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British Association for the Advancement of Science. Meeting at Leeds, August 31st to September 7th, 1927

The meeting of the British Association at Leeds will long be remembered as one of the most successful of recent years. The excellent arrangements made by the local committee, not only for the conduct of the meeting itself, but also for the comfort and entertainment of their guests, were by no means the least of the factors which contributed to its success. Both the City of Leeds and the University seemed determined to give the members of the Association an unforgettable impression of true Yorkshire hospitality. In the words of Sir Oliver Lodge, it was "a great and friendly meeting."

As in the case of the Oxford meeting last year, there were no papers in Section A which could be described as purely meteorological in character. Professor J. J. Nolan's paper on "Ionization in the Lower Atmosphere," in which the author gave a lucid account of recent experimental work on this subject carried out in Ireland, was, perhaps, the closest approach to meteorology in the transactions of this section. There was another link with meteorology in the paper by Dr. W. Kolhörster, describing experimental work in Germany on penetrating rays. Meteorology also found a place in the transactions of other sections. On September 3rd the Forestry sub-section devoted a three-hour session to the much-debated question of the effect of forests on climate. Papers on the subject were read by

Dr. T. F. Chipp, assistant director of the Royal Botanical Gardens at Kew, by Dr. C. E. P. Brooks and by Dr. A. W. Borthwick, professor of forestry at Aberdeen University, and were followed by a very keen discussion in which the foresters showed themselves very reluctant to accept the view of the meteorologists that forests have no practical effect on rainfall. On September 5th papers were read at the Textile Section by Mr. E. E. Canney, on "Cotton-growing Policy, the Influence of Climate on Staple Quality," and by Dr. Guy Barr and Miss I. Hadfield, on "The Nature of the Action of Sunlight on Cotton." On September 6th, a combined discussion was arranged between the sections of Mathematics and Physics, Geology and Botany on "Climates of the Past," in which Professor A. C. Seward, Dr. G. C. Simpson and Dr. C. E. P. Brooks took part.

The report of the Committee on the Investigation of the Upper Air, which was presented during the meeting, showed gratifying activity during the past year. The Committee was re-appointed with the addition of the name of Dr. L. F. Richardson, F.R.S., and a monetary grant was sanctioned towards defraying the expenses of a co-operative investigation of the upper air to be carried out on selected occasions with the help of Universities and the Science Departments of Schools.

As in past years the Meteorological Office, Air Ministry, with the collaboration of the Signals Branch, organised a demonstration of weather forecasting based on broadcast synoptic data which was received locally by wireless. The demonstration was given daily in the Law Library at the Town Hall, which was in close proximity to the Reception Room, and attracted considerable attention not only from members of the Association but also from the local Press, several papers publishing the special forecasts for the Leeds area which their representatives obtained from the meteorologist in charge of the demonstration. A "Local Daily Weather Report" was prepared and copies circulated to the various sectional meeting rooms and to hotels and hostels where members were accommodated. The morning and afternoon synoptic charts were also reproduced on a large scale map which occupied a prominent position in the Reception Room.

In addition to the demonstration of forecasting, a comprehensive exhibit of instruments and diagrams was arranged. Among distinctive features of the exhibit may be mentioned a series of five rain-gauges, illustrating recent improvements in the design of these instruments; a model of a climatological station, in which each detail was faithfully represented, kindly lent for the purpose by Messrs. Negretti and Zambra; a large-scale rainfall map of the Leeds District; a series of beautiful cloud photographs lent by Mr. C. J. P. Cave, and an exhibit illustrating

the meteorological arrangements on the London-Continental air routes.

The Meteorological Luncheon was held at Powolny's Restaurant the day before the concluding meeting of the Association and proved an exceedingly successful function in spite of the relatively small attendance. The latter was inevitable owing to the fact that a large number of meteorologists and geophysicists, who would have been present normally, were attending an international Conference at Prague. The following were present at the luncheon :—

Dr. G. C. Simpson, C.B., F.R.S. (in the Chair) ; Professor D'Arcy Thompson, C.B., F.R.S. ; Professor A. Fowler, F.R.S., and Mrs. Fowler ; Lady Lockyer ; Professor J. J. Nolan ; Professor A. M. Tyndall, Recorder of Section A ; Professor E. H. Neville ; the Reverend Father O'Connor, S.J. ; Dr. Vaughan Cornish ; Dr. H. Borns ; Dr. J. S. Owens and Mrs. Owens ; Captain F. Entwistle and Mr. W. M. H. Greaves, Secretaries of Section A, and Mrs. Greaves ; Dr. H. Jeffreys, F.R.S. ; Dr. C. E. P. Brooks ; Major W. S. Tucker ; Dr. C. B. Fawcett ; Mr. R. Stoneley and Mrs. Stoneley ; Mr. G. Merton and Mrs. Merton ; Mr. R. F. Budden ; Mr. E. W. Bliss ; and Mr. R. H. Mathews.

In the speeches which followed the loyal toast, several references were made to the unseasonable summer which was just drawing to a close. Dr. Simpson in the opening speech welcoming the guests caused much amusement by quoting the ditty,

“ Dirty days hath September,
April, June and November.
From January up to May
The rain it raineth every day.
All the rest have thirty-one
Without a blessed gleam of sun.
If any of them had two and thirty
They'd be just as wet and twice as dirty.”

Professor D'Arcy Thompson in a witty speech proposed the toast of “ Meteorology and Allied Sciences.” Professor J. J. Nolan in replying to the toast said that Meteorology can propound more problems to General Science than General Science can well solve. Father O'Connor in proposing the toast of “ The British Association,” to which Professor Tyndall subsequently replied, referred to the fact that Stonyhurst College would shortly be celebrating its centenary as a meteorological station.

No account of the Leeds meeting would be complete without a reference to the local arrangements for the entertainment of the members of the British Association. Two excellent handbooks had been prepared, one a general handbook of the Leeds area illustrated by maps and diagrams, which contained a section on meteorology including rainfall, and the other a handbook for members taking part in the various excursions which

covered a wide area around Leeds. The Lord Mayor and Lady Mayoress of Leeds held a reception at the City Art Gallery on the evening of September 1st, at which H.R.H. Princess Mary, Viscountess Lascelles and Viscount Lascelles were present. On the evening of the 6th, the University held a reception for members of the Association, which included a display of exhibits in the various departments. The display included an exhibit illustrating atmospheric pollution, which was arranged by Professor J. B. Cohen, Dr. J. S. Owens, Dr. J. R. Ashworth and Dr. Leonard Hill. Other local arrangements included garden parties, a dance, and a concert arranged by the Leeds Choral Union.

F. E.

The Wet Summer of 1927

The year 1927 apparently started with the determination to emulate its memorable predecessor of 1924, for after a very dry December, heavy rain began to fall in Scotland on the 1st or 2nd, and January as a whole was wet and stormy. The next three months provided us with a moderate rainfall, rather above the average over the country as a whole (see Table 1). A dry and sunny May gave hopes of a fine summer, but these hopes were doomed to disappointment, for from June to September the rainfall has been well above the average in England at least, while a more serious drawback has been the persistent character of the wet weather. The county cricket season has been remarkable for the number of matches abandoned without any result, often with less than six hours' play, and on all sides one hears laments of spoilt holidays.

