Av.	Co.	STATION.	In.	Per cent of Av.
<i>Lond.</i>	Camden Square.....	1.07	61	<i>Leics.</i>	Thornton Reservoir ...	.68	34
<i>Sur.</i>	Reigate, Wray Pk. Rd..	1.97	108	"	Belvoir Castle.....	.59	28
<i>Kent.</i>	Tenterden, Ashenden...	1.65	105	<i>Rut.</i>	Ridlington .....	1.00	50
"	Folkestone, Boro. San.	1.80	97	<i>Lincs.</i>	Boston, Skirbeck.....	.32	18
"	Eden'bdg., Falconhurst	1.80	97	"	Cranwell Aerodrome...	.41	23
"	Sevenoaks, Speldhurst.	1.68	...	"	Skegness, Marine Gdns.	.30	18
<i>Sus.</i>	Compton, Compton Ho.	1.19	54	"	Louth, Westgate.....	.33	16
"	Patching Farm.....	1.63	88	"	Brigg, Wrawby St.....	.31	...
"	Eastbourne, Wil. Sq....	1.24	75	<i>Notts.</i>	Worksop, Hodsock.....	.42	21
"	Heathfield, Barklye....	1.96	109	<i>Derby.</i>	Derby, L. M. & S. Rly.	.39	20
<i>Hants.</i>	Ventnor, Roy.Nat.Hos.	1.40	82	"	Buxton, Terr. Slopes...	.67	22
"	Fordingbridge, Oaklnds	1.95	94	<i>Ches.</i>	Runcorn, Weston Pt....	1.45	63
"	Ovington Rectory.....	1.18	54	<i>Lancs.</i>	Manchester, Whit. Pk.	.84	40
"	Sherborne St. John.....	.79	41	"	Stonyhurst College.....	1.16	41
<i>Herts.</i>	Royston, Therfield Rec.	1.32	68	"	Southport, Bedford Pk.	1.46	70
<i>Bucks.</i>	Slough, Upton.....	1.20	71	"	Lancaster, Greg Obsy.	1.50	60
"	H. Wycombe, Flackwell	.79	43	<i>Yorks.</i>	Wath-upon-Deerne.....	.41	20
<i>Oxf.</i>	Oxford, Mag. College...	1.70	95	"	Wakefield, Clarence Pk.	.61	31
<i>Nor.</i>	Wellingboro, Swanspool	.95	49	"	Oughtershaw Hall.....	1.33	...
"	Oundle .....	.67	...	"	Wetherby, Ribston H..	.35	17
<i>Beds.</i>	Woburn, Exptl. Farm...	2.37	122	"	Hull, Pearson Park....	.49	25
<i>Cam.</i>	Cambridge, Bot. Gdns.	.73	41	"	Holme-on-Spalding.....	.45	22
<i>Essex.</i>	Chelmsford, County Lab	1.18	82	"	West Witton, Ivy Ho.	.94	42
"	Lexden Hill House.....	1.37	...	"	Felixkirk, Mt. St. John.	1.27	68
<i>Suff.</i>	Haughley House.....	2.31	...	"	York, Museum Gdns....	1.07	54
"	Campsea Ashe.....	1.98	132	"	Pickering, Hungate....	1.15	59
"	Lowestoft Sec. School...	1.32	82	"	Scarborough.....	1.10	58
"	Bury St. Ed., Westley H.	1.28	70	"	Middlesbrough.....	.69	36
