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Pressure, weather and rainfall of 1935

Variations of Pressure near the British Isles during 1935

During the year 1935 charts have been drawn for each half-month giving the average pressure distribution over the region between the west coast of North America and western Siberia, with a view to studying the changes in the general barometric situation of a more gradual kind than those seen in the *Daily Weather Reports*. These charts are of some interest, in that they show, more clearly than monthly charts, how a certain general type of distribution can persist for six weeks or more, and then rapidly give place to quite another type.

The year opened with a westerly type, low pressure over the Greenland-Spitsbergen region and high pressure south or south-west of the British Isles. This type persisted for six weeks, the pressure difference between Scilly and Jan Mayen increasing from 21·4 mb. in January 1st–15th to 27·8 mb. in January 16th–31st and 31·6 mb. in February 1st–14th; during the last period pressure at Spitsbergen was only 984 mb. In the second half of February (see chart) the type was similar, but the centre of lowest pressure lay north of Thorshavn (981 mb.) and the whole of the British Isles was below 1000 mb. In March 1st–15th (see chart) the distribution changed completely to a southerly type, with high pressure over Scandinavia and low over the North Atlantic. This was short-lived however, the period from

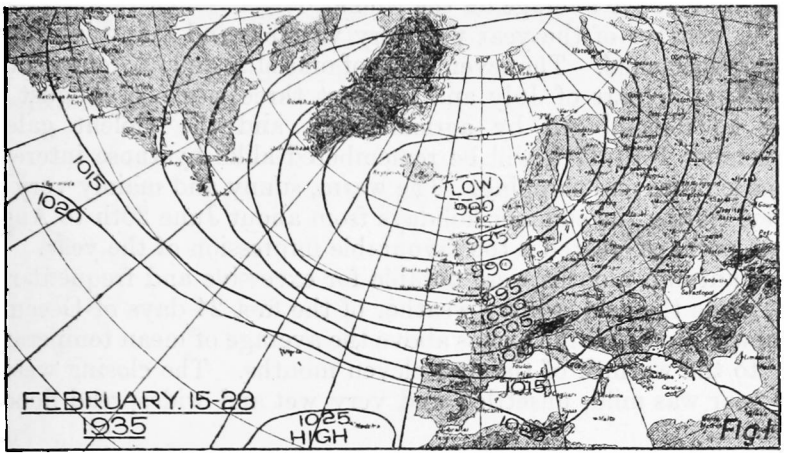
March 16th to April 15th showing a reversion to something approaching that of February 15th–28th, a long belt of low pressure extending from mid-Atlantic to Norway across the northern part of the British Isles while an anticyclone lay over France and Spain.

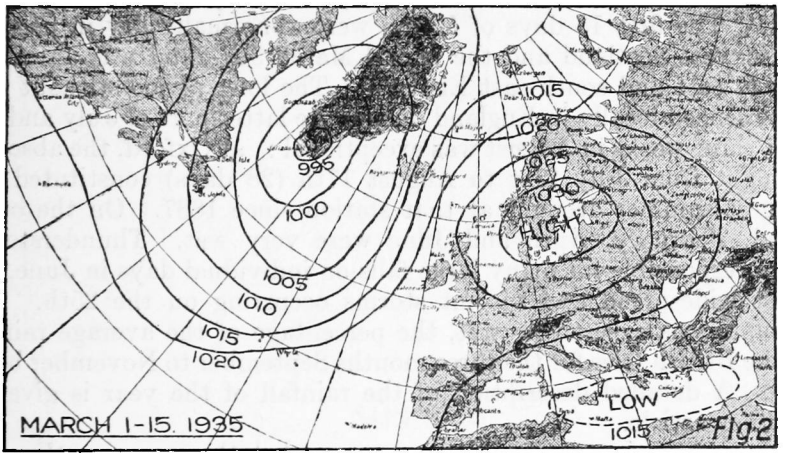
In the second half of April the pressure was extraordinarily uniform over the whole of Europe and the eastern Atlantic, while both halves of May showed an anticyclone, persistent though not intense, centred near Thorshavn and covering the British Isles, giving a fine warm month. In the first half of June this distribution was completely reversed, a shallow depression covering the British Isles and Scandinavia. June 16th–30th was another period of uniform pressure, but from July 1st to August 15th a tongue of high pressure from the Azores anticyclone extended to the east-north-east across the British Isles, and this period of six weeks during which the general pressure distribution scarcely changed brought the remarkably fine weather of the height of summer. From August 16th to September 15th conditions were somewhat less favourable, a shallow depression extending, first south-east from Greenland and then eastwards from the mid-Atlantic. From September 16th to October 15th the low pressure centre lay directly over the north of Scotland, with a marked gradient for westerly winds over England, giving a very stormy period, while from October 16th–31st the depression, though centred somewhat further north, was intensified. There were two autumn gales of exceptional severity on September 16th–17th and October 18th–20th. The chart for October 16th–31st closely resembled that for February 15th–28th and rather curiously the chart for November 1st–15th (see chart) is not dissimilar in appearance from that for March 1st–15th. Both high and low pressure however were some 1,500 miles further east in November than in March, so that the British Isles came under the influence of the depression instead of the anticyclone, and the weather here was exceptionally wet and stormy instead of exceptionally dry. The second half of November was similar to the first half, but with some approach to the type of October 1st–15th. December 1st–15th showed the Azores high again extending towards the north-east, but this promise was not maintained and the latter half of the month showed an intense elongated depression occupying the North Atlantic between 48° and 60° N. In the centre of this depression pressure was only about 990 mb., and the area below 1000 mb. included both Newfoundland and the British Isles. At the other extreme pressure was very high over eastern Russia, giving a strong flow of air from south-west over the greater part of Europe.

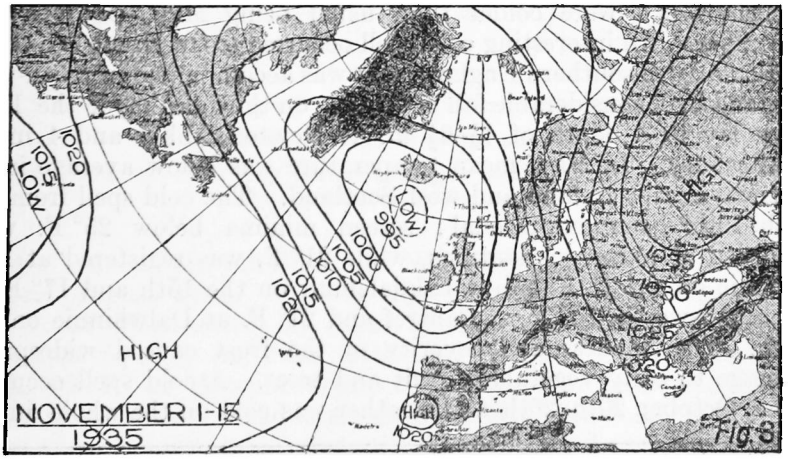
C. E. P. Brooks.

The Weather of 1935

Full information for December is not yet available but there is no doubt that rainfall and temperature for the year 1935 exceeded the







CHARTS SHOWING PRESSURE ISOANOMALIES

average for the country generally. Sunshine was variable but somewhat above average on the whole.

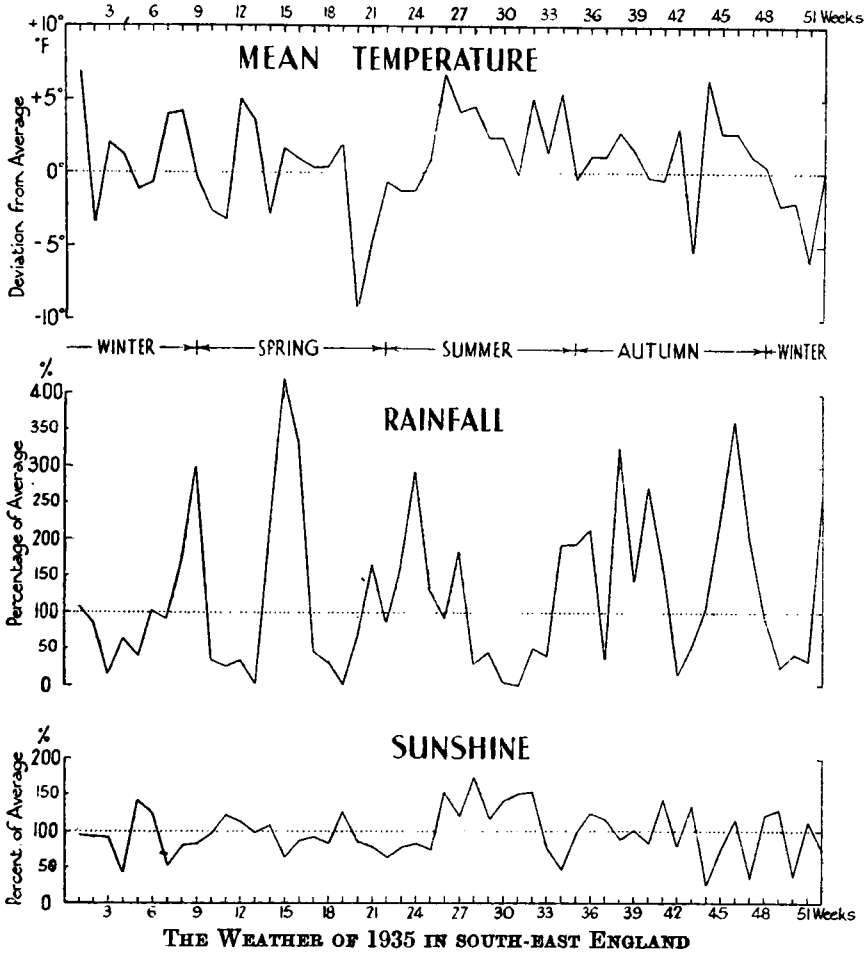
The weather of the year was very variable and many interesting features occurred. The severe frost of mid-May and the long drought of the latter part of July and the first three weeks of August will long be remembered by agriculturists, and the violent gale of September 16th–17th will be remembered alike by those interested in agriculture and shipping. The warm, sunny and mainly very dry period during the summer holidays from about June 20th to August 22nd, perhaps created a too favourable impression of the year. The three autumn months were notable for excessive and frequent rainfall, while the cold, wintry weather of the first 24 days of December somewhat reduced the excess above the average of mean temperature due to the warmth of the first eleven months. The closing week of the year was mild, unsettled and very wet and widespread flooding resulted.