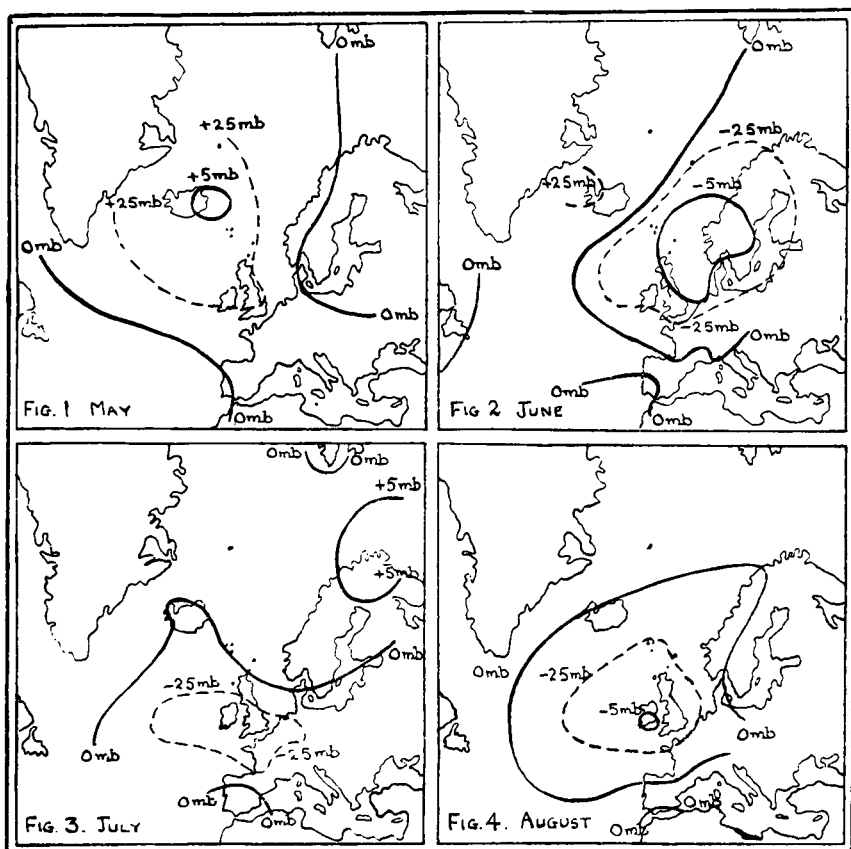
TABLE I. RAINFALL (PERCENTAGE OF NORMAL) DURING 1927.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Average
England and Wales ...	122	134	136	107	56	163	133	155	233	139
Scotland ...	130	67	93	145	100	165	99	121	200	123
Ireland ...	132	88	138	69	65	135	113	126	159	116
British Isles ...	126	108	126	107	69	158	120	140	209	130

Table 1 shows that the percentage excess has generally been greater in England and Wales than in Scotland or Ireland, especially from June to September. This is a characteristic of the cyclonic type of wet season,* an inference which is borne out by the charts of deviation of pressure from normal, shown

* The fluctuations of annual rainfall in the British Isles considered cartographically. By M. de C. S. Salter and J. Glasspoole. *London, Q.J.R. Meteor. Soc.*, 49, 1923, p. 213.

in figs. 2 to 4, the greatest deficit of pressure occurring in the neighbourhood of the British Isles in all three summer months. In this type the wet weather is due to the passage of a number of depressions across the British Isles from west to east or from south-west to north-east, and the greatest deficit of pressure from normal is found over the British Isles. In September pressure was more than 5 mb. below normal over the whole of the British Isles and nearly 10 mb. below in northern Scotland.



PRESSURE ANOMALIES, 1927.

In discussing previous wet seasons in the British Isles it was found* that prolonged spells of rainy weather were generally associated with some factor which tended to cause a low surface temperature in the North Atlantic Ocean.

The factors which were found to have the greatest importance were four :—

1. The north-east trade wind in the Atlantic.
2. The south-east trade wind in the Atlantic.

* Pressure distributions associated with wet seasons in the British Isles. By C. E. P. Brooks. *London, Q. J. R. Meteor. Soc.*, 52, 1926, p. 387.

3. The pressure difference between Newfoundland and southern Greenland, which is regarded as a measure of the strength of the north-west winds along the Labrador current.

4. The amount of ice in the East Greenland Current.

Recent work* has shown that a strong north-east trade wind tends to be followed 12 months later by low pressure in the far north (Stykkisholm and Vardö) and by high pressure over western Europe (Valentia, Paris, Berlin and Bergen). A weak north-east trade has the opposite tendency. Variations of the south-east trade have similar effects to those of the north-east trade, but occurring after an interval of 15 to 21 months instead of 12 months.

TABLE 2. DEPARTURES FROM NORMAL OF VARIOUS FACTORS OF BRITISH WEATHER.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
North-east Trade Velocity (m.p.h.), 1926	-2.0	-1.4	-1.2	-1.0	-1.1	-2.1	-1.8	-1.0	-1.2	-0.1	+1.4	+0.5
South-east Trade Velocity (m.p.h.), 1925							+0.7	+2.0	-2.2	+0.7	+0.2	-2.5
1926	+0.2	+0.9	+1.8	+0.9	+0.9	+0.9	-2.5	-3.6	-1.6	-3.1	-0.4	-1.3
Pressure diff. (mb.)												
St. Johns 60°N, 44°W. { 1925												-3
1926	0	-4	0	-1	-3	+1	-1	-1	0	-4	+14	+1
1927	+3	+3	+6	+3	-3	-1	+2	+1				
Temperature Jan Mayen, 1927				-6.0	-2.3	-1.5	+1.3	+0.2				

A large pressure difference between Newfoundland and southern Greenland, associated with north-west winds which drive cold water into the North Atlantic circulation, would be expected to have the reverse effect to strong trade winds. It is found that this is to some extent the case, a large pressure difference tending to be followed three months later by low pressure at Stykkisholm, Valentia and Berlin, but by high pressure at the Azores. Variations of the pressure difference during the winter months, when the Labrador Current is ice-laden, especially from December to March inclusive, are much more effective than those during the summer months. There appears to be a recrudescence of the effect at a later stage, for a large pressure difference is followed twelve months later by high pressure at Vardö and low pressure at Valentia and Berlin, but these relationships have not yet been completely explored.

The fourth factor is the influence of ice in the Greenland Sea. This is most effective during the three months April to June, and appears to have a two-fold consequence. A large amount

* The effect of fluctuations of the Gulf Stream on the distribution of pressure over the eastern North Atlantic and western Europe. By C. E. P. Brooks. *London, Meteor. Office, Geophys. Mem. No. 34, 1926.*

of ice tends to be associated with a contemporary excess of pressure over Iceland, while in the following autumn and winter an area of pressure deficit tends to develop over the British Isles.* No information is yet available as to the ice conditions in the Greenland Sea during 1927, but it has been found that temperature at Jan Mayen is a useful index, much ice being associated with a low temperature and *vice versa*.

The variations of these four factors, velocity of the north-east trade wind and south-east trade wind, pressure difference between Newfoundland and south Greenland, and Jan Mayen temperature, are shown in Table 2. It is to be remarked that the velocity of the north-east trade wind is not known directly, but has been calculated from the values of pressure at the Azores, Gibraltar and Sierra Leone.† The velocity of the south-east trade wind is given by the anemometer at St. Helena, but unfortunately the figures for January to June, 1925, are not available.

This table shows that the north-east trade wind was abnormally weak throughout the first nine months of 1926, which would give a persistent tendency for low pressure over western Europe during the corresponding months of 1927. The velocity of the south-east trade wind was not especially abnormal, and the pressure difference between Newfoundland and Greenland was nearly normal until October, 1926, but this pressure difference shows a marked excess in the important period from December, 1926, to March, 1927. This would give a tendency for low pressure over western Europe during the months of April, May and June. Finally, the low temperatures at Jan Mayen in April to June indicate that there was more ice than usual in the Greenland Sea in those months. This would give

TABLE 3. DEVIATIONS OF PRESSURE FROM NORMAL IN MILLIBARS.

1927	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Kew	-7.3	+2.3	-5.8	+0.3	+2.2	-3.7	-3.4	-3.4	-8.1
Isafjord	-2.6	-1.8	-8.9	-4.5	+3.5	+4.3	-0.6	+1.2	+5.4

a tendency for pressure to be above normal over Iceland during April to June, and for pressure to be below normal over the British Isles from September onwards. The resultant of all these tendencies was for pressure to be persistently below normal over the British Isles throughout January to September, 1927, with the greatest deficit in the latter month, and for pressure generally above normal over Iceland during the months of April,

*Polareis und atmosphärische Schwankungen. By W. Wiese. *Stockholm, Geog. Ann.*, 6, 1924, p. 273.