<i>Norf.</i>	Wells, Holkham Hall...	.38	24	"	Baldersdale, Hury Res.	.56	22
<i>Wilts.</i>	Calne, Castleway.....	1.10	59	<i>Durh.</i>	Ushaw College.....	.96	44
"	Porton, W.D. Exp'l. Stn	.84	49	<i>Nor.</i>	Newcastle, Town Moor.	1.05	52
<i>Dor.</i>	Evershot, Melbury Ho.	1.84	90	"	Bellingham, Highgreen	.94	39
"	Weymouth, Westham.	2.02	125	"	Lilburn Tower Gdns....	1.08	47
"	Shaftesbury, Abbey Ho.	1.31	62	<i>Cumb.</i>	Carlisle, Scaleby Hall..	.85	36
<i>Devon.</i>	Plymouth, The Hoe....	1.45	70	"	Borrowdale, Seathwaite	1.25	18
"	Holne, Church Pk. Cott.	3.38	107	"	Borrowdale, Moraine...	1.21	22
"	Teignmouth, Den Gdns.	2.92	160	"	Keswick, High Hill.....	.85	27
"	Cullompton .....	2.06	95	<i>West.</i>	Appleby, Castle Bank...	.77	35
"	Sidmouth, U.D.C.....	1.82	...	<i>Mon.</i>	Abergavenny, Larchf'd	.68	25
"	Barnstaple, N. Dev. Ath	2.43	117	<i>Glam.</i>	Ystalyfera, Wern Ho....	2.40	69
"	Dartm'r, Cranmere Pool	3.50	...	"	Cardiff, Ely P. Stn.....	1.17	47
"	Okehampton, Uplands.	3.11	115	"	Treherbert, Tynywaun.	2.63	...
<i>Corn.</i>	Redruth, Trewirgie....	2.17	94	<i>Carm.</i>	Carmarthen, Priory St.	...	...
"	Penzance, Morrab Gdn.	1.65	75	<i>Pemb.</i>	Haverfordwest, Portfld.	...	...
"	St. Austell, Trevarna...	2.19	90	<i>Card.</i>	Aberystwyth .....	2.32	...
<i>Soms.</i>	Chewton Mendip.....	1.28	46	<i>Rad.</i>	Birm W.W. Tyrmynydd	2.19	64
"	Long Ashton .....	1.11	53	<i>Mont.</i>	Lake Vyrnwy .....	1.11	35
"	Street, Millfield.....	1.04	54	<i>Flint.</i>	Sealand Aerodrome.....	1.80	96
<i>Glos.</i>	Blockley .....	2.60	...	<i>Mer.</i>	Dolgelley, Bontddu.....	2.50	76
"	Cirencester, Gwynfa...	1.32	64	<i>Carn.</i>	Llandudno .....	1.24	70
<i>Here.</i>	Ross, Birchlea.....	1.05	49	"	Snowdon, L. Llydaw 9..	3.84	...
<i>Salop.</i>	Church Stretton.....	.68	26	<i>Ang.</i>	Holyhead, Salt Island...	1.42	72
"	Shifnal, Hatton Grange	.94	46	"	Lligwy .....	1.78	...
<i>Staffs.</i>	Market Drayt'n, Old Sp.	.82	37	<i>Isle of Man</i>			
<i>Worc.</i>	Ombersley, Holt Look.	1.00	49		Douglas, Boro' Cem....	1.06	42
<i>War.</i>	Alcester, Ragley Hall...	1.44	70	<i>Guernsey</i>			
"	Birmingham, Edgbaston	1.77	83		St. Peter P't. Grange Rd.	1.81	106