The first six months were alternately markedly dry and excessively wet. The first 18 days of March were abnormally dry in parts of north-west Scotland and the period March 5th–22nd was unusually dry in east and south-east England. The long period without rain experienced locally in England during the latter part of July and the first three weeks in August was exceptional: at Oxford, the absolute drought from July 21st to August 17th (28 days) constituted the longest summer drought at that station since 1887. On the other hand, February, April and June were very wet. Thunderstorms were responsible for many large falls on individual days in June, the most widespread and violent storms occurring on the 25th. The autumn was excessively wet, the percentage of the average rainfall of the British Isles for the three months September to November being 160. A detailed description of the rainfall of the year is given in another article.

Mean temperature for the year exceeded the average, the only months which were colder than usual being May, October and December. An interesting cold spell occurred from March 8th–11th, particularly in southern England. It was accompanied in south-west England by a considerable fall of snow: on the morning of the 11th, snow lay to a depth of $4\frac{1}{2}$–$6\frac{1}{2}$ in. at Newton Abbot and 4 in. at Shaftesbury. In May, mean temperature was below average in all districts except Ireland and west Scotland. The cold spell from the 12th–19th* was exceptional: screen minima below 25° F. were recorded at numerous stations, while 21° F. was registered at Dalwhinnie on the 13th and at Eskdalemuir on the 15th and 17° F. at Rickmansworth, 20° F. at Cantref and 21° F. at Dalwhinnie on the 17th. The lateness and severity of the frost caused widespread damage to early vegetables, fruit and trees. A cold spell occurred from October 20th–26th and weather was cold on the whole during

* See *Meteorological Magazine*, *70*, 1935 pp. 105–9.

the first 24 days of December. The latter period was accompanied at times by severe frost and much fog, and widespread snow occurred between the 14th and 24th. On the other hand, February was unusually mild and the latter part of June, July and August were excessively warm. Notable warm spells included the last ten



THE WEATHER OF 1935 IN SOUTH-EAST ENGLAND

Weekly variations from long period averages computed from observations at five representative stations

days of June, July 9th–16th and 22nd–28th, August 5th–11th and around August 22nd. Among high maxima may be mentioned 88° F. at Manchester on June 22nd, at Brighton and London (Camden Square) on June 24th and at Huddersfield on June 29th, 92° F. at Attenborough, 91° F. at Worcester and 90° F. at Wakefield and Huddersfield on July 13th and 89° F. at numerous stations in the eastern half of England on August 22nd.

In general, the sunniest months were May and July and the dullest

June and October, but considerable variations occurred in different districts in individual months. For example, January was exceptionally sunny in west Scotland and notably dull in north Ireland, while November was the dullest month in north-east England. A remarkable excess of sunshine was registered in west Scotland, north-west England, and north Ireland in May. The totals at Eskdalemuir and Stonyhurst were the largest recorded in any month since observations were first taken in 1909 and 1881 respectively. The excessive sunshine in July was noteworthy and at some stations it was the sunniest July on record.

No description of the year's weather would be complete without some reference to gales. During a severe gale from January 24th–26th a gust of 100 m.p.h. was registered at Butt of Lewis. In February, gales were widespread and frequent but not of exceptional severity. Perhaps the most notable, on account of the season in which it occurred, was the gale of September 16th–17th. In southern England it was very violent and was comparable with the most severe winter gales on record in that part of the country. Another exceptional gale occurred from October 18th–20th. It was especially violent in Scotland and a gust of 101 m.p.h. was recorded at Bell Rock Lighthouse. Detailed descriptions of the gales of September 16th–17th and October 18th–20th are given in the *Meteorological Magazine* for November, 1935.

The diagram on page 281 shows the weekly variations in temperature, rainfall and sunshine in south-east England in 1935. The variations are given in the form of deviation from the average of temperature and percentages of the average of rainfall and sunshine. The district value is the arithmetic mean of the values for the following stations:—Kew Observatory, Margate, St. Leonards, Southampton and Marlborough. The curves clearly show the cold spell in May, the long warm, dry, sunny spell during the summer, the wet autumn and the cold of the greater part of December. The rainfall curve indicates the alternating very dry and very wet periods during the first six months, notably the excessively wet April.

L. F. LEWIS.

The Rainfall of 1935

The general rainfall for 1935 over England, Wales and Scotland exceeded the average, but there was a small deficiency over Ireland. The wettest individual stations, in relation to the average, occurred in the south of England between London, Ventnor and Salisbury, where falls of 135 per cent. were recorded locally. On the other hand, there was as little as 80 per cent. in Co. Carlow. The alternation of dry and wet months, which commenced in November, 1934, continued until August, 1935, both July and August giving less than the average. Subsequently in each of the autumn months, September,

October and November, the rainfall was appreciably in excess of the average. December gave less than the average in both Scotland and Ireland, although exactly the average amount over England and Wales.

Provisional estimates of the general rainfall for 1935 are given below, both in actual inches and as percentages of the average, together with similar values for 1934, 1933 and 1930.

	1935.		1934.		1933.		1930.	
	in.	%	in.	%	in.	%	in.	%
England and Wales ...	40·1	114	33·5	95	28·6	81	41·4	117
Scotland	54·8	109	55·4	110	40·3	80	54·6	109
Ireland	42·6	98	45·5	105	33·5	77	50·4	116
British Isles	45·5	110	41·4	100	33·3	80	47·7	115

Over England and Wales and the British Isles as a whole, 1935 ranks as the wettest year since 1930, while over both Scotland and Ireland 1934 was wetter than 1935.

General values for each month are set out in the table below, both as percentages of the average and in actual inches of rainfall.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	%	%	%	%	%	%	%	%	%	%	%	%
England and Wales ...	65	158	38	186	60	149	30	80	210	129	179	100
Scotland	81	126	71	144	48	146	75	87	172	183	114	72
Ireland	45	125	53	116	46	196	36	75	196	119	132	72
British Isles	65	144	49	162	55	158	41	81	198	139	154	88
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
England and Wales ...	1·9	4·1	1·0	3·9	1·4	3·6	0·9	2·7	5·3	5·1	6·3	3·9
Scotland	4·0	5·2	2·9	4·3	1·5	4·1	2·8	3·9	6·9	9·0	6·0	4·2
Ireland	1·8	4·4	1·8	3·2	1·3	5·5	1·2	3·2	6·1	4·8	5·7	3·6
British Isles	2·5	4·6	1·6	4·1	1·4	4·2	1·3	3·1	6·1	5·9	6·5	4·2

The total rainfall for the year was less than the average over small areas in England, including the north-east of Northumberland, as well as near Penrith, Lancaster, Bideford, the Wash and the Thames Estuary. Falls exceeding 110 per cent. were widespread. More than 120 per cent. occurred over small areas near Barnard Castle, York, Huddersfield and Ipswich as well as over much of the south of England from Bristol to Folkestone. Falls exceeding 130 per cent. were confined to areas around Salisbury Plain, from Dorking to Tunbridge Wells, and at Ventnor and Littlehampton.

Over Wales the variation was from rather less than the average in the extreme south-west to 123 per cent. at Lake Vyrnwy in Montgomeryshire. Falls of more than 110 per cent. were widespread over central Wales.

Less than the average occurred over large areas in Scotland, including the Outer Hebrides and the south-east from Crieff to Berwick-on-Tweed. Falls exceeding 110 per cent. were not so widespread as over England and Wales. More than 120 per cent. occurred in Argyll and Sutherland and near Glasgow and Inverness. At Inveraray, in Argyll, as much as 131 per cent. was recorded.

Over most of Ireland the totals approximated closely to the average. There was less than the average over the south-east from Co. Kerry to Wicklow, with rather less than 80 per cent. near Carlow. Less than the average also occurred over a large area from Co. Longford to the north-east coast, while as much as 110 per cent. was recorded in Connemara and Londonderry.