† London, Meteor. Office, *Geophys. Mem.* No. 34.

May and June. The deviations of pressure from normal which actually occurred at Kew and Isafjord are shown in Table 3.

The general agreement of these pressure deviations and the tendencies deduced from the oceanic causes is fairly good, but of course the slowly changing oceanic effects are incompetent to account for rapid fluctuations of pressure from one month to the next. The pressure distribution during May (fig. 1) is especially interesting, as the one fine month of the year in England. It appears that the high pressure which brought the fine weather was part of a large area of pressure excess centred over Iceland, probably associated with the excess of Greenland Sea ice.

C. E. P. B.

The Wet Summer in the Isle of Wight

The summer of 1927 has been so persistently wet that some comments and statistics seem interesting.

As far as Shanklin is concerned, the four months June-September were the wettest since records began in 1906, as much as 17.47 inches falling. The nearest approach to this was 14.78 inches in 1912. The three months July, August and September, 1927, were also the wettest known, with 14.62 inches against 12.80 inches in 1918. The period January-September, or the first nine months of 1927, was wetter than any preceding year since 1906. The number of rainy days was also a record for the period June-September, rain falling on 73 days out of a possible 122, while during the period July-September, precipitation was measured on 58 days out of a possible 92. Rain fell on 15 days in June, 20 in July, and 19 days each in August and September. July has never before had so many wet days. September, which one hoped would make amends for the preceding wet months, turned out the wettest month of the year so far, and with the exception of 1918, the wettest September on record. In 1918, 7.68 inches fell, in 1927, 7.32 inches. The fall of 2.09 inches on the 14th was the heaviest twenty-four-hour fall in September on record, and it is rare for two days in one month to measure more than one inch of rain, viz., 2.09 inches on the 14th, and 1.23 inches on the 23rd. At Newport there was one day with over 2 inches of rain, and two other days during September with more than one inch—a very exceptional occurrence. Thunder was heard in Shanklin on five days in September, this was also a record, no other month since 1906 producing more than four days of thunder. In contrast to this wet spell, the period April 9th-June 15th gave only 1.14 inches of rain at Shanklin. Between June 16th and August 31st there were never more than four consecutive days without rain.

J. E. COWPER.

Wet Summers

The recent wet summer adds interest to the results of an investigation on the extremes of seasonal rainfall. The following statistics refer to the summer half-years, April to September, during the period 1870 to 1926. It has been shown previously that the wettest summers on record over the British Isles as a whole were those of 1879 and 1924. The wettest summer varies however, in different districts.

The years 1872, 1873, 1874, 1877, 1880, 1892, 1898, 1904, 1918, 1920, 1923 and 1924, all gave summers which were the wettest in some part of the British Isles. Such years were therefore most frequent in the 'seventies and in the 'twenties. In fact, the areas which did not experience the wettest summer during these two decades were relatively small. The wettest summer was 1918 in the extreme north of Scotland, 1892 in the English Lake District, 1904 in Co. Kerry and 1898 in Co. Clare. The summers of 1879, 1877, 1924 and 1872 were the wettest over the largest areas. The summer of 1879 was the wettest over England and Wales south of a line from Cardigan, Monmouth and King's Lynn, as well as in the south-east of Scotland from Mull to Wigtown and in the extreme north-west and south-east of Ireland; 1877 along the east coast from Hull to Edinburgh and in North Wales; 1924 over the greater part of northern and central Ireland, over the Grampians and as far east as Aberdeen and also in the Valley of the Severn; 1872 in the neighbourhood of the southern Pennines, and in parts of Scotland, *e.g.*, in the counties of Berwick, Perth and Banff and in the outer Hebrides. The summer of 1923 ranked as the wettest in parts of the south-west of Scotland, including Islay and Dumfries.

It is of interest to recall that the wet summer of 1879 was followed by the driest winter, October to March, on record, over roughly three-quarters of the whole British Isles.

The fall of the wettest summer was less than 140 per cent. of the average summer fall for the period 1881 to 1915, only at stations along coastal strips of Argyll, Caithness, Waterford, Clare and Donegal. The falls generally were more than 150 per cent. and exceeded 175 per cent. over large areas in the southern half of England and Wales. At London and Spalding, the fall of the summers of 1879 and 1880 respectively exceeded twice the average fall at these stations.

The statistics referred to above have been used as a standard for a comparison of the fall of 1927. It appears that although the rainfall of the last summer was remarkably heavy, exceeding 150 per cent. of the average summer fall in the south-east of England and of Scotland, appreciably larger falls are on record in all parts of the British Isles.

J. G.

Discussions at the Meteorological Office

The subjects for discussion for the next meetings will be :—

October 24th. *Sur l'erreur moyenne des moyennes mensuelles des éléments magnétiques observées à l'observatoire de Rude Skov.*

By D. la Cour (Copenhagen, Dansk Meteor. Inst. Publ. No. 1, 1927). *Opener*—Dr. C. Chree, F.R.S.

November 7th. *Richtung von Wind und Wolken auf Teneriffa.*

By H. v. Ficker (Wien, SitzBer. Ak. Wiss. IIa, 135, 1926, pp. 307-22; also in Wien, Festschr. ZentAnst. Meteor. Geodyn., 1926, pp. 15-30). *Opener*—Mr. W. H. Bigg, B.Sc.

Correspondence

To the Editor, *The Meteorological Magazine*

Old-fashioned Winters

In the March issue of the *Meteorological Magazine* I suggested lines on which investigations might be made to solve the question of "milder winters." As a result of this, Mr. A. W. Preston very kindly prepared and placed at my disposal a summary of records kept by him for many years at Eaton, Norwich, and from a diary in his possession kept by the late Mr. Whistlecroft, in Suffolk, from 1830-90; the two records thus covering nearly 100 years. The results, however, are not so conclusive as I hoped would be the case.

As regards temperature, the winters of the twentieth century certainly show a longer period of relatively mild winters than during the previous sixty years, particularly in the case of day maxima. In the ten years 1850-9, when the number of night frosts was low, the days with a maximum reading below 32° were more numerous than during the last quarter century. Of the 31 winters when there were no maximum temperatures below 32°, no fewer than fifteen have occurred since 1900.

The number of screen frosts does not show such a marked decrease, although fewer in the present century than during the period 1860-1900.

Full records of snow are available only since 1883, and show little variation.

Several interesting facts are revealed, one being the severity of the winter 1887-8 exceeding, as regards snow and screen frosts, the perhaps more severe and continuous cold periods of 1891 and 1895, while the ten-year period with most snow days was 1900-9. Ten-year period with greatest number of days snow lying was 1890-9. Greatest number of screen frosts 1880-9; greatest number of days 32° or below, 1830-9. The winter 1887-8 had the most snow days, snow lying and screen frosts, 1837-8, the largest number of days on which tempera-

ture did not exceed 32° . Year with least number of snow days, 1858-9. Least number days snow lying 1895-6 (following the severe winter 1894-5), year with least number of screen frosts, 1845-6.

Finally it appears that another 20 or 30 years must elapse before a satisfactory answer can be given to the question "Are winters becoming milder?" Also, assuming that the present tendency for milder conditions is continued, it seems probable that the next two or three winters must be decidedly on the cold side, especially as regards snow, in order to reach anything like the average of 1910-19.

G. C. WOOLDRIDGE.

Leicester Road, Packington, Ashby-de-la-Zouch. Sept. 22nd, 1927.

An Interesting Cloud Formation

The cloud formation subsequent to the passage of the central regions of a cyclone over Nottingham on August 18th gave interesting indications of wind structure.