## Rainfall : May, 1935 : Scotland and Ireland

Co.	STATION.	In.	Per cent of Av.	Co.	STATION.	In.	Per cent of Av.
<i>Wig</i>	Pt. William, Monreith.....	·53	23	<i>Suth</i>	Melvich.....	1·20	59
"	New Luce School.....	1·11	39	"	Loch More, Achfary....	4·19	95
<i>Kirk</i>	Dalry, Glendarroch.....	·92	29	<i>Caith</i>	Wick.....	·56	27
"	Carsphairn, Shiel.....	1·38	33	<i>Ork</i>	Deerness.....	·53	27
<i>Dumf.</i>	Dumfries, Crichton, R.I.....	·74	29	<i>Shet</i>	Lerwick.....	·94	45
"	Eskdalemuir Obs.....	1·16	35	<i>Cork</i>	Caheragh Rectory.....	1·03	...
<i>Roxb</i>	Braxholm.....	...	...	"	Dunmanway Rectory...	·98	29
<i>Selk</i>	Ettrick Manse.....	·96	26	"	Cork, University Coll....	·71	31
<i>Peeb</i>	West Linton.....	·99	...	"	Ballinacurra.....	·52	22
<i>Berw</i>	Marchmont House.....	1·03	42	"	Mallow, Longueville....	·84	38
<i>E.Lot</i>	North Berwick Res.....	1·00	50	<i>Kerry</i>	Valentia Obsy.....	1·35	43
<i>Midl</i>	Edinburgh, Roy. Obs..	·93	45	"	Gearhameen.....	1·90	36
<i>Lan</i>	Auchtyfardle.....	·84	...	"	Darrynane Abbey.....	1·40	47
<i>Ayr</i>	Kilmarnock, Kay Pk....	·64	...	<i>Wat</i>	Waterford, Gortmore...	·70	30
"	Girvan, Pinmore.....	1·08	36	<i>Tip</i>	Nenagh, Cas. Lough....	1·39	56
<i>Renf</i>	Glasgow, Queen's Pk....	·61	25	"	Roscrea, Timoney Park...	1·05	...
"	Greenock, Prospect H..	·57	17	"	Cashel, Ballinamona....	1·09	45
<i>Bute</i>	Rothsay, Ardenraig....	1·11	...	<i>Lim</i>	Foynes, Coolnanes.....	1·12	48
"	Dougarie Lodge.....	1·10	...	"	Castleconnel Rec.....	1·09	...
<i>Arg</i>	Ardgour House.....	1·41	...	<i>Clare</i>	Inagh, Mount Callan....	1·73	...
"	Glen Etive.....	...	...	"	Broadford, Hurdlest'n.	1·29	...
"	Oban.....	·46	...	<i>Wexf</i>	Gorey, Courtown Ho....	·88	40
"	Poltalloch.....	·83	29	<i>Wick</i>	Rathnew, Clonmannon..	·74	...
"	Inveraray Castle.....	1·19	30	<i>Carl</i>	Hacketstown Rectory...	·97	37
"	Islay, Eallabus.....	1·13	43	<i>Leix</i>	Blandsfort House.....	1·06	44
"	Mull, Benmore.....	3·60	48	"	Mountmellick.....	1·38	...
"	Tiree.....	·98	39	<i>Offaly</i>	Birr Castle.....	1·04	47