Over the British Isles generally, the driest months were July, May and March, and the wettest November, September and October. The last four months of the year contributed half the total rainfall. February was the fourth wettest month of the year. At Borrowdale, in Cumberland, the total for the 15 days, February 10th to 24th, was 17·01 in. or twice the average for the whole month. This total included falls of 6·25 in. and 6·41 in. for the 15th–16th and 18th–20th respectively. Over the country as a whole June was as wet as December, an unusual state of affairs. At Cashel, in Co. Tipperary, the total for June was three times the average. Some rain occurred on every day from the 1st to 21st, the total for the three days, the 24th to 26th, being 2·23 in. or the average for the whole month. A remarkable change was experienced in August at Ventnor, for while the total for the 62 days, June 21st to August 21st, was only 0·54 in., that for the 8 days, August 23rd to 30th, was 3·35 in. Dry weather was general during the 62 days, June 21st to August 21st. Thus, at Hull, the total was only 0·47 in. A number of stations in England and Wales recorded the wettest September since that of 1918. At Inveraray, in Argyllshire, as much as one inch was recorded on as many as 12 days during October and the total was the largest recorded there in any month in records back to 1881. Up to the end of August the rainfall over the country was in general less than the average. Thus while 1935 gave early promise of rivalling 1933 and 1934 for low totals, the persistent rains of the last four months resulted in the year ending with widespread floods, especially in the Midlands and south of England.

J. GLASSPOOLE.

Discussions at the Meteorological Office

The subjects for discussion for the next two meetings are :—

January 27th, 1936. *Practical experiences and some results gained from soundings with registering balloons and registering apparatus in the stratosphere.* (Beitr. Phys. frei. Atmos., Leipzig, Vol. 22, 1935. pp. 249–60). *Opener.*—Mr. F. J. W. Whipple, Sc.D.

February 10th, 1936. *Practical rules for prognosticating the movement and the development of pressure centres.* By S. Pettersen (U.G.G.I., Ass. Met., Proc.-Verb., Lisbon, 1933 II, 1935, pp. 35–66). *Opener.*—Mr. W. D. Flower, B.Sc.

Royal Meteorological Society

The monthly meeting of this Society was held on Wednesday, November 18th, in the Society's rooms at 49, Cromwell Road, South Kensington, Lt.-Col. E. Gold, D.S.O., F.R.S., President, in the Chair.

Mr. A. Hampton Brown has retired from the position of Assistant Secretary to the Society after serving on the office staff for forty years. Miss E. N. Kidner, B.A., succeeds him.

The following papers were read and discussed :—

A. King.—The great fireball of 1934, *October* 11*th, and an instance of streak-drift.*

The fireball, probably brighter than the full moon, first appeared over east Yorkshire at a height of 94 miles and ended, after a flight of 58 miles, over north Lincolnshire at a height of 51 miles. The speed was 21 miles per sec. and the radiant at ∞, 252·3°, 8, + 75·8°. The parabolic orbit deduced from the corrected radiant gave rise to the suspicion that the object may have been connected with Comet Giacobini-Zinner. A streak was left along the track between the heights of 77 miles and 56 miles. The upper portion quickly vanished, and the part from 69 miles high to the end (56 miles high) drifted in a generally north-east direction with rates as under for the respective heights :—

Height. miles.	Speed of drift. m.p.h.
69	130
60⅓	162
56	150

R. M. Poulter.—Configuration, air mass and rainfall.

Starting with the proportions of the year's rainfall attributable to warm fronts, occlusions and cold fronts, a relation is obtained between average annual rainfall and the altitude and slope of the land in the British Isles.

Gordon Manley, M.A., B.Sc.—The climate of the northern Pennines ; the coldest part of England.

The northern Pennine moorlands comprise the most consistently elevated and chilly part of England. Very few observations are available, however, as regard temperature, although an interesting record, showing great extremes, was maintained near Alston from 1880–6. Rainfall is better known ; other climatic features of especial note include occasional peculiarly violent thunderstorms and the well-known " helm-wind ". The writer has established a station at which temperatures have been taken in a standard screen since early in 1932 ; this is at a keeper's cottage on the exposed moorland of Upper Teesdale just to the south-east of Crossfell. The altitude (1,840 ft.) makes the station the highest at which a continuous record has been kept in England. In general, although mean temperatures differ by about 5·5°F., no more than might be expected,

from a group of northern lowland stations, the maxima are decidedly lower (7·0°) while the minima are not so much lower (3·3°); and the mean daily range of temperature on the uplands is less than that in the valleys. This is to be expected; but exceptional extremes occur on particular occasions which appear to be due to the position of the moorland basin in which the station lies. As a whole the figures confirm the prevailing impression of bleakness associated with a windy and damp upland and correspond well with records at sea-level in southern Iceland.

A. H. R. Goldie, M.A., F.R.S.E.—Some characteristics of the mean annual circulation over the British Isles.

The westerly component of the mean annual drift of air over the northern part of the British Isles has, during the last 30 years, attained maxima at intervals mostly of four years. Using this element as an index for classifying the years, the writer sets out the special features which in various corresponding years, have affected weather, temperature, rainfall, sunshine and gales in the British Isles.

It is shown that years in which the westerly component of air drift reached a maximum have been characterized on the average by warmer and drier conditions and their summers individually by sunnier conditions than other years of the series; years preceding a maximum (so far as the available statistics enable the point to be explored) appear mostly to have been characterized by a high duration of winds of gale force and by maximum "latitude-exchange" of air.

Attention is called to the fact that Lockyer, over 30 years ago, noted the existence of a 3·8 year period in atmospheric pressure in India, Australasia and South America, and that more recently Elton, from biological researches, and Kershaw, from consideration of sunshine data, have remarked on the probability of a climatic factor with a period of about four years.

S. Chapman, M.A., D.Sc., F.R.S.—The lunar atmospheric tide in the Azores, 1894–1932.

This paper is a continuation of the series on lunar atmospheric tides.

Correspondence

To the Editor, *Meteorological Magazine*

Winter Smoke Deposit Measurement

Yesterday, December 16th, snowfall in Leeds froze hard at night, the sky being very clear and radiation, therefore, high. About 10 a.m. December 17th all throughout Roundhay, undisturbed snow was patterned with a liberal deposit of smuts more or less evenly distributed. These were very evidently all from morning-fire smoke emission in the district. As the smuts had held to the snow where they had fallen, and their disintegrated products were very plainly

visible against the white background; the occurrence was equivalent to the arrest of a normal daily process in that weather, and provided a static cross-section, as it were, for observation of such daily process.

The neighbourhood where these countless smuts were observed is one of the highest, and probably the cleanest, in Leeds, and open to moorland breezes from NW., and fresh, relatively clean winds from many points of the compass.

An average count of the smut deposit in the snow gave rather more than one smut per square inch, and a similar distribution was quite general so far as the snow persisted towards the city. The disappearance of snow in the lower districts prevented computation there, which would probably have proved heavier.

Smuts about 0·5 cm. diameter or major axis, were studied as they lay in the snow. After falling, they at first lay lightly adherent on the snow surface. Owing to their insulation protection under the warmer morning atmospheric condition, the snow underneath them gradually melted, and the smut fell into the small hole formed. In doing so, it broke up into smaller portions under its own movement, and around the lip of each hole as a centre, was a small galaxy of disintegrated smut. That this was the general procedure was shown by the fact that these small distinct collections of smut-components marked the position of every smut-fall in the snow except the most recent.

The most important aspects of this observation are :—(i) it shows very plainly one way in which smoke after aggregating to form smut agglomerates, then disintegrates and breaks down to form dust, and (ii) since the air was still, and conditions typical for cold weather in the neighbourhood, and smuts were held *in situ* by snow as they fell, it is now easy to calculate the typical winter smoke deposit per morning per unit area in this district, by finding average smut weight. And, of course this will approximate the heaviest deposit for the whole year.

The observation is put on record in the hope that this simple, naturally-provided, counting method may be used in numerous other districts to estimate the winter smut-fall, as soon as further snow showers provide the opportunity. A large body of useful data towards the prevention of atmospheric pollution might thus be gathered and made available. As, normally, the smut deposit per unit area would be elusive and difficult to determine, such a natural opportunity ought not to be ignored or lost, in view of the increasing need for data to overcome atmospheric pollution.

On December 18th, the ground being colder with continued frost, the new daily smut deposit, still evident and countable in every direction against the white background, had not been broken up by the snow's melting.

S. C. Blacktin.

20, *Denton Avenue, Roundhay, Leeds*, 8, *December* 17*th*, 1935.

Christmas Frost in Co. Tipperary

It is very unusual in southern Ireland to have what may be called an "old-fashioned" Christmas, but, although this year there was some thaw on Christmas Day itself, the few days previous provided the hardest weather known in Co. Tipperary for 20 years, being chiefly notable for severe frost and thick fog. Several accidents were reported on the roads.

At Cashel some frost was recorded in November, including 8° on the 24th, but the actual wintry spell was confined to December, and there was nothing extraordinary until the 17th, which began a real arctic week. The minimum screen temperature for each day was as follows:—17th, 24°; 18th, 32°; 19th, 22°; 20th, 22°; 21st, 17°; 22nd, 18°; 23rd, 29°; while the maximum never exceeded 40° in the week. The fog was thickest from the 19th to 23rd, and, added to the frost, made roads almost impassable. At times it was not possible to see more than 50 yards, although there were some bright intervals. Ponds were covered with about 6 in. of ice, which did not clear off for some days after the commencement of the thaw on the 23rd. Snow in the district, however, was confined to mountains and hills, which were generally covered by dense masses of cumulus cloud.

To compare this spell with others, temperature at Ballinamona was never lower than 20° since 1918, when the screen was fixed in its present position. In other parts of Ireland, during the recent frost, temperature in Cork fell to 18° in the screen, and 15° on the ground, while in Co. Longford many roads were completely blocked by snow.