Rain fell steadily from soon after midnight till about 14h. 15m. with an east-southeast wind; the sky then cleared in the east while a thunderstorm formed and drove up from the south-southwest. As its rear passed over about 15h. the wind changed suddenly to west-northwest and in the southwest a magnificent bank of cumulo-nimbus was revealed lying from west-northwest to east-southeast. When first observed at 15h. 5m. it had three massive heads. The most northerly was soon seen to be collapsing and the middle one growing; within a few minutes this latter ceased to grow and collapsed rapidly while the most southerly towered up, the most northerly being now reduced to a thin ragged cloud. By 15h. 15m. the most southerly of the three was being outstripped by a new head still further to the southeast. It was noticed that as the cloud heaps fell they drifted to west-northwest while low clouds along the chain were plainly moving in the opposite direction. Further observation was prevented for the time by intervening clouds.

The whole phenomenon suggested a northwesterly wind cutting under a southeasterly one and setting up vast waves with cumulo-nimbus on their crests, the heads being carried along in the upper current. The most striking part was the speed with which these tremendous masses of vapour appeared and disappeared. During 20 minutes' observation three cloud heads, apparently 15,000 to 20,000 ft. high were thrown up, and in each case at least half (in the first nearly all) of the mass either precipitated or evaporated. There was no false cirrus, but a clearing in the clouds at 16h. showed that the whole of this

portion of the cloud range had dwindled to a thin cirrus-like band.

The observation was made from Longeaton, about 8 miles southwest of Nottingham; it would be interesting to know if very heavy rain fell in the neighbourhood of Kingston-on-Soar over which the cloud range seemed to lie.

R. FRANCIS GRANGER.

Lenton Fields Climatological Station, Nottingham. August 18th, 1927.

Waterspout at Ulverston

On August 24th I was walking along the shore of Morecambe Bay and to all appearances a storm was imminent. Heavy cumulus clouds were gathering over the Bay, although the movement of the clouds was scarcely perceptible, in fact there was hardly a breath of wind.

My attention was attracted to a funnel-shaped streamer which was hanging from a cloud right in the thick of the stormiest looking part. Presently this streamer gradually dispersed with a curious wavy movement which reminded me of the disturbance produced by radiation on a hot day. As I watched, the streamer was sent out again, and I can only describe it as though the bottom of the cloud burst and the contents came streaming out in much the same fashion as I would expect the contents of a sack of flour to pour out. In a few minutes the streamer again dispersed. This process was repeated for some time—twenty minutes or half an hour at least—until finally the streamer crept down the sky in a long straight band with a curious dark line down the middle. Slowly the whole thing melted away, a slight wind sprang up and before I could move a dozen yards I was in the heaviest downpour I have ever experienced.

I might mention that the rain was local only, the town of Ulverston less than a mile away being entirely out of the zone.

C. J. SMITH.

1, School View, Bardsea, Ulverston, Lancs. August 29th, 1927.

NOTES AND QUERIES

Meteorology and Agriculture

It is a commonplace that the weather has important effects upon the magnitude and quality of field crops, not only in the sowing, growing and harvesting seasons, but also during the weeks which precede sowing, when the ground is being prepared, and in some cases during the weeks following harvest when the produce is lying in the stack or other form of storage.

Until a few years ago, there were in Great Britain no organized

means of collecting accurate information from all parts of the country on the subject of the relation of weather to crops in order to elucidate the complicated and difficult problems which arise. Organizations exist which deal with observations in agriculture alone and in meteorology alone, but the task of applying the one set of observations to the other has been left to isolated workers in the one science or the other who have been attracted by the subject. Thus, the Ministry of Agriculture publishes statistics of estimated yields of crops, while the Meteorological Office publishes district values of temperature, rainfall and sunshine week by week. The valuable work of Sir Napier Shaw and of Mr. R. H. Hooker in correlating data extracted from these two sources is well known.

In America, where the U.S. Weather Bureau forms part of the U.S. Department of Agriculture, there is a special branch of the Bureau which deals specifically with the subject, but in most other foreign countries there are no organized means of prosecuting this special application of meteorology.

In 1922 the Ministry of Agriculture and Fisheries, acting in co-operation with the Board of Agriculture for Scotland, appointed a committee to study the problem. The Committee arranged an "Agricultural-Meteorological Scheme" (usually called a "crop-weather scheme"). This consists in the collection and circulation of agricultural and meteorological observations or summaries made side by side at a number (about 22) of Agricultural Colleges or Agricultural Research Institutions throughout the country. A description of the scheme by Mr. W. R. Black, of the Ministry of Agriculture, Secretary of the Committee, appeared in *The Journal of the Ministry of Agriculture*, Vol. 33, 1926, pp. 321-331. Sir Napier Shaw is chairman of the Committee, and the Meteorological Office is represented upon it.

The observers who contribute to this scheme are distributed over the whole of Great Britain, from Craibstone near Aberdeen to Wye in Kent and Gulval in Cornwall, and in the ordinary course it would therefore be seldom that they would meet to exchange views. On the other hand, those who have to prepare and publish the official agricultural and meteorological data in London need to acquire personal contact with the observers and other workers on the subject. To provide for these requirements it is the practice to hold "paper-reading discussions" every year, to which all concerned are invited. Such meetings were held at the Meteorological Office, South Kensington, under the chairmanship of Sir Napier Shaw on Thursday and Friday, September 22nd and 23rd, 1927, when the following papers were read and discussed: "The week as a phenological unit," by Sir Napier Shaw, F.R.S.; "Rothamsted temperature records," by Mr. T. B. Hoblyn, of the Rothamsted experimental station;

"The effects of temperature and humidity on the changes in weight of crops in storage," by Mr. G. V. Jacks, of the Rothamsted experimental station; "Changes during storage in the stack," by Mr. W. S. Gibson, of the East Anglian Institute of Agriculture, Chelmsford, and Dr. W. Goodwin, of the South-eastern Agricultural College, Wye, Kent; "The effect of temperature on the keeping quality and bacterial content of milk," by Capt. H. Barkworth, of the South-eastern Agricultural College, Wye, Kent; "The effect of meteorological conditions on the amount and nutritive value of pasture and hay," by Prof. R. G. Stapledon, of the Welsh Plant Breeding station, Aberystwyth; "The effect of meteorological conditions on the rate of growth of pasture grass," by Dr. H. E. Woodman, of the Animal Nutrition Research Institute, Cambridge; "Temperature and the food requirements of animals," by Prof. T. B. Wood, of the Animal Nutrition Research Institute, Cambridge; "The effect of ultra-violet light on animal nutrition," by Dr. H. E. Magee, of the Rowett Research Institute, Aberdeen, and "The meteorological factors affecting sheep," by Mr. J. E. Nichols, of the Animal Breeding Research Department, University of Edinburgh. There can be no doubt of the great value of these discussions in widening the outlook and focussing ideas, and considerable benefit would result if they could be held more frequently. Clearly we are only at the threshold of the subject, and much depends on the results of the next few years' work. We shall look forward with interest to the issue of the report of the meeting in due course.

R. C.

Course of Training for Observers

A Course of Instruction for meteorological observers was held this year at Kew Observatory from September 19th to 23rd. During the first three days instruction was given in the equipment and exposure of a climatological station, the recording of the observations and their transmission to the Meteorological Office, and the special meteorological observations in connexion with the scheme for obtaining data suitable for the correlation of weather and crops instituted a few years ago by the Ministry of Agriculture and Fisheries and the Board of Agriculture for Scotland in co-operation with the Meteorological Office.

This part of the course was attended by eight observers from Crop Weather stations, two members of the staff of the Ministry of Agriculture and Fisheries and seven observers from other climatological stations.

During the last two days of the course, instruction was given in the routine of observations at health resort stations whose

reports are issued daily to the Press, in the charting of observations, distributed by wireless telegraphy and in climatology. This part of the course was not attended by the observers from Crop Weather stations.

The Annual Variation of Cirrus Cloud at Kimberley

Table 1 gives the average number of times per month, for four standard daylight hours of observation, upon which cirrus of any kind has been observed alone in the sky, other cloud forms being absent, together with the corresponding percentages of sky covered. For the purpose of making the frequencies comparable one with another they have all been reduced to a uniform month of thirty days. Night observations at 20h. and 23h. are also made; but these are not used here, the determination of faint cirrus on a night sky being largely a matter of illumination by the moon. The period is the 26 years 1900 to 1925.