<i>Kinr</i>	Loch Leven Sluice.....	...	...	<i>Dublin</i>	Dublin, FitzWm. Sq....	1·39	68
<i>Perth</i>	Loch Dhu.....	·55	12	"	Balbriggan, Ardgillan...	1·45	70
"	Balquhiddel, Stronvar..	·37	...	<i>Meath</i>	Beauparc, St. Cloud....	1·58	...
"	Crief, Strathearn Hyd..	·26	10	"	Kells, Headfort.....	1·19	44
"	Blair Castle Gardens....	·60	30	<i>W.M.</i>	Moate, Coolatore.....	1·13	...
<i>Angus</i>	Kettins School.....	·57	21	"	Mullingar, Belvedere...	1·78	73
"	Pearsie House.....	1·09	...	<i>Long</i>	Castle Forbes Gdns.....	·83	32
"	Montrose, Sunnyside...	1·12	55	<i>Gal</i>	Galway, Grammar Sch..	1·08	...
<i>Aber</i>	Braemar, Bank.....	1·22	51	"	Ballynahinch Castle....	1·81	50
"	Logie Coldstone Sch....	1·91	77	"	Ahascragh, Clonbrock..	...	...
"	Aberdeen, King's Coll..	1·60	69	<i>Mayo</i>	Blacksod Point.....	1·16	41
"	Fyvie Castle.....	2·54	98	"	Mallaranny.....	...	...
<i>Moray</i>	Gordon Castle.....	1·51	71	"	Westport House.....	2·16	76
"	Grantown-on-Spey.....	2·25	97	"	Delphi Lodge.....	3·08	51
<i>Nairn</i>	Nairn.....	1·51	84	<i>Sligo</i>	Markree Obsy.....	1·70	62
<i>Inv's</i>	Ben Alder Lodge.....	·84	...	<i>Cavan</i>	Crossdoney, Kevit Cas..	1·06	...
"	Kingussie, The Birches..	1·42	...	<i>Ferm</i>	Enniskillen, Portora....	1·10	...
"	Inverness, Culduthel R..	1·14	...	<i>Arm</i>	Armagh Obsy.....	·84	35
"	Loch Quoich, Loan.....	1·49	...	<i>Down</i>	Fofanny Reservoir.....	1·75	...
"	Glenquoich.....	...	...	"	Seaforde.....	·87	33
"	Arisaig, Faire-na-Sguir..	·90	...	"	Donaghadee, C. Stn....	·59	26
"	Fort William, Glasdrum	1·04	...	"	Banbridge, Milltown....	·92	41
"	Skye, Dunvegan.....	1·84	...	<i>Antr</i>	Belfast, Cavehill Rd....	1·21	...
"	Barra, Skallary.....	1·00	...	"	Aldergrove Aerodrome..	·96	42
<i>R&amp;C</i>	Alness, Ardross Castle..	2·43	93	"	Ballymena, Harryville..	1·65	58
"	Ullapool.....	2·04	80	<i>Lon</i>	Garvagh, Moneydig....	1·05	...
"	Achnashellach.....	2·23	50	"	Londonderry, Creggan..	1·98	76
"	Stornoway.....	1·66	65	<i>Tyr</i>	Omagh, Edenfel.....	1·18	46
<i>Suth</i>	Laig.....	2·20	87	<i>Don</i>	Malin Head.....	1·22	...
"	Tongue.....	1·61	68	"	Killybegs, Rockmount..	1·46	...