On the whole, it seems probable that this week was the most severe recorded in Ireland for about 50 years, though isolated frosts may have been worse on other occasions.

E. W. Montagu Murphy.

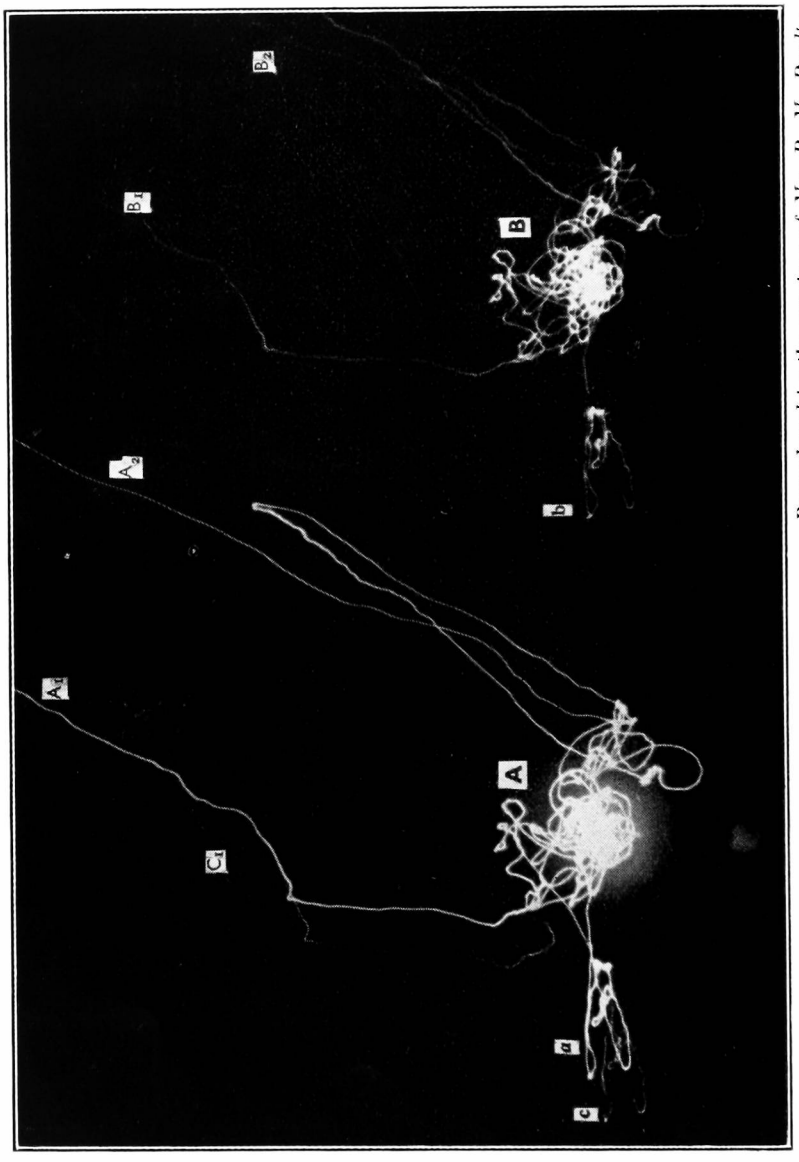
Ballinàmona, Cashel, Co. Tipperary, December 31st, 1935.

Cloudburst at Syra

Syra suffered, at about noon on December 25th, from a cloudburst accompanied by lightning which did considerable damage to wells, crops and agricultural land generally, by washing away supporting walls of terraces, etc. Many sheep were drowned and lightning struck and killed some more. The storm approached very slowly from west by south and fell almost solidly on the west coast between Phoenika (Krasi Bay) and Kini, doing the greatest amount of damage on the flats of Galissá. By the time it reached Hermoupolis (the town of Syra) its force was spent and was no more than heavy rain.

In appearance it resembled a line squall, the cloud having a straight sharply defined front, but there was a complete absence of wind. The barometer remained steady. Temperature in the low 60°'s. The cloud (nimbus) was at about 1,000 feet. The day had been fine with detached clouds and light airs. Afterwards it rained, on and off

facing p. 289]



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SPURIOUS LIGHTNING PHOTOGRAPH

until 22h. when the sky cleared and a northerly breeze sprang up. Within living memory a rain storm of such violence has not been observed here.

J. M. CHAPLIN.

British Vice-Consulate, Syra, December 27th, 1935.

NOTES AND QUERIES

Lightning Photographs

From time to time not only in the British Isles but in other parts of the world photographs are produced purporting to be records of remarkable lightning discharges: sometimes attempts are made to base electrical theories on the records obtained. So great a proportion of these photographs are unwittingly spurious, deceiving sometimes their authors, that the accompanying illustration has been expressly prepared to serve as a cautionary sign to guide future investigators away from the trap.

Photographers will know and others may be interested to know that to obtain a photograph of lightning during a storm a camera loaded with film or plates is pointed in the direction of the lightning flashes with the shutter opened and ready to receive an impression of the next flash. By some mistake or misjudgment the flash may be missed, but on development the negative sometimes shows a record more wonderful than even the photographer hoped for: such a result is shewn in the illustration.

When this photograph was taken there was no thunderstorm, the sky being overcast with nimbostratus cloud. The camera was held in the hand with the shutter open as might be the case when waiting for a lightning flash, but all that were visible were a street-lamp, a light in a house, and a reflection of the street-lamp in a window. These recorded faithfully the unsteady movement of the photographer's hand, not once but in triplicate. A is the wandering image of the street-lamp, C the path of its reflection and B the light in the house.

As the camera was brought into position with the shutter open the images entered the field at A_1, B_1, and C_1 and then traced the three similar patterns, parts of which are shewn well at a, b and c. It is this faithful repetition that reveals the spurious nature of the photograph. The image of the reflection (C_1) was not as complete as the other two records because the movement of the camera brought the lens out of range of the reflecting window. The images of the lamps left the field at A_2 and B_2.

R. M. POULTER.

Retirement of Mr. Zambra

The retirement of Mr. Mark Zambra from active participation in the affairs of the well known firm of Messrs. Negretti & Zambra on October 1st last will be a matter of interest to a wide circle of

meteorologists. The firm deals with an extensive range of scientific and industrial instruments, but Mr. Zambra had always identified himself closely with the meteorological side of their work and in the course of his 38 years' association with the firm had become known to many meteorological observers throughout the country in addition to official meteorologists. The association of the latter with Mr. Zambra has always been of the happiest and they will join with all who knew him in wishing him many years of happiness in the country home in Kent to which he has retired.

REVIEWS

Tätigkeit des Schweizerischen Forschungsinstitutes für Hochgebirgsklima und Tuberkulose in Davos vom 1 April, 1931 bis 31 März, 1933, Davos, 1934.

Zur Klimatologie der Abkühlungsgrösse (mit neuen Beobachtungsergebnissen aus der Schweiz). By W. Mörikofer. Reprinted from Acta Davosiana, Davos, 1, 1933, No. 3.

Ueber das Klima im Zimmer und seine Beziehungen zum Aussenklima, mit besonderer Berücksichtigung von Feuchtigkeit, Staub- und Ionengehalt der Luft. By K. Egloff. Dissertation, Eidgen. Techn. Hochschule, Zürich, No. 766, 1933.

To many the beauty of the Alps is associated directly or indirectly with health, and though medical climatology and meteoropathology are fast becoming fashionable studies in many countries, research in such subjects seems peculiarly appropriate to Switzerland and has long been pursued in places such as Davos. The report of the research institute there for the years 1931 to 1933 includes lists of numerous papers published during the period.

Dr. Mörikofer's "Zur Klimatologie der Abkühlungsgrösse" contains some interesting comparisons between the average cooling power of the atmosphere in various places. The annual values at most of the Swiss stations considered are shown to vary but little even though temperature conditions are far from similar. Appreciable differences exist, however, in the seasonal variations. Thus during the day-time in summer at Basel it is little more than half that at Davos, though the corresponding values for the year as a whole differ by no more than a sixteenth. Some of the tables include figures for a few places in other countries north of Switzerland. These indicate much greater cooling powers more especially in winter when, for instance, it is about twice as great at Helsingfors as in the Swiss mountain stations and still higher at Dresden. A frequency table further illustrates the fact that thermally agreeable weather is more abundant in sheltered high alpine localities than in the lowlands or German mountain stations of medium altitude.

Publications dealing with indoor climate are comparatively rare though as Dr. Egloff points out in the introduction to his thesis "Ueber das Klima im Zimmer und seine Beziehungen zum Aussen-

klima", most people spend the greater part of their lives indoors. This may be one of the doubtful blessings of civilization and there would appear to be much wisdom in the author's assumption that indoor conditions should approximate to those outside, care being taken to exclude only the inimical extremes of weather while all beneficial factors should be retained as far as possible.

The investigations were carried out in a sanatorium in Davos, two rooms being specially set aside for the work, but additional observations mainly of dust and condensation nuclei were made in several other buildings in Davos and in some other parts of Switzerland. The observations in the special rooms included temperature, humidity, cooling power, illumination, dust content, condensation nuclei and ion content. In all, some 30,000 observations were made during the year 1932–3, and the opportunity was also taken to test certain air conditioning apparatus.