Upon the whole there are two maxima in the year both in frequency and in quantity: in June and in September; and this rule is closely followed at each of the standard hours. The minimum frequencies come in February and in August, excepting that at 8h. which falls a little later into March; also the minimum percentages of sky covered are irregular in their incidence.

The rule of the diurnal variation appears to be that there is a decrease of frequency from early morning to mid afternoon, followed by an increase until perhaps sunset.

TABLE 1.—CIRRUS ALONE. MEAN MONTHLY FREQUENCIES AND PERCENTAGE OF SKY COVERED.

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
8 h	Times.	4.0	3.9	3.2	4.1	4.4	6.3	4.4	4.3	7.1	6.8	6.0	4.6	59.0
	Per cent.	41	40	42	38	43	46	41	41	44	40	38	43	41
11 h	Times.	2.4	1.8	2.2	3.6	4.5	5.2	4.4	3.7	6.5	5.8	3.6	2.7	46.3
	Per cent.	38	40	42	29	45	45	43	47	48	43	43	44	42
14 h	Times.	0.9	0.5	0.9	2.6	4.1	5.2	4.1	4.4	5.3	4.2	2.7	1.2	36.1
	Per cent.	43	32	40	32	35	40	40	43	48	47	41	33	41
17 h	Times.	1.1	0.9	1.5	3.3	4.8	6.2	5.5	5.2	6.2	5.8	3.7	1.7	46.3
	Per cent.	44	40	38	31	34	34	35	34	41	43	38	37	37
Day	Times.	8.4	7.1	7.8	13.6	17.8	22.9	18.4	17.6	25.1	22.6	16.0	10.2	187.7
	Per cent.	41	38	40	33	39	41	40	41	45	43	40	39	40

Table 2 is a summarised mean of all cirrus observed at the standard daylight hours, whether other cloud forms be present

or not. It differs somewhat from Table 1. May takes something from the June maximum, while October displaces September.

TABLE 2.—MEAN MONTHLY FREQUENCIES OF ALL DAYS WITH CIRRUS.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
8 h ...	5.9	6.8	5.2	5.6	5.6	6.7	4.9	4.8	7.9	8.5	8.0	6.7	76.7
11 h ...	6.4	6.5	6.3	6.4	6.3	6.4	5.7	5.1	9.0	9.3	7.7	7.6	82.7
14 h ...	4.9	4.9	5.1	5.4	7.5	6.9	5.7	6.0	8.2	8.4	7.2	5.3	75.5
17 h ...	4.1	5.3	5.3	6.1	7.4	7.3	6.5	6.5	8.5	8.5	7.0	5.0	77.6
Day ...	21.3	23.6	22.0	23.5	26.8	27.3	22.8	22.4	33.6	34.7	29.9	24.6	312.5

ber. There is, moreover, a third maximum in February in place of the definite minimum of Table 1. There is no great variation during the day, the outstanding feature being a rise (instead of a fall) in frequency from 8h. to 11h. In interpreting these results it has to be remembered that cirrus may frequently be present in the sky though hidden by a lower cloud sheet. Another small point is that owing to difficulties of seeing—of which a bad horizon is the worst—one or another of the five observers who at one time and another from first to last have been responsible for the observations have sometimes noted "stratus" where a stratiform cloud may happen to have been cirro-stratus, though doubtless most often strato-cumulus. Taking the registers as they stand, however, the mean number of all observations of cirrus for the year is 317, or, say, on 79 days. The range of frequency is from 53 days in 1901 to 103 days in 1910. For cirrus alone the range is from 28 days in 1914 to 67 in 1906. Throughout the four years 1911 to 1914 there was a remarkable minimum of days with cirrus alone.

TABLE 3.—YEARLY TOTALS OF CIRRI'S DAYS.

Middle Year	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
Cirrus alone	46	46	51	51	52	50	51	44	40	39	37
All days with Cirrus ...	64	68	74	77	79	83	86	86	85	87	81

Middle Year	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
Cirrus alone	39	41	47	49	53	52	52	51	50	53	50
All days with Cirrus...	80	77	79	81	83	83	84	82	82	86	82

The yearly totals of cirrus frequency, averaged in sets of five, are given in Table 3. It would be interesting to know whether cirrus phenomena in other parts of the world correspond with these. For the first twenty years or so there is quite a good

correlation with Wolfer's sunspot numbers ; but the last two years spoil the effect. The mean direction of motion of cirrus over Kimberley has a very large westerly component. Table 4 is added for purposes of comparison.

TABLE 4.—AVERAGE DAILY PERCENTAGE OF CLOUD.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
8 h ...	34	36	33	28	28	23	19	19	29	30	25	31	28
11 h ...	37	40	36	26	27	24	19	18	36	36	33	35	31
14 h ...	51	53	46	37	29	21	19	20	34	41	41	48	37
17 h ...	49	52	43	31	26	20	17	17	36	40	40	44	35
20 h ...	42	43	36	27	18	15	14	13	21	30	29	38	27
23 h ...	35	40	32	22	20	17	13	12	24	28	26	32	25
Year ...	42	44	38	29	25	19	17	17	28	36	32	38	30

J. R. SUTTON.

The Spanish Meteorological Society

We have received the first two numbers (January—April, 1927) of the *Anales de la Sociedad Española de Meteorología*, a new society which has been formed to further the development of meteorological studies in Spain. The first President of the Society is Colonel Enrique Meseguer, the Director of the Spanish Meteorological Service, who contributes a paper on "The Flights to Guinea and Meteorology," illustrated by folding maps including a coloured plate of the climatic provinces of northern Africa. The issue includes also a study by M. Doporto on orographic rainfall with special reference to the Sierra de Grazalema, and several other papers, meteorological notes and a summary of the weather. The second number of the *Anales* maintains the high standard of the first. All meteorologists will join in wishing success to the new Society.

Reviews

Jahresbericht (34) *des Sonnblick-Vereines für das Jahr* 1925.

Edited by W. Schmidt. Size 11×8, pp. 32. Wien, Julius Springer, 1927, 2 Reichsmark.

An account of the founding and early history of the Sonnblick Observatory appeared in the *Meteorological Magazine* for 1926, p. 172. In July 1900, the Observatory, which had fallen on evil days, was handed over to the Bavarian state and reopened, and the present annual volume records the celebration of the 25th anniversary of this reorganisation, which was held on October 4th, a party of meteorologists foregathering at the Observatory and spending the night there. The number also contains an

obituary notice of Matthias Mayacher, who assisted in the building of the Observatory in 1885, and became assistant observer in 1893 and chief observer from 1908 until 1923, except for a period of war service. His death came only a week after the anniversary celebrations. Other articles are "High Rambles in the Sonnblick Group," by Dr. A. Smekal; "American High-level Observatories," by Dr. W. E. Bernheimer; "Snow Conditions in the Sonnblick Region," by Dr. A. Roschkott, and the usual meteorological tables for 1925. An artistic frontispiece shows fog drifting over the Sonnblick.

Deutsches Meteorologisches Jahrbuch 1925, Freistaat Sachsen.

Edited by Prof. Dr. E. Alt. $12\frac{1}{2} \times 10\frac{1}{2}$. Dresden, 1926.

In addition to the usual very complete tables of meteorological observations, this volume contains an interesting appendix by G. Dietschold on the periodic 24-hourly variation of the mean temperature of the lowest air-layer, based on the diurnal variation of temperature at 343 stations. The variations are considered from the point of view, not of local time but of Greenwich time, so that while some places are cooling down with the approach of night, others are warming up. These changes do not entirely cancel out however; a cartographic determination shows that the lowest layer of air over the earth as a whole reaches its highest temperature about 10h. G.M.T., with a departure of $+0.35^{\circ}$ C. in January and $+0.33^{\circ}$ C. in July, and its lowest temperature about 0h. G.M.T. with a departure of -0.38° C. in both months.