## Climatological Table for the British Empire, December, 1934

STATIONS.	PRESSURE.			TEMPERATURE.							PRECIPITATION.			BRIGHT SUNSHINE.		
	Mean of Day M.S.L.	Diff. from Normal.	mb.	Absolute.		Mean Values.					Mean Cloud Am't	Diff. from Normal.	Days.	Hours per day.	Per-centage of possi-ble.	
				Max.	Min.	°F.	Max.	Min.	°F.	Diff. from Normal.						Wet Bull.
	°F.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	%	in.	in.				
London, Kew Obsy....	1003.0	-10.7	57	34	50.9	44.2	47.5	58.1	7.2	45.6	8.0	2.13	26	0.8	11	
Gibraltar.....	1021.6	+1.3	69	45	64.5	51.8	58.1	58.1	2.1	52.8	4.9	1.98	14	...	...	
Malta.....	1015.2	-1.0	68	50	62.3	54.2	58.3	54.2	0.4	54.5	6.7	0.77	17	5.5	57	
St. Helena.....	1012.7	0.0	70	57	65.8	58.2	62.0	62.0	0.3	59.5	9.6	...	21	...	...	
Freetown, Sierra Leone.....	1013.9	+3.0	89	71	85.6	74.2	79.9	74.2	1.5	75.4	3.4	1.15	2	...	...	
Lagos, Nigeria.....	1010.9	+0.9	89	70	86.3	74.7	80.5	74.7	1.3	75.4	2.9	3.91	3	6.1	52	
Kaduna, Nigeria.....	1010.7	...	93	50	89.2	53.6	71.4	53.6	1.9	55.6	1.3	0.00	0	9.4	82	
Zomba, Nyasaland.....	1009.7	+1.4	88	60	78.8	61.6	71.7	61.6	1.4	67.5	7.9	2.42	21	...	...	
Salisbury, Rhodesia...	1010.2	-1.1	87	51	76.9	59.4	68.1	59.4	1.5	62.4	6.8	2.10	20	4.9	37	
Cape Town.....	1015.1	+0.8	97	55	80.5	60.2	70.3	60.2	2.4	61.0	3.2	0.60	3	...	...	
Johannesburg.....	1011.5	+0.7	83	47	74.9	54.6	64.7	54.6	0.8	58.0	6.9	0.74	13	6.9	50	
Mauritius.....	1013.1	-0.9	90	66	85.5	72.9	79.2	72.9	0.9	73.8	5.6	3.66	14	8.6	65	
Calcutta, Alipore Obsy.	1016.2	+0.5	82	52	77.9	58.8	68.3	58.8	1.8	59.9	1.2	0.07	2*	...	...	
Bombay.....	1013.5	0.0	92	67	87.7	70.1	78.9	70.1	1.5	67.3	2.2	0.05	0*	...	...	
Madras.....	1014.0	+0.5	85	64	82.4	68.3	75.3	68.3	1.4	70.3	5.8	3.16	6*	...	...	
Colombo, Ceylon.....	1011.2	+0.9	88	68	86.0	72.2	79.1	72.2	0.4	73.4	4.6	3.07	6	7.8	67	
Singapore.....	1010.4	+0.7	89	71	86.0	73.8	79.9	73.8	0.0	75.4	7.6	7.28	14	6.1	51	
Hongkong.....	1019.2	-0.5	79	43	69.2	59.6	64.4	59.6	1.4	59.1	5.6	0.50	4	5.6	52	
Sandakan.....	1009.5	...	89	72	86.6	74.4	80.5	74.4	0.3	76.1	7.2	2.62	22	...	...	
Sydney, N.S.W.....	1010.8	-1.1	90	55	72.8	60.5	66.7	60.5	3.4	61.9	7.2	3.34	21	6.3	44	
Melbourne.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Adelaide.....	1013.2	0.0	104	49	81.3	57.6	69.5	57.6	1.6	58.2	6.0	0.18	8	8.3	58	
Perth, W. Australia...	1013.5	+0.3	103	50	79.8	60.2	70.0	60.2	0.8	59.7	4.3	0.21	6	10.0	70	
Coolgardie.....	1011.2	0.0	105	52	90.1	61.2	75.7	61.2	0.0	63.7	3.1	0.69	0	...	...	
Brisbane.....	1009.8	-2.2	97	58	82.1	65.2	73.7	65.2	2.7	67.7	5.6	4.93	16	8.6	62	
Hobart, Tasmania.....	1012.5	+2.8	94	44	66.1	52.2	59.1	52.2	1.1	53.8	7.4	3.24	16	5.2	34	
Wellington, N.Z.....	1018.5	+6.3	84	50	74.1	58.3	66.2	58.3	6.0	61.8	5.5	3.17	1	10.1	67	
Suva, Fiji.....	1008.5	-0.1	91	70	86.0	73.8	79.9	73.8	0.9	74.8	5.7	6.32	17	8.8	67	
Apia, Samoa.....	1007.2	-1.1	88	71	84.6	74.4	79.5	74.4	0.2	76.3	7.5	6.16	23	5.5	43	
Kingston, Jamaica....	1014.2	+0.2	91	65	86.1	69.6	77.9	69.6	0.2	67.7	4.6	0.19	2	4.3	39	
Grenada, W.I.....	...	...	85	70	83	70	76.5	70	1.7	72	5	5.89	19	...	...	
Toronto.....	1018.2	+0.6	45	0	31.8	19.3	25.5	19.3	1.6	22.5	7.7	1.57	6	1.7	19	
Winnipeg.....	1020.9	+2.2	35	-37	13.3	-3.2	5.1	-3.2	0.7	...	5.8	0.94	0	2.6	32	
St. John, N.B.....	1012.6	-1.4	56	0	26.2	11.5	18.9	11.5	5.5	14.1	5.1	1.02	6	4.2	48	
Victoria, B.C.....	1017.5	+0.8	52	31	45.8	38.7	42.3	38.7	1.2	40.1	7.1	0.68	23	2.3	27	