A few only of the many interesting results can be mentioned here. The annual range of absolute humidity indoors is parallel to that in the open but the values are somewhat higher. In heated rooms the vapour pressure increases linearly with increasing temperature. It is suggested that this may be due to water vapour drawn from the walls but cannot be occasioned by the external air. Relative humidity varies but little in the open throughout the year but owing to the heating it decreases greatly indoors during the winter.

The number of dust and soot particles in the open air at Davos was found by an Owen's dust counter to be 117 per cm^3 on an average for the year, the number of soot particles in winter being many times as great as that of the dust particles in summer. Figures for fourteen other localities are given by way of comparison ranging from less than one, based upon a small number of observations, at Weissfluhgipfel (3,000m.) to over 10,000 per cm^3 in Paris and 20,000 per cm^3 in London (Westminster). This table (p. 37) is somewhat misleading as while care is taken to refer to the paucity of observations in some Swiss localities no reference is made to fog in connexion with the entry of 20,000 for London. Although this figure may be doubled in some of our densest fogs it is obviously not to be regarded as representative of the average state.

The increase, due to smoke in winter mornings, was observed in closed rooms as well as out of doors, as will be seen from the following table of mean values for December and January.

	8h.	10h.	12h.	18h.
		Particles per cm^3		
I. In the open ...	284	418	226	107
II. In unaired room ...	351	397	249	203
III. In aired room ...	351	400	182	126

It is stated that in case II the room was not aired all day long, whereas in case III it was aired between 8h. and 10h. and again between 12h. and 14h. for periods varying between 30 and 60 minutes. Both rooms were apparently closed throughout the evening and night. It would be interesting to know how much lower the

morning figures would have been had III been aired well before the 8h. observations were made. Apart from the results obtained in the experimental (unoccupied) rooms, counts were also made in various other buildings, care being taken to make synchronous observations in the open so that the indoor values could thus be fairly expressed as percentages of the latter. At first sight it is surprising to find both a schoolroom and a cinema among the few places with less than 100 per cent. The explanation, however, appears to be that a considerable proportion of the dust particles inhaled by the occupants is retained in their lungs and respiratory passages. This fact has of course long been known but may be better realised from such comparisons.

The results of the condensation nuclei measurements in the open air at Davos proved to be extraordinarily high, even slightly higher in winter than in the comparatively low lying town of Zürich. They obviously cannot, therefore, be regarded as indicative of the degree of purity of the air, but it is suggested that owing to the absence of wind and the dryness of the air at Davos they are not readily dissipated nor able to form droplets. In a closed room the number was appreciably smaller than outside even immediately after airing. The explanation offered is not that the nuclei fail to enter the room but that they are quickly deposited. The number was proved to decrease if the humidity was raised artificially.

Ion content measurements in the open could not conveniently be made simultaneously with those indoors but some made in the previous year were available for comparison and in general it was concluded that much similarity exists both in the annual and the diurnal range of the number of light ions. There appeared, however, to be a slight lag and decidedly less amplitude in the diurnal range indoors. The annual range of heavy ions indoors was much less than in the open but showed a clear maximum in winter. The proportion of heavy to light (N/n) varied between 16·3 in January and 2·5 in July. The opposite numerical trends of light and heavy ions indoors were particularly marked in the diurnal range curves while the total sum was found to vary considerably. On some occasions intermediate ions were considered separately and were found to have a similar daily range to the heavy ions, of which they amounted on an average to 69 per cent. It is suggested that such high proportions may be characteristic of mountain air. The influence of weather upon the number and kind of ions is dealt with briefly and as regards Föhn conditions it is stated that the proportion of positive to negative light ions was only found to be less than unity in 25 per cent. of the cases investigated, in fact almost as seldom as in the absence of Föhn. In general no relationship was established between the electrical state of the atmosphere and the condition of healthy and sick persons. This negative result is of interest in view of suggestions made by some other writers.

As regards the air conditioning tests, the " Lucagra " apparatus

was found capable of raising relative humidity in room by 15 per cent.—on one occasion by as much as 25 per cent. Increase in humidity is only advocated as a means of lessening the amount, or still better, the development of dust in the air. Immediately above the apparatus a decrease of 50 per cent. was observed but this was by no means representative of the room as a whole.

L. D. SAWYER.

BOOK RECEIVED

Humidity records obtained at Agra with hair elements and with wet and dry elements in a Dines' Meteorograph. By S. P. Venkiteshwaran, India Meteor. Dept., Sci. Notes **5**, No. 57.

OBITUARY

Sir Richard Glazebrook, K.C.B., K.C.V.O., F.R.S.—We regret to learn of the death on December 15th at the age of 81 of Sir Richard Glazebrook. He was born at Liverpool on September 18th, 1854, and educated at Dulwich College and Liverpool College, whence he obtained a scholarship to Trinity College, Cambridge, in 1872. He was elected a Fellow in 1877. In 1880 he was appointed a demonstrator at the Cavendish Laboratory, where he was associated with W. N. Shaw (now Sir Napier Shaw) in organising the teaching of practical physics. One outcome of this association was the well known " Textbook of Practical Physics " by Glazebrook and Shaw. In 1882 he was elected a Fellow of the Royal Society, of which he sat on the Council for many years, acting as Vice-President in 1919–20 and as Vice-President and Foreign Secretary from 1924–8. He was also President of the Institution of Electrical Engineers, the Physical Society (twice) and of the Optical Society and was a member of the Gassiot Committee appointed by the Royal Society, from its formation in March 1910 until 1921.

In 1898 he became Principal of University College, Liverpool, but in the following year he was selected as the first Director of the National Physical Laboratory, which was to be established at Bushy House, Teddington, and which he had himself to organise and create. When formally opened in 1902 the National Physical Laboratory consisted of only two departments, physics and engineering; its usefulness has been proved by the vast expansion which it has undergone since its inception. In addition to this great task of organisation and administration, Glazebrook devoted much time to the work of the Electrical Standards Committee of the British Association, of which he was Secretary. He was also Chairman of the Advisory Committee for Aeronautics from 1909, the year of its formation, until 1920, and of its successor, the Aeronautical Research Committee, from 1920 to 1933. His interest in the many problems of aeronautics was very great, and after his retirement from the National Physical Laboratory in 1919 he was until 1923 Zaharoff Professor of Aviation and Director

of the Aeronautics Department of the Imperial College of Science and Technology. He thus inspired and guided aeronautical research in this country from the beginning of flying right through the rapid advance during the war years and almost up to the present day.

Glazebrook wrote a number of text-books on various branches of physics, but to meteorologists he is best known as the editor of the "Dictionary of Applied Physics", one of the most useful reference books for a meteorological library. He was the recipient of many honours from the Royal Society and other learned bodies; he was made a C.B. in 1910, Knighted in 1917, K.C.B. in 1920 and K.C.V.O. in 1934.

NEWS IN BRIEF

Professor Dr. E. G. Mariolopoulos has been appointed Director of the Observatoire National d'Athènes in place of the late Professor Dr. D. Eginitus.*

A discussion on "Ice Ages" will be held at the Royal Astronomical Society, Burlington House, on January 31st at 4.30 p.m. The discussion will be opened by Sir George Simpson, C.B., F.R.S.

The Weather of December, 1935

Pressure was below normal over Europe (except northern Scandinavia and Russia), over the North Atlantic to the eastern coasts of North America, and over western coasts of the United States and Alaska, the greatest deficits being 10·1 mb. at Kew and Bayonne and 5·1 mb. at Kodiak, Alaska. Pressure was above normal over western Asia, Russia, north Scandinavia, Spitsbergen, Iceland, Greenland and the central parts of North America, the greatest excesses being 15·7 mb. at Ekaterinburg and 4·8 mb. near Winnipeg. In Sweden temperature was generally above normal and rainfall twice to three times the normal in the north but about normal in the south.

The main characteristic of the weather of December over the British Isles was the cold spell from the 14th to 24th. Rainfall was mainly deficient and sunshine above normal in the north and west, while the reverse was general in the south-east. At Stornoway the total sunshine, 54 hours, was the greatest for December since records began there in 1881. There was much mist and fog generally. From the 1st to 8th, low pressure systems crossing the country gave unsettled weather, stormy at first, gales being reported from the western coasts on the 1st and 2nd. Rainfall was slight to moderate, being heaviest on the 1st and 4th, 1·31 in. at Patching, Sussex on the 4th, but there were many fair intervals, especially on the 2nd, when 6·9 hours bright sunshine were recorded at Lowestoft. Thunderstorms occurred locally on the 1st and 2nd, while snow was reported from Scotland and north England from the 1st–4th. Much mist and fog developed from the 4th–7th, and on the 7th in parts of the eastern districts,

* *See Meteorological Magazine* 69, 1934, p. 102.