Obituary

Professor Svante Arrhenius.—At Stockholm on October 2nd the death occurred of Prof. Svante Arrhenius at the age of 68. Prof. Arrhenius was born at Wijk, near Uppsala, on February 19th, 1859. He studied at a number of European universities, and during the years 1881-84, at Stockholm, he worked at the theory of electrolytic dissociation, which is his claim to rank as one of the founders of the modern science of physical chemistry. He was also interested in meteorology, astronomy and geophysics, and he is well known for his theory that geological changes of climate were due to variations in the amount of carbon dioxide in the atmosphere. This theory, although now discredited, attracted great attention at the time. He also published papers dealing with auroræ and terrestrial and atmospheric electricity, and with vulcanology. Perhaps the best known of his books is "Worlds in the Making," of which an English translation appeared in 1908, where he put forward a conception of life universally diffused, constantly being emitted from all habitable worlds in the form of tiny spores which wander through space

for years or for ages, the vast majority of them only to meet with destruction, but some few to find resting-place on a body which, like our own earth, has reached the habitable stage in its history. Others of his books are "The Destinies of the Stars" and the "Lehrbuch der kosmischen Physik."

Professor Arrhenius received the Nobel prize for physics in 1903, and in 1905 was appointed Director of the Nobel Institute for Physical Chemistry in Stockholm, which position he held until his death. He received honours and awards from a number of universities and learned societies in this country, among these being the Davy medal of the Royal Society and the Faraday medal of the Chemical Society.

Frank Walter Snell.—We regret to announce the death, which occurred suddenly on October 9th, at the age of 60 years, of Mr. F. W. Snell, who had been on the staff of the Meteorological Office since 1889. Mr. Snell was a skilled telegraphist, originally in the Telegraph Department of the G.P.O., and in March, 1889, accepted the offer of a similar appointment in the Telegraph Branch (now Forecast Division) of the Office. He remained in this division for many years, operating the Morse Sounder of the direct private wire which connected the Forecast Division with the Central Telegraph Office, until the removal of the Office to South Kensington in 1910. His duties, during this period, included the reception of the telegraphic weather reports and despatching the forecasts, gale warnings, etc. In May, 1915, he was promoted Staff Assistant and transferred to the Instruments Division, where he remained until his death.

Mr. Snell was a native of Devon, coming of an old farming stock, and throughout his career maintained an enthusiastic interest in the countryside and in agricultural pursuits. He was a widower, and leaves a son and three daughters

A. T. B.

Erratum

September, 1927, page 183, line 30, for "2.39 in. on March 29th, 1917,"—read "2.39 in. on May 29th, 1917."

The Weather of September, 1927

Heavy rain and a lack of sunshine were the chief characteristics of the weather of September, and in the north and west the temperature was considerably below normal. At the beginning of the month a belt of high pressure extended over the British Isles giving mainly dry warm weather for a few days, but the approach of depressions from the Atlantic and France caused a renewal of unsettled conditions on the 5th. Rain fell repeatedly, sometimes in very large amounts, and strong winds and gales occurred at times. Over 1.5 in. of rain were measured in parts

of Scotland and northeast England on the 6th, *e.g.*, 1.92 in. fell at Pickering (Yorkshire) and 1.69 in. at Aberdeen. Thunderstorms developed locally in southern England on the 10th. After a temporary improvement on the 11th and 12th a complex depression caused some very wet weather in central, southern and eastern England round the 14th; 2.70 in. fell at Basset Down (Wilts) on the 15th, 2.58 in. at Selbourne (Hants), 2.48 in. at Brighton, 2.41 in. at Portsmouth and 2.25 in. at Titchfield (Hants) and Fritton (Suffolk) on the 14th. At Norwich 2.11 in. fell on the 14th and 1.94 in. on the 15th. From the 16th to 19th the rainfall was smaller and occurred chiefly at night, the 17th and 18th in particular being fine warm days with over 10 hours bright sunshine in many parts except the extreme south on the 18th. Further heavy rain occurred again from the 20th to 24th; among the largest measurements being 3.01 in. at Dungeon Ghyll (Westmoreland) and 2.40 in. at Inagh (Clare) on the 20th, 3.31 in. at Blaenau (Merioneth) and 2.10 in. at Edinburgh and Marchmont on the 21st, 2.72 in. at Montrose on the 22nd and 2.50 in. at St. Michael's on Wyre (Lancashire) on the 24th. A secondary depression which developed off our southwest coasts deepened rapidly as it passed to the North Sea and caused gales at exposed places on the 23rd. In its rear rather cold northerly winds and bright, though not settled, weather prevailed for a few days. Before the end of the month, however, milder, south-westerly winds were renewed with some further heavy rain and local gales at times. The total sunshine for the month was very low in many places, being more than 40 hours below normal at Kew and Falmouth.

Pressure was below normal in Newfoundland, Bermuda and western and central Europe with the exception of the western part of the Iberian Peninsula, the greatest deficit amounting to 9.8 mb. at Aberdeen. Pressure was above normal at Spitsbergen, eastern Greenland, Iceland, central North Atlantic and the Azores, the greatest excess being 5.4 mb. at Isafjord. Temperature was below normal on the western seaboard but above normal in central Europe and Spitsbergen, and rainfall, with the exception of the extreme south, was considerably above normal. In central Sweden it was as much as $2\frac{1}{2}$ times the normal.

On the 4th the first appreciable amount of rain fell on the French Riviera since April 11th. The floods in eastern Galicia continued during the early part of the month, the highest level of the Vistula being recorded at Warsaw on the 6th. Storms followed by floods occurred in North Portugal on the 2nd and in eastern Spain between the 5th and 9th. Low temperatures prevailed in Switzerland about the middle of the month and snow fell down to a level of 5,000 ft. On the lower levels there

was heavy rain and floods occurred in the Arve Valley on the 18th. Severe storms and heavy rain were experienced in eastern Switzerland, the upper Rhine Valley and the Austrian Tyrol from the 23rd-26th, and the floods were aggravated by a warm strong Föhn wind. The weather was much colder and drier on the 28th and 29th and the floods began to subside. Eleven people in all were drowned. Storms and floods were also experienced in many parts of north Italy from the 24th-26th.

A typhoon, lasting about one and a half hours and accompanied by a typhoon wave, wrecked the towns of Kojima and Nakamura near Nagasaki, Japan, on the 13th and caused floods and much damage in the surrounding districts; about 700 people were killed. On the 14th a tornado about sixty yards wide passed over Yokohama and on the same day heavy rain and floods occurred in Tokyo. Good rains fell in the Bombay Presidency between the 15th and 22nd, putting an end to the long drought over the Deccan and Carnatic and thus saving the crops. In the Gujarat area, which was flooded in July, the crops are doing well.

Unprecedented frosts occurred on the Murray River settlements, Australia, from Renmark to the mouth of the river on the night of 24th-25th, and extensive destruction has been caused to the fruit crops, especially the sultanas.

Heavy rain seriously delayed harvesting in British Columbia and the Maritime Provinces, but the weather conditions in Quebec and Ontario were favourable. In the Prairie Provinces heavy rain fell on the 13th and 14th. A severe storm accompanied by a great wave occurred on the west coast of Mexico on the 6th and incessant rain fell from the 8th-11th on the Central Plateau. Many lives were lost and floods occurred. A tornado lasting five minutes swept across St. Louis on the 29th. The wind was reported to have a velocity of 90 m.p.h. Ninety people were killed.

The special message from Brazil states that the rainfall in the northern and central districts was 0.9 in. and 0.5 in. below normal respectively, and that the distribution in the southern districts was irregular with 1.0 in. above normal. Numerous depressions passed across the south of the country and were associated with high winds and unsettled weather. The number of anticyclones was smaller than last month. The crops were in good condition except the vegetables, which were badly affected by late frosts. Pressure at Rio de Janeiro was 0.4 mb. above normal and 0.4° F. above normal.