\* For Indian stations a rain day is a day on which 0.1 in. or more rain has fallen.

\* For Indian stations a rain day is a day on which 0.1 in. or more rain has fallen.

## Climatological Table for the British Empire, Year 1934

STATIONS.	PRESSURE.			TEMPERATURE.						PRECIPITATION.			BRIGHT SUNSHINE.	
	Mean of Day M.S.L.	Diff. from Normal.	mb.	Absolute.		Mean Values.			Mean Cloud Am't.	Rela- tive Hum- idity.	Mean Am't.	Days.	Hours per day.	Per- cent- age of possi- ble.
				Max.	Min.	Max.	Min.	Diff. from Normal.						
	°F.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	in.	in.	in.	in.	in.	in.
London, Kew Obsy....	1015.3	0.1	84	22	58.4	44.7	51.5	+ 1.8	7.2	85	19.71	149	4.3	32
Gibraltar.....	1017.9	0.0	91	36	71.2	56.6	63.9	- 0.3	55.8	76	26.11	81	...	...
Malta.....	1015.8	0.4	97	41	70.9	60.7	65.8	- 0.3	60.5	81	22.80	90	8.3	67
St. Helena.....	1013.4	0.1	74	53	65.1	58.5	61.8	- 0.3	59.4	94	40.81	223	...	...
Freetown, Sierra Leone	1013.1	1.7	92	62	85.8	71.1	78.5	- 2.2	75.6	86	172.96	161	...	...
Lagos, Nigeria.....	1011.2	0.4	92	67	86.3	75.4	80.9	+ 0.2	75.7	87	77.80	129	5.6	47
Kaduna, Nigeria.....	1008.6	...	105	50	89.1	64.2	76.6	+ 0.2	66.1	79	53.38	117	7.5	63
Zomba, Nyasaland....	1012.1	0.2	93	47	79.1	61.1	70.1	+ 0.7	64.7	63	48.97	137	...	...
Salisbury, Rhodesia...	1014.1	0.7	92	37	76.9	54.4	65.7	+ 0.4	57.8	61	33.67	98	7.6	63
Cape Town.....	1016.9	0.1	103	37	73.6	55.3	64.5	+ 2.2	56.3	78	19.19	90	...	...
Johannesburg.....	1015.9	0.5	85	26	70.5	50.2	60.6	+ 0.6	51.5	62	34.36	104	8.2	68
Mauritius.....	1016.5	0.4	90	54	79.8	67.3	73.6	- 0.4	69.4	71	47.55	249	7.9	65
Calcutta, Alipore Obsy.	1007.1	0.5	105	45	81.1	71.7	79.9	+ 1.1	72.4	86	54.39	87*	...	...
Bombay.....	1008.8	0.4	96	53	87.1	73.9	80.5	- 0.1	72.8	78	73.25	86*	...	...
Madras.....	1008.4	0.4	110	59	90.0	74.8	82.4	- 0.7	75.1	77	36.66	51*	...	...
Colombo, Ceylon.....	1010.2	0.5	90	63	85.1	74.6	79.9	- 1.1	76.0	78	114.77	187	6.8	56
Singapore.....	1009.4	0.1	90	67	85.8	74.3	80.0	- 0.9	76.5	81	106.55	194	5.6	46
Hongkong.....	1013.1	0.6	93	43	76.5	67.7	72.1	- 0.2	67.4	76	97.68	153	5.1	42
Sandakan.....	1009.5	...	94	70	87.6	74.7	81.2	- 0.1	76.8	85	166.12	242	...	...
Sydney, N.S.W.....	1016.6	0.7	103	40	70.2	56.2	63.2	+ 0.1	58.4	73	64.91	183	6.7	56
Melbourne.....	1017.5	0.5	111	38	74.6	54.3	64.5	+ 1.5	54.9	51	20.24	125	6.9	57
Adelaide.....	1016.1	0.3	110	37	74.0	56.1	65.1	+ 0.9	56.8	61	40.61	119	7.7	64
Perth, W. Australia...	1015.2	0.7	111	35	77.4	53.5	65.5	+ 1.0	56.9	60	11.31	50	...	...
Coolgardie.....	1016.7	0.8	97	40	76.3	59.2	67.7	- 1.2	61.8	67	54.26	117	7.6	63
Brisbane.....	1015.4	2.9	99	31	62.3	47.4	54.9	+ 0.5	49.1	66	23.17	167	5.3	44
Hobart, Tasmania.....	1017.4	2.7	84	32	60.8	48.8	54.8	- 0.6	51.8	76	43.34	151	5.9	49
Wellington, N.Z.....	1012.1	0.8	95	63	83.0	72.2	77.6	+ 0.6	73.3	81	134.33	246	5.2	43
Suva, Fiji.....	1010.2	0.1	89	66	84.9	74.0	79.5	+ 1.0	75.9	79	120.22	213	...	...
Apia, Samoa.....	1013.8	0.1	93	65	86.5	70.7	78.6	- 0.7	69.9	83	26.62	82	5.9	49
Kingston, Jamaica....	...	...	90	70	85	72	78.5	- 0.3	73	75	121.88	241	...	...
Grenada, W.I.....	1017.1	0.5	94	-21	53.8	37.4	45.6	+ 0.4	40.0	72	20.49	103	5.7	47
Toronto.....	1016.4	0.2	99	-39	46.6	26.6	36.6	+ 2.0	...	...	15.42	70	...	...
Winnipeg.....	1015.5	0.9	80	-20	48.5	33.0	40.7	- 0.5	36.7	78	42.44	135	5.4	43
St. John, N.B.....	1016.8	0.1	87	31	57.7	46.2	51.9	+ 2.5	48.5	83	30.92	156	6.4	52
Victoria, B.C.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...