where the fog persisted all day, temperature rose only slightly above the freezing point, a maximum of 29° F. was recorded then at Gorleston. From the 9th–13th the country came under the influence of an anticyclone which developed over Scandinavia. Some drizzle, slight snow and mist were experienced at times, chiefly in the eastern districts, but conditions were mainly dry and dull with little diurnal temperature variation, though sunny periods occurred on the 9th and in the north and west on the 10th and 11th. From the 14th–18th low pressure systems crossed the country. Snow occurred in Scotland, north Ireland and England as far south as Oxford. Temperature was generally low and in many parts the roads became ice bound on the 16th. During the 19th–24th the country lay between two depressions centred to north-east and south-west respectively. Temperature became still lower during this period and severe frost was widespread ; among the most notable low temperatures recorded were, on the ground, 2° F. at Dalwhinnie on the 23rd and 9° F. at Ross-on-Wye on the 21st, Oxford on the 24th, and Abbotsinch and Eskdalemuir on the 23rd and 24th ; and in the screen, 6° F. at Dalwhinnie on the 23rd and 11° F. at Peebles on the 20th. Fog was experienced generally during this time in England and south Scotland, being particularly severe on the 23rd. Maximum temperatures were exceptionally low in districts where the fog continued all day ; a maximum of 18° F. was recorded at Abbotsinch on the 23rd and of 25° F. at Stonyhurst on the 20th and at Cambridge, Ross-on-Wye, Upper Heyford and Eskdalemuir on the 23rd. There were, however, a few sunny intervals chiefly in the west and north, Penzance had 7·3 hours bright sunshine on the 21st. Snow occurred at a few places on several days and as far south as Bath on the morning of the 24th. On the 24th an intense depression moved slowly from the Atlantic and remained centred to the north-west until the 29th. Another depression was centred off the south-west coasts on the 30th and 31st. Mild conditions spread eastwards on the evening of the 24th and temperature continued above normal until the end of the month. Rain occurred on most days, being heaviest in the west and south, 1·50 in. at Winchcombe (Gloucester) on the 27th and Peaslake (Surrey) on the 30th, and floods were experienced in many parts of the south and Midlands, but there were some bright periods chiefly on the 29th. Gales and strong winds were frequent in the south-west but elsewhere there was much mist or fog. The year ended with conditions unsettled, misty, and mild. The distribution of bright sunshine for the month was as follows :—

	Total (hrs.)	Diff. from normal (hrs.)		Total (hrs.)	Diff. from normal (hrs.)
Stornoway ...	54	+32	Chester ...	38	− 6
Aberdeen ...	46	+ 9	Ross-on-Wye ...	63	+15
Dublin	68	+22	Falmouth ...	68	+12
Birr Castle ...	44	+ 1	Gorleston ...	35	− 8
Valentia... ...	49	+11	Kew	34	− 3

Miscellaneous notes on weather abroad culled from various sources

Storms prevailed at Syra on the 3rd. Gales accompanied by heavy rain swept over most of France on the 1st and serious floods occurred in central France, Brittany, Gironde and Vendée. Further storms were experienced between then and the 5th causing the Rhône and Saône to flood again. Abundant snow fell in Switzerland and northern Italy about the 4th and 5th; the snow was 10 ft. deep in the Great St. Bernard. A northerly gale was reported from Constantza (Roumania) on the 11th. A sudden drop of temperature followed by a snowstorm occurred on the Riviera on the 13th. Severe cold was experienced from Paris to the southern French coasts on the 14th with snow generally, but on the 15th the weather became mild with mist and rain. Severe cold was again experienced in France about the 21st and 22nd, especially in the east and centre, and flooding occurred in the valleys of the Tarn, Lot, Aveyron and Garonne. Snow fell abundantly in Switzerland on the 21st and 23rd, but on the 25th the mild Föhn wind blew up to the 5,000 ft. level; rain fell heavily on the 26th and many avalanches occurred on the 27th. The thaw about the 26th following a long period of frost and snow caused floods, landslips and avalanches in north Italy. Navigation closed at Yzpila and Jacobstadt (Finland) on the 23rd. Severe storms swept over Spain during the Christmas holidays, eight people were drowned by floods in the province of Avila, and parts of Madrid were flooded. On the 29th and 31st heavy rain and floods also occurred in the valley of the Douro. Heavy rain accompanied by strong winds were experienced in France on the 28th and 29th causing still further floods in the valleys of the Rhône, Saône, Ardèche, Loire and Garonne. Forty people were reported to have lost their lives in Skutari (Albania) as the result of floods; floods also occurred at Elbassan and Berat. By the 31st snow was falling generally again in Switzerland. (*The Times*, December 3rd–January 1st.)

Heavy rain occurred in the neighbourhood of Baghdad at the end of the month. (*The Times*, January 1st.)

In many parts of the Transvaal rain fell about the 5th bringing relief from the prolonged drought there. The rains were preceded by violent duststorms which did much damage; there was also much damage by lightning. Drizzle on the 26th damped down the flames of the great fire on Table Mountain, and the change of wind helped extinguish it. (*The Times*, December 3rd–28th.)

The total rainfall for December over Australia was generally below normal, considerably so in parts of Queensland, but in New South Wales and Tasmania it was above normal locally. SE. to E. gales were experienced between Victoria and New Zealand between about the 26th and 30th. (Cable and *The Times*, December 18th–31st.)

A hurricane passed through the New Hebrides from the 11th to 14th and across Vanikoro Island on the 16th–17th doing much damage (telegram).

Fog was prevalent at Vancouver early in the month. Landslips occurred on Bay of Islands, Newfoundland, on the 6th following on heavy rain. Severe cold was experienced in central Canada about the 22nd. Seven people were drowned at Houston (Texas) in floods caused by heavy rains on the 10th. The distribution of temperature and precipitation over the United States during the month was variable, but towards the close there was a spell of severe cold accompanied by blizzards in the central and eastern States. (*The Times*, December 6th–27th, and *Washington, D.C., U.S. Dept. Agric., Weekly Weather and Crop Bulletin.*)

Daily Readings at Kew Observatory, December, 1935

Date	Pressure, M.S.L. 13h.	Wind, Dir., Force 13h.	Temp. Min.	Temp. Max.	Rel. Hum. 13h.	Rain.	Sun.	Remarks. (see vol. 69, 1934, p. 1).
	mb.		°F.	°F.	%	in.	hrs.	
1	980·5	W.4	45	46	61	0·02	1·4	r_0 4h–8h., 18h.
2	986·4	WNW.4	38	46	61	—	5·8	
3	989·8	W.2	35	42	73	—	—	x early.
4	997·9	WNW.4	35	44	65	0·05	1·9	r_0–r 7h., 9h–11h.
5	1006·4	N.2	32	41	66	0·02	4·6	r_0–r 2h–4h. fx18h.
6	1005·4	Calm.	32	42	90	0·01	—	r_0 5h.–11h.
7	1013·5	W.1	32	37	98	0·13	—	f till 18h. r 22h.–24h.
8	1010·5	WSW.2	35	47	83	0·10	2·1	r 17h.–18h., 24h.
9	1019·2	N.4	40	44	81	0·02	1·1	r_0 0h.–8h., 13h.
10	1029·9	NE.6	41	43	59	trace	—	d_0 18h.–22h., r_0 23h.
11	1028·1	NE.5	40	43	82	0·01	—	ir_0 1h.–9h. 13h., 15h.,
12	1027·7	NE.3	40	41	78	—	—	[d_0 21h.
13	1025·3	N.3	35	39	69	—	—	
14	1017·8	S.1	36	38	63	—	—	
15	1002·3	WSW.2	32	45	91	0·11	1·8	r_0s_0 0h.–3h. r 3h.–8h.
16	999·4	W.5	34	46	64	0·04	2·7	pr 2h., 11h. r 15h.
17	1001·7	N.2	30	37	85	trace	0·2	fx till 11h.
18	1013·7	SW.2	33	36	85	—	0·1	f 21h. [r_0s_0 18h.
19	1007·0	N.1	31	37	89	0·03	—	r_0 1h. r_0f 9h.–13h.,
20	1008·4	WSW.1	31	36	100	—	0·2	f 9h.–21h.
21	1008·8	WSW.1	27	36	91	—	2·4	x all day, f 11h.–13h.
22	1008·1	SW.2	26	37	69	0·01	4·1	x all day.
23	1007·1	NNW.1	25	29	99	0·01	—	Fx all day.
24	989·7	E.3	27	43	96	0·17	—	rs 6h.–8h., r 8h.–10h.
25	985·2	SSW.3	42	49	88	0·16	0·6	r–r_0 1h.–6h., 16h.–17h.
26	976·2	SW.4	46	51	92	0·06	0·3	r_0 0h.–9h.
27	979·7	S.2	48	52	92	0·29	0·9	r–r_0 3h.–9h., 13h.–14h.
28	986·8	SW.3	47	51	94	0·31	—	r–r_0 1h.–6h., 10h.–12h.
29	1002·1	SW.4	41	47	82	0·08	2·3	r_0 18h.–24h.
30	989·9	S.4	45	51	87	0·22	1·3	pr$_0$ 9h.–13h., r_0–r 15h.–
31	991·2	SSW.4	47	50	93	0·28	—	r–r_0 7h.–16h. [24h.
*	1003·1	—	36	43	81	2·15	1·1	* Means or totals.

General Rainfall, 1935.