Rainfall, September, 1927—General Distribution

England and Wales	..	233	} per cent. of the average 1881-1915.
Scotland	.. .. .	200
Ireland	.. .. .	159
British Isles	.. .. .	209

Rainfall: September, 1927: England and Wales

CO.	STATION.	In.	Per- cent. of Av.	CO.	STATION.	In.	Per- cent. of Av.
<i>London.</i>	Camden Square	4.77	262	<i>Leics.</i>	Thornton Reservoir . .	5.10	282
<i>Sur.</i>	Reigate, The Knowle . .	5.68	291	"	Belvoir Castle	3.98	213
<i>Kent.</i>	Tenterden, Ashenden . .	3.37	158	<i>Rut.</i>	Ridlington	4.02	...
"	Folkestone, Boro. San. .	3.32	...	<i>Linc.</i>	Boston, Skirbeck	3.33	189
"	Margate, Cliftonville . .	2.74	139	"	Lincoln, Sessions House	3.44	223
"	Sevenoaks, Speldhurst . .	5.15	...	"	Skegness, Marine Gdns. .	3.53	195
<i>Sus.</i>	Patching Farm	6.49	270	"	Louth, Westgate	3.83	190
"	Brighton, Old Steyne . .	6.31	302	"	Brigg	3.47	205
"	Tottingworth Park	5.53	226	<i>Notts.</i>	Worksop, Hodsock	4.26	280
<i>Hants.</i>	Ventnor, Roy. Nat. Hos. .	7.30	294	<i>Derby.</i>	Derby	4.43	...
"	Fordingbridge, Oaklands .	5.55	258	"	Buxton, Devon. Hos. . .	6.75	208
"	Ovington Rectory	7.01	306	<i>Ches.</i>	Runcorn, Weston Pt. . . .	6.64	248
"	Sherborne St. John	6.50	317	"	Nantwich, Dorfold Hall .	3.76	...
<i>Berks.</i>	Wellington College	4.94	268	<i>Lancs.</i>	Manchester, Whit. Pk. . .	5.69	239
"	Newbury, Greenham . . .	6.17	306	"	Stonyhurst College	9.04	236
<i>Herts.</i>	Benington House	4.18	230	"	Southport, Hesketh Pk . .	5.09	185
<i>Bucks.</i>	High Wycombe	6.04	320	"	Lancaster, Strathspey . .	6.77	...
<i>Oxf.</i>	Oxford, Mag. College . . .	5.30	316	<i>Yorks.</i>	Wath-upon-Deerne	3.71	235
<i>Nor.</i>	Pitsford, Sedgebrook . . .	4.36	242	"	Bradford, Lister Pk. . . .	4.07	197
"	Oundle	3.81	...	"	Oughtershaw Hall	9.09	...
<i>Beds.</i>	Woburn, Crawley Mill . . .	4.37	244	"	Wetherby, Ribston H. . . .	3.56	198
<i>Cam.</i>	Cambridge, Bot. Gdns. . .	3.48	216	"	Hull, Pearson Park	3.45	201
<i>Essex.</i>	Chelmsford, County Lab . .	4.17	242	"	Holme-on-Spalding	4.11	...
"	Lexden, Hill House	3.37	...	"	West Witton, Ivy Ho. . . .	4.87	...
<i>Suff.</i>	Hawkedon Rectory	5.00	259	"	Felixkirk, Mt. St. John . .	5.09	280
"	Haughley House	2.85	...	"	Pickering, Hungate	6.34	...
<i>Norfol.</i>	Beccles, Geldeston	3.98	206	"	Scarborough	3.73	208
"	Norwich, Eaton	7.15	334	"	Middlesbrough	3.37	203
"	Blakeney	3.61	194	"	Baldersdale, Hury Res. . .	5.76	...
"	Little Dunham	3.71	161	<i>Durh.</i>	Ushaw College	4.21	210
<i>Wills.</i>	Devizes, Highclere	5.84	286	<i>Nor.</i>	Newcastle, Town Moor . .	3.49	171
"	Bishops Cannings	5.98	273	"	Bellingham, Highgreen . .	4.63	...
<i>Dor.</i>	Evershot, Melbury Ho. . .	6.59	248	"	Lilburn Tower Gdns. . . .	5.44	...
"	Crech Grange	7.66	...	"	Geltsdale	8.10	...
"	Shaftesbury, Abbey Ho. . .	6.40	263	<i>Cumb.</i>	Carlisle, Scaleby Hall . .	7.10	263
<i>Devon.</i>	Plymouth, The Hoe	5.85	230	"	Seathwaite M. . . . .	...	...
"	Polapit Tamar	7.61	272	"	Keswick, High Hill	7.75	...
"	Ashburton, Druid Ho. . . .	7.11	229	<i>Glam.</i>	Cardiff, Ely P. Stn. . . .	7.58	244
"	Cullompton	5.15	229	"	Treherbert, Tynywaun . .	11.78	...
"	Sidmouth, Sidmount	5.51	240	<i>Carm.</i>	Carmarthen Friary	4.92	142
"	Filleigh, Castle Hill	8.05	...	"	Llanwrda, Dolaucothy . .	7.29	179
"	Barnstaple, N. Dev. Ath. . .	7.21	267	<i>Pemb.</i>	Haverfordwest, School . .	5.71	161
<i>Corn.</i>	Redruth, Trewirgie	6.96	223	<i>Card.</i>	Gogerddan	7.03	193
"	Penzance, Morrab Gdn. . . .	5.80	198	"	Cardigan, County Sch. . .	4.73	...
"	St. Austell, Trevarna . . .	7.07	222	<i>Brec.</i>	Crickhowell, Tallymaes . .	7.50	...
<i>Soms.</i>	Chewton Mendip	8.44	275	<i>Rad.</i>	Birm. W. W. Tyrmynydd . .	6.53	169
"	Street, Hind Hayes	6.63	...	<i>Mont.</i>	Lake Vyrnwy	6.77	192
<i>Glos.</i>	Clifton College	6.28	267	<i>Denb.</i>	Llangynhafal	6.11	...
"	Cirencester, Gwynfa	5.60	254	<i>Mer.</i>	Dolgelly, Bryntirion . . .	6.54	154
<i>Here.</i>	Ross, Birchlea	4.95	258	<i>Carn.</i>	Llandudno	4.58	201
"	Ledbury, Underdown	4.90	257	"	Snowdon, L. Llydaw 9 . . .	20.70	...
<i>Salop.</i>	Church Stretton	4.23	208	<i>Ang.</i>	Holyhead, Salt Island . .	3.41	127
"	Shifnal, Hatton Grange . . .	3.06	159	"	Lligwy	4.93	...
<i>Worc.</i>	Ombersley, Holt Lock	3.78	214	<i>Isle of Man</i>	Douglas, Boro' Cem. . . .	6.75	206
"	Blockley, Upton Wold	5.82	277	<i>Guernsey</i>	St. Peter P't. Grange Rd . .	7.20	277
<i>War.</i>	Farnborough	5.83	274				
"	Birmingham, Edgbaston . .	4.59	256				