\* For Indian stations a rain day is a day on which 0.1 in. or more rain has fallen.

(continued from p. 123).

people were killed. In the United States temperature was mainly below normal except during the first part of the month in the Gulf States where it was above normal and along the Pacific coast where it was about normal, while the rainfall was generally about or above normal at first becoming mainly below normal. One hundred icebergs were reported to be moving south to within 30 miles of the westbound steamer lane on the North Atlantic early in the month (*The Times*, May 3rd–June 4th and *Washington, D.C., U.S. Dept. Agric. Weekly Weather and Crop Bulletin*).

### Daily Readings at Kew Observatory, May 1935

Date	Pressure, M.S.L. 13h.	Wind, Dir., Force 13h.	Temp.		Rel. Hum. 13h.	Rain.	Sun.	REMARKS. (see p. 1).
			Min.	Max.				
	mb.		°F	°F	%	in.	hrs.	
1	1024.6	SSW.2	44	49	82	0.11	0.0	r-r <sub>0</sub> 3h. 50m.–13h.
2	1022.5	SSW.3	37	62	48	—	8.5	X early.
3	1014.4	ESE.4	47	65	24	—	11.2	
4	1012.6	E.4	50	64	44	—	4.1	
5	1019.5	ENE.1	46	70	50	—	5.9	f m early.
6	1025.7	NE.3	50	74	30	—	12.5	w early.
7	1029.1	N.E.3	49	64	43	—	3.9	w early.
8	1030.9	NE.3	48	57	60	trace	3.1	d <sub>0</sub> 8h. 45m.
9	1024.8	NE.4	47	58	43	—	8.2	
10	1020.6	ENE.5	45	63	37	—	13.8	
11	1020.0	NNE.5	45	65	39	—	12.3	
12	1021.7	NE.4	45	53	44	—	5.0	
13	1023.3	NNW.3	39	52	43	—	5.3	
14	1018.5	N.4	39	50	61	0.13	5.0	rr <sub>0</sub> 5h.–8h., pr h <sub>0</sub> s <sub>0</sub> 11h.
15	1017.8	NNE.4	39	54	47	0.15	6.8	r–ir <sub>0</sub> 0h. 30m.–6h.
16	1018.9	NNE.4	41	47	51	trace	2.8	r <sub>0</sub> 7h. & 12h. pr <sub>0</sub> h <sub>0</sub> 18h.
17	1009.4	SSW.4	30	52	43	trace	8.7	x early, pr <sub>0</sub> 23 h. 55m.
18	1012.0	N.3	36	51	45	0.01	9.8	pr <sub>0</sub> 13h., r–r <sub>0</sub> 19h.–20h.
19	1013.6	S.3	34	50	85	0.19	0.3	r–r <sub>0</sub> 11h. 30m.–18h.
20	1015.6	S.3	46	57	81	0.60	1.1	rr <sub>0</sub> 0h.–3h., pr <sub>2</sub> 10h.
21	1022.3	NNE.4	42	56	52	—	11.0	
22	1021.9	NNE.5	42	54	49	—	6.2	
23	1013.2	NE.6	43	64	45	—	7.8	
24	1015.1	NE.6	50	67	45	trace	4.3	pr <sub>0</sub> 12h. & 23h. 40m.
25	1017.1	ENE.5	50	67	56	0.13	3.9	r–r <sub>0</sub> 2h.–10h.
26	1019.1	NE.4	46	65	54	—	9.7	
27	1018.4	NE.3	46	60	72	0.02	0.1	pr <sub>0</sub> 14h., pr 15h. 30m.
28	1014.9	E.2	51	66	74	0.05	0.6	pr <sub>0</sub> 8h., 11h. & 12h.
29	1013.1	NNE.3	49	68	68	—	11.9	
30	1011.3	NE.2	50	68	55	trace	6.1	pr <sub>0</sub> 17h. 45m.–18h.
31	1015.8	NE.2	49	55	79	0.01	0.0	d <sub>0</sub> 3h., 5h., 7h. & 10h.
*	1018.6		45	60	53	1.40	6.1	* Means or totals.

### General Rainfall for May, 1935.

England and Wales	...	60	} per cent. of the average 1881–1915.
Scotland	...	48	
Ireland	...	46	
British Isles	...	55	