	Dec.	Yr.	
England and Wales	100	114	per cent. of the average 1881–1915.
Scotland	72	109	
Ireland	72	98	
British Isles ...	88	110	

Rainfall : December, 1935 : England and Wales

Co.	Station.	In.	Per cent of Av.	Co.	Station.	In.	Per cent of Av.
Lond .	Camden Square.....	2·63	110	*Leics* .	Thornton Reservoir ...	4·28	160
Sur .	Reigate, Wray Pk. Rd..	4·26	134	„ .	Belvoir Castle.....	2·82	115
Kent .	Tenterden, Ashenden...	3·98	128	*Rut* .	Ridlington	3·06	124
„ .	Folkestone, Boro. San.	3·31	...	*Lincs* .	Boston, Skirbeck.....	2·50	116
„ .	Eden'bdg., Falconhurst	3·89	118	„ .	Cranwell Aerodrome...	2·25	102
„ .	Sevenoaks, Speldhurst.	3·83	...	„ .	Skegness, Marine Gdns.	1·73	79
Sus .	Compton, Compton Ho.	4·39	105	„ .	Louth, Westgate.....	2·50	90
„ .	Patching Farm.....	5·27	157	„ .	Brigg, Wrawby St.....	2·58	...
„ .	Eastbourne, Wil. Sq....	3·33	95	*Notts* .	Worksop, Hodsock.....	2·61	111
„ .	Heathfield, Barklye....	5·45	147	*Derby*.	Derby, L. M. & S. Rly.	3·65	140
Hants.	Ventnor, Roy.Nat.Hos.	4·47	135	„ .	Buxton, Terr. Slopes...	5·93	105
„ .	Fordingbridge, Oaklnds	5·45	138	*Ches* .	Runcorn, Weston Pt....	3·56	113
„ .	Ovington Rectory.....	4·88	123	*Lancs*.	Manchester, Whit. Pk.	3·26	101
„ .	Sherborne St. John.....	3·38	103	„ .	Stonyhurst College.....	3·59	74
Herts .	Royston, Therfield Rec.	2·24	97	„ .	Southport, Bedford Pk.	2·88	89
Bucks.	Slough, Upton.....	2·65	105	„ .	Lancaster, Greg Obsy.	2·48	57
„ .	H. Wycombe, Flackwell	2·91	96	*Yorks*.	Wath-upon-Dearne.....	2·22	93
Oxf .	Oxford, Mag. College...	2·87	124	„ .	Wakefield,Clarence Pk.	2·46	101
Nor .	Wellingboro, Swanspool	2·87	122	„ .	Oughtershaw Hall.....	3·46	...
„ .	Oundle	2·33	...	„ .	Wetherby, Ribston H..	2·83	115
Beds .	Woburn, Exptl. Farm...	1·95	83	„ .	Hull, Pearson Park.....	2·24	93
Cam .	Cambridge, Bot. Gdns.	1·73	90	„ .	Holme-on-Spalding.....	2·55	104
Essex.	Chelmsford,County Gdns	...	...	„ .	West Witton, Ivy Ho.	2·12	58
„ .	Lexden Hill House.....	2·57	...	„ .	Felixkirk, Mt. St. John.	2·71	112
Suff .	Haughley House.....	2·08	...	„ .	York, Museum Gdns....	2·43	108
„ .	Campsea Ashe.....	2·34	102	„ .	Pickering, Hungate.....	2·39	95
„ .	Lowestoft Sec. School...	...	...	„ .	Scarborough.....	2·48	104
„ .	Bury St. Ed., WestleyH.	2·43	101	„ .	Middlesbrough.....	1·92	99
Norf. .	Wells, Holkham Hall...	1·85	90	„ .	Baldersdale, Hury Res.	...	...
Wilts .	Calne, Castle Walk.....	3·91	...	*Durh* .	Ushaw College.....	2·22	89
„ .	Porton, W.D. Exp'l. Stn	4·43	141	*Nor* .	Newcastle, D. & D. Inst.	1·82	83
Dor .	Evershot, Melbury Ho.	6·64	129	„ .	Bellingham, Highgreen	1·83	50
„ .	Weymouth, Westham.	4·60	132	„ .	Lilburn Tower Gdns....	2·74	104
„ .	Shaftesbury,Abbey Ho.	3·94	109	*Cumb*.	Carlisle, Scaleby Hall...	1·78	55
Devon.	Plymouth, The Hoe....	5·99	120	„ .	Borrowdale, Seathwaite	8·00	52
„ .	Holne, Church Pk. Cott.	8·97	106	„ .	Borrowdale, Moraine...	5·18	42
„ .	Teignmouth, Den Gdns.	4·82	114	„ .	Keswick, High Hill.....	3·44	51
„ .	Cullompton	5·03	115	*West* .	Appleby, Castle Bank...	1·89	48
„ .	Sidmouth, U.D.C.....	4·98	...	*Mon* .	Abergavenny, Larchf'd	5·64	126
„ .	Barnstaple, N. Dev.Ath	4·22	95	*Glam* .	Ystalyfera, Wern Ho....	4·56	55
„ .	Dartm'r,Cranmere Pool	9·30	...	„ .	Cardiff, Ely P. Stn.....	3·78	74
„ .	Okehampton, Uplands.	7·01	99	„ .	Treherbert, Tynywaun.	6·78	...
Corn .	Redruth, Trewirgie.....	6·16	98	*Carm* .	Carmarthen, The Friary	4·00	70
„ .	Penzance, Morrab Gdns.	5·40	95	*Pemb* .	St. Ann's Hd, C. Gd. Stn.	2·61	58
„ .	St. Austell, Trevarna...	5·97	98	*Card* .	Aberystwyth	2·17	...
Soms .	Chewton Mendip.....	5·33	99	*Rad* .	BirmW.W.Tyrmynydd	6·51	79
„ .	Long Ashton.....	4·41	114	*Mont* .	Lake Vyrnwy	4·69	68
„ .	Street, Millfield.....	4·05	...	*Flint* .	Sealand Aerodrome.....	3·12	...
Glos .	Blockley	3·80	...	*Mer* .	Dolgelley, Bontddu.....	4·10	60
„ .	Cirencester, Gwynfa....	3·82	114	*Carn* .	Llandudno	1·67	58
Here .	Ross, Birchlea.....	3·51	118	„ .	Snowdon, L. Llydaw 9..	7·84	...
Salop.	Church Stretton.....	4·06	121	*Ang* .	Holyhead, Salt Island...	3·48	84
„ .	Shifnal, Hatton Grange	2·27	88	„ .	Lligwy	2·56	...
Staffs.	Market Drayt'n, Old Sp.	2·86	103	*Isle of Man*			
Worc .	Ombersley, Holt Lock.	2·84	108		Douglas, Boro' Cem....	5·08	103
War .	Alcester, Ragley Hall...	3·48	141	*Guernsey*			
„ .	Birmingham, Edgbaston	3·59	133		St. PeterP't.Grange Rd.	8·29	202

Rainfall: 1935: December, Scotland and Ireland

Co.	Station.	In.	Per cent of Av.	Co.	Station.	In.	Per cent of Av.
Wig .	Pt. William, Monreith.	5·61	123	*Suth* .	Melvich	4·13	96
„ .	New Luce School	5·94	107	„ .	Loch More, Achfary	6·22	67
Kirk .	Dalry, Glendarroch	4·54	64	*Caith* .	Wick	3·08	100
„ .	Carsphairn, Shiel	6·26	67	*Ork* .	Deerness	3·94	94
Dumf.	Dumfries, Crichton R.I.	2·63	65	*Shet* .	Lerwick	5·05	105
„ .	Eskdalemuir Obs	2·94	42	*Cork* .	Caheragh Rectory	...	...
Roxb .	Hawick, Wolfelee	1·92	46	„ .	Dunmanway Rectory	5·23	65
Selk .	Ettrick Manse	2·32	38	„ .	Cork, University Coll.	4·29	84
Peeb .	West Linton	1·60	...	„ .	Ballinacurra	4·00	78
Berw .	Marchmont House	1·80	64	„ .	Mallow, Longueville	3·59	73
E.Lot .	North Berwick Res.	1·57	73	*Kerry.*	Valentia Obsy	4·27	64
Midl .	Edinburgh, Blackfd. H.	1·13	48	„ .	Gearhameen	7·50	60
Lan .	Auchtyfardle	1·91	...	„ .	Bally McElligott Rec.	3·31	...
Ayr .	Kilmarnock, Kay Pk.	2·97	...	„ .	Darrynane Abbey	4·13	70
„ .	Girvan, Pinmore	3·41	57	*Wat* .	Waterford, Gortmore	3·19	70
Renf .	Glasgow, Queen's Pk.	2·83	67	*Tip* .	Nenagh, Cas. Lough	2·00	43
„ .	Greenock, Prospect H.	4·37	55	„ .	Roscrea, Timoney Park	2·02	...
Bute .	Rothesay, Ardencraig	4·04	...	„ .	Cashel, Ballinamona	2·60	61
„ .	Dougarie Lodge	3·72	...	*Lim* .	Foynes, Coolnanes	2·67	56
Arg .	Ardgour House	5·70	...	„ .	Castleconnel Rec.	1·91	...
„ .	Glen Etive	4·98	40	*Clare* .	Inagh, Mount Callan	4·29	...
„ .	Oban	5·40	...	„ .	Broadford, Hurdlest'n.	1·55	...
„ .	Poltalloch	5·01	79	*Wexf* .	Gorey, Courtown Ho.	2·10	55
„ .	Inveraray Castle	6·60	66	*Wick* .	Rathnew, Clonmannon.	2·26	...
„ .	Islay, Eallabus	5·07	85	*Carl* .	Hacketstown Rectory	2·71	66
„ .	Mull, Benmore	...	...	*Leix* .	Blandsfort House	2·27	62
„ .	Tiree	...	...	*Offaly.*	Birr Castle	1·48	45
Kinr .	Loch Leven Sluice	2·21	56	*Dublin*	Dublin, FitzWm. Sq.	1·38	56
Perth .	Loch Dhu	5·35	53	„ .	Balbriggan, Ardgillan	2·50	87
„ .	Balquhidder, Stronvar.	4·55	...	*Meath.*	Beauparc, St. Cloud	3·26	...
„ .	Crieff, Strathearn Hyd.	2·92	65	„ .	Kells, Headfort	3·19	84
„ .	Blair Castle Gardens	1·56	41	*W.M* .	Moate, Coolatore	2·18	...
Angus.	Kettins School	2·85	86	„ .	Mullingar, Belvedere	2·61	71
„ .	Pearsie House	...	...	*Long* .	Castle Forbes Gdns	2·17	55
„ .	Montrose, Sunnyside	2·41	87	*Gal* .	Galway, Grammar Sch.	2·21	...
Aber .	Braemar, Bank	1·73	49	„ .	Ballynahinch Castle	5·49	73
„ .	Logie Coldstone Sch.	2·21	79	„ .	Ahascragh, Clonbrock.	2·28	49
„ .	Aberdeen, Observatory.	3·19	99	*Mayo.*	Blacksod Point	2·54	41
„ .	Fyvie Castle	4.12	120	„ .	Mallaranny	3·67	...
Moray	Gordon Castle	2·61	97	„ .	Westport House	3·35	58
„ .	Grantown-on-Spey	...	...	„ .	Delphi Lodge	6·66	55
Nairn.	Nairn	1·63	73	*Sligo* .	Markree Castle	4·00	83
Inv's .	Ben Alder Lodge	2·39	...	*Cavan.*	Crossdoney, Kevit Cas.	2·98	...
„ .	Kingussie, The Birches.	1·10	...	*Ferm* .	Enniskillen, Portora	...	...
„ .	Inverness, Culduthel R.	1·63	...	*Arm* .	Armagh Obsy	2·33	74
„ .	Loch Quoich, Loan	6·17	...	*Down.*	Fofanny Reservoir	6·58	...
„ .	Glenquoich	...	...	„ .	Seaforde	4·52	110
„ .	Arisaig, Faire-na-Sguir.	3·27	...	„ .	Donaghadee, C. G. Stn.	3·02	95
„ .	Fort William, Glasdrum	4·66	...	„ .	Banbridge, Milltown	2·60	90
„ .	Skye, Dunvegan	4·21	...	*Antr* .	Belfast, Cavehill Rd.	4·69	...
„ .	Barra, Skallary	4·17	...	„ .	Aldergrove Aerodrome.	2·52	73
R&C .	Alness, Ardross Castle.	2·74	66	„ .	Ballymena, Harryville.	4·12	93
„ .	Ullapool	2·96	47	*Lon* .	Garvagh, Moneydig	3·69	...
„ .	Achnashellach	3·97	40	„ .	Londonderry, Creggan.	3·91	89
„ .	Stornoway	2·77	44	*Tyr* .	Omagh, Edenfel	3·69	87
Suth .	Lairg	3·97	99	*Don* .	Malin Head	3·31	...
„ .	Tongue	4·17	84	„ .	Killybegs, Rockmount.	2·50	...

Climatological Table for the British Empire, July, 1935

STATIONS.	PRESSURE.		TEMPERATURE.							Relative Humidity.	Mean Cloud Am'nt	PRECIPITATION.			BRIGHT SUNSHINE.	
			Absolute.		Mean Values.				Mean.							
	Mean of Day M.S.L.	Diff. from Normal.	Max.	Min.	Max.	Min.	½ Max. and Min.	Diff. from Normal	Wet Bulb.			Am'nt.	Diff. from Normal.	Days.	Hours per day.	Per-centage of possible.
	mb.	mb.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	%	0–10	in.	in.			
London, Kew Obsy....	1020·0	+ 4·2	85	49	75·0	57·6	66·3	+ 3·6	57·7	77	5·1	1·63	— 0·54	7	8·8	54
Gibraltar.....	1016·2	— 0·6	97	63	83·7	68·8	76·3	+ 1·5	66·5	77	3·4	0·00	— 0·03	0	...	...
Malta.....	1015·6	+ 0·9	89	70	83·3	72·4	77·9	— 0·4	71·0	73	2·2	0·02	— 0·03	1	12·1	85
St. Helena	1016·8	+ 0·6	63	52	60·1	54·1	57·1	— 1·4	54·6	92	9·1	3·47	...	22	...	...
Freetown, Sierra Leone	1015·3	+ 2·6	87	64	82·1	71·5	76·8	— 1·8	74·8	91	9·2	41·20	+ 5·62	28	...	...
Lagos, Nigeria	1013·8	+ 0·6	86	72	82·2	74·3	78·3	+ 0·3	74·8	89	9·2	16·09	+ 5·59	25	2·7	22
Kaduna, Nigeria	1009·9	...	89	66	83·3	68·8	76·1	+ 2·5	71·1	90	8·5	8·63	— 1·99	19	4·9	39
Zomba, Nyasaland	1019·5	+ 1·0	81	48	70·6	53·6	62·1	+ 0·1	55·9	69	4·5	0·61	+ 0·26	3	...	...
Salisbury, Rhodesia...	1021·9	0·0	78	34	69·9	43·1	56·5	+ 0·4	49·2	61	1·8	0·00	— 0·03	0	9·1	81
Cape Town	1021·8	+ 0·5	81	35	62·2	46·9	54·5	— 0·2	47·5	85	5·2	4·60	+ 0·98	15	...	...
Johannesburg	1023·2	+ 0·4	68	33	62·0	41·7	51·9	+ 1·5	40·2	51	2·2	0·01	— 0·32	1	9·3	87
Mauritius	1020·2	— 0·2	76	55	73·4	61·9	67·7	— 0·6	64·4	76	5·2	2·27	— 0·22	23	7·0	64
Calcutta, Alipore Obsy.	997·5	— 1·7	93	77	90·3	79·9	85·1	+ 1·4	80·0	87	8·2	6·58	— 6·12	14*	...	...
Bombay	1003·0	— 0·9	88	74	85·0	76·8	80·9	— 0·5	77·3	87	9·5	24·10	— 0·17	25*	...	...
Madras	1003·5	— 1·0	101	74	96·0	80·4	88·2	+ 0·6	74·9	63	8·6	2·21	— 1·63	7*	...	...
Colombo, Ceylon	1009·3	+ 0·2	86	71	84·0	76·2	80·1	— 1·1	76·6	81	7·7	2·81	— 1·62	10	6·1	49
Singapore.....	1008·8	— 0·1	88	72	86·3	78·5	82·4	+ 1·1	77·4	79	8·0	3·09	— 3·70	12	6·9	56
Hongkong.....	1002·7	— 2·0	91	75	86·7	78·6	82·7	+ 0·2	78·9	83	7·8	22·21	+ 7·79	20	5·1	38
Sandakan	1008·2	...	91	73	88·4	75·4	81·9	+ 0·1	76·4	83	7·2	8·12	+ 1·40	17	...	...
Sydney, N.S.W.....	1017·1	— 1·2	67	39	62·5	45·7	54·1	+ 1·4	47·9	73	4·6	1·52	— 3·28	13	6·5	64
Melbourne	1016·3	— 2·6	64	33	57·2	41·6	49·4	+ 0·7	44·4	81	5·6	1·88	+ 0·02	16	4·6	47
Adelaide	1016·2	— 4·1	67	38	60·1	45·1	52·6	+ 0·8	46·7	72	7·2	2·58	— 0·06	14	4·2	42
Perth, W. Australia ...	1015·7	— 3·3	67	40	62·5	48·1	55·3	+ 0·1	50·1	81	6·4	10·61	+ 4·05	25	5·3	52
Coolgardie	1015·9	— 3·9	71	32	61·5	39·2	50·3	— 0·9	47·1	80	3·6	1·19	+ 0·32	8	...	...
Brisbane.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hobart, Tasmania.....	1012·1	— 1·6	60	32	53·3	41·0	47·1	+ 1·4	42·1	77	5·6	1·25	— 0·93	17	4·4	47
Wellington, N.Z.	1016·7	+ 2·8	60	35	50·3	41·6	45·9	— 2·1	43·5	80	6·6	4·32	— 1·31	14	3·9	41
Suva, Fiji	1012·3	— 1·7	87	67	80·0	70·4	75·2	+ 1·8	70·8	87	6·5	8·55	+ 3·62	16	5·1	46
Apia, Samoa	1010·6	— 1·3	87	71	84·7	74·6	79·7	+ 2·5	76·1	79	4·5	3·05	+ 0·07	16	8·1	71
Kingston, Jamaica	1013·8	— 0·9	96	71	89·6	73·8	81·7	0·0	73·6	79	3·1	0·21	— 1·41	4	8·7	67
Grenada, W.I.	...	...	89	72	86	75	80·5	+ 1·3	75	79	5	6·97	— 2·46	23	...	...
Toronto.....	1014·7	+ 0·3	93	57	82·9	64·9	73·9	+ 4·8	66·4	77	4·1	3·59	+ 0·75	12	9·6	64
Winnipeg	1012·3	0·0	90	53	82·4	62·3	72·3	+ 5·9	63·6	86	4·6	1·92	— 1·18	9	10·0	63
St. John, N.B.	1015·1	+ 1·5	82	50	70·6	54·3	62·5	+ 2·1	58·6	82	6·6	2·13	— 1·50	12	7·2	47
Victoria, B.C.....	1016·9	— 0·4	90	48	66·7	52·3	59·5	— 0·6	54·9	75	4·4	0·95	+ 0·53	9	9·8	62

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