Rainfall: September, 1927: Scotland and Ireland

CO.	STATION	In.	Per- cent. of Av.	CO.	STATION.	In.	Per- cent. of Av.
<i>Wigt.</i>	Stoneykirk, Ardwell Ho.	5.97	214	<i>Suth.</i>	Loch More, Achfary . . .	10.37	180
"	Pt. William, Monreith .	6.30	...	<i>Caith</i>	Wick	3.28	131
<i>Kirk.</i>	Carsphairn, Shiel. . . .	8.57	...	<i>Ork</i>	Pomona, Deerness . . .	3.34	115
"	Dumfries, Cargen	7.66	261	<i>Shet.</i>	Lerwick	3.60	120
<i>Roxb.</i>	Branxholme . . . . .	...	...	<i>Cork.</i>	Caheragh Rectory . . .	4.45	...
<i>Selk.</i>	Ettrick Manse	9.22	...	"	Dunmanway Rectory .	4.51	110
<i>Berk.</i>	Marchmont House . . .	6.04	250	"	Ballinacurra	3.07	122
<i>Hadd.</i>	North Berwick Res. . .	5.51	264	"	Glanmire, Lota Lo. . .	3.33	119
<i>Midl.</i>	Edinburgh, Roy. Obs. .	7.91	421	<i>Kerry</i>	Valentia Obsy.	5.27	127
<i>Lan.</i>	Biggar . . . . .	...	...	"	Gearahameen	9.80	...
"	Leadhills . . . . .	...	...	"	Killarney Asylvurs . . .	6.30	176
<i>Ayr.</i>	Kilmarnock, Agric. C. .	7.07	231	"	Darrynane Abbey . . .	5.51	155
"	Girvan, Pinnmore	6.55	171	<i>Wat.</i>	Waterford, Brook Lo. .	3.52	127
<i>Renf.</i>	Glasgow, Queen's Pk. .	6.60	238	<i>Tip.</i>	Nenagh, Cas. Lough . .	5.15	183
"	Greenock, Prospect H. .	9.49	200	"	Roscrea, Timoney Park	3.15	...
<i>Bute.</i>	Rothsay, Ardencraig .	7.65	189	"	Cashel, Ballinamona . .	3.14	128
"	Dougarie Lodge	5.12	...	<i>Lim.</i>	Foynes, Coolmanes . . .	5.38	187
<i>Arg.</i>	Ardgour House	8.04	...	"	Castleconnell Rec. . . .	5.03	...
"	Manse of Glenorchy . .	8.64	...	<i>Clare</i>	Inagh, Mount Callan . .	8.93	...
"	Oban	5.46	...	"	Broadford, Hurdlest'n .	5.66	...
"	Poltalloch	5.52	121	<i>Wexf.</i>	Newtownbarry	2.87	...
"	Inveraray Castle	9.75	152	"	Gorey, Courtown Ho. . .	2.37	96
"	Islay, Eallabus	6.43	154	<i>Kilk.</i>	Kilkenny Castle	2.87	124
"	Mull, Benmore	12.00	...	<i>Wic.</i>	Broadnew, Clonmannon .	2.48	...
"	Tiree	3.96	...	<i>Carl.</i>	Hacketstown Rectory .	2.91	104
<i>Kinr.</i>	Loch Leven Sluice . . .	7.46	290	<i>QCo.</i>	Blandsfort House	3.41	125
<i>Perth</i>	Loch Dhu	7.10	124	"	Mountmellick	4.32	...
"	Balquhiddie, Stronvar .	6.83	...	<i>KCo.</i>	Birr Castle	4.88	...
"	Crieff, Strathearn Hyd. .	3.91	137	<i>Dubl.</i>	Dublin, FitzWm. Sq. . .	2.85	148
"	Blair Castle Gardens . .	4.10	173	"	Balbriggan, Ardgillan .	3.87	190
<i>Forf.</i>	Kettins School	3.43	172	<i>Me'th</i>	Beauparc, St. Cloud . .	4.69	...
"	Dundee, E. Necropolis .	5.32	256	"	Kells, Headfort	4.07	153
"	Pearsie House	3.89	...	<i>W.M.</i>	Moate, Coolatore . . . .	...	...
"	Montrose, Sunnyside . .	5.87	295	"	Mullingar, Belvedere .	4.45	167
<i>Aber.</i>	Braemar, Bank	4.22	168	<i>Long</i>	Castle Forbes Gdns. . .	5.43	189
"	Logie Coldstone Sch. . .	5.32	228	<i>Gal.</i>	Ballynahinch Castle . .	9.97	210
"	Aberdeen, King's Coll. .	6.38	288	"	Galway, Grammar Sch. .	5.84	...
"	Fyvie Castle	7.22	...	<i>Mayo</i>	Mallaranny	9.14	...
<i>Mor.</i>	Gordon Castle	6.98	280	"	Westport House	6.92	195
"	Grantown-on-Spey . . .	6.03	243	"	Delphi Lodge	13.65	...
<i>Na.</i>	Nairn, Delnies	5.11	232	<i>Sligo</i>	Markree Obsy.	6.13	183
<i>Inv.</i>	Ben Alder Lodge	6.26	...	<i>Cav'n</i>	Belturbet, Cloverhill . .	4.21	170
"	Kingussie, The Birches .	3.85	...	<i>Ferm</i>	Enniskillen, Portora . .	4.51	...
"	Loch Quoich, Loan . . .	12.00	...	<i>Arm.</i>	Armagh Obsy.	5.27	214
"	Glenquoich	10.70	124	<i>Doun</i>	Fofanny Reservoir . . .	5.85	...
"	Inverness, Culduthel R. .	5.65	...	"	Seaforde	4.90	178
"	Arisaig, Faire-na-Squir .	4.71	...	"	Donaghadee, C. Stn. . .	4.36	183
"	Fort William	7.51	119	"	Banbridge, Milltown . .	4.57	186
"	Skye, Dunvegan	5.25	...	<i>Antr.</i>	Belfast, Cavehill Rd. .	5.85	...
<i>R&C</i>	Alness, Ardross Cas. . .	6.43	220	"	Glenarm Castle	6.18	...
"	Ullapool	7.18	...	"	Ballymena, Harryville .	5.48	176
"	Torridon, Bendamph. . .	8.36	120	<i>Lon.</i>	Londonderry, Creggan .	5.40	164
"	Achnashellach	8.04	...	<i>Tyr.</i>	Donaghmore	4.95	...
"	Stornoway	6.12	155	"	Omagh, Edenfel	4.31	141
<i>Suth.</i>	Lairg	4.83	...	<i>Don.</i>	Malin Head	4.39	167
"	Tongue	5.71	181	"	Dunfanaghy	5.15	149
"	Melvich	4.76	170	"	Killybegs, Rockmount .	7.09	154

Climatological Table for the British Empire, April, 1927

STATIONS	PRESSURE		TEMPERATURE						Mean Cloud Am't	Relative Humidity	PRECIPITATION			BRIGHT SUNSHINE		
	Mean of Day M.S.L.	Diff. from Normal	Absolute		Mean Values						Mean	Diff. from Normal	Days	Hours per day	Per-centage of possible.	
			Max.	Min.	Max.	1 and 2 min.	Diff. from Normal	Wet Bulb.								
																° F.
mb.	mb.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	in.	in.	in.	in.	in.	in.	in.	in.
London, Kew Obsy.	1014.3	- 0.1	70	32	55.4	41.0	48.2	+ 0.9	41.8	82	6.0	1.78	+ 0.33	12	5.7	41
Gibraltar	1017.4	+ 0.9	79	48	67.9	53.9	60.9	- 0.1	52.5	78	3.8	1.30	- 1.38	4	...	...
Malta	1015.2	+ 1.2	71	47	64.6	55.4	60.0	- 0.9	56.2	82	4.4	0.35	- 0.51	4	9.8	75
St. Helena	1011.3	+ 1.2	72	58	67.0	60.4	63.7	- 2.1	61.0	89	3.0	3.36	- 0.51	19	...	...
Sierra Leone	1010.9	+ 0.1	91	70	88.1	75.1	81.6	- 0.8	76.2	77	6.6	6.90	+ 2.84	9	...	...
Lagos, Nigeria	1008.5	- 1.3	91	72	88.0	77.0	82.5	0.0	77.9	81	6.7	3.37	- 2.38	8	...	...
Kaduna, Nigeria	1013.9	+ 3.2	98	...	93.5	...	...	...	75.2	71	...	2.81	- 0.48	6	...	...
Zomba, Nyasaland	1012.0	- 0.5	83	47	78.4	59.3	68.9	- 0.4	...	80	7.0	6.34	+ 2.68	19	...	...
Salisbury, Rhodesia	1012.6	- 1.1	81	45	76.0	54.9	65.5	- 0.2	59.6	67	4.6	2.37	+ 1.38	7	6.7	57
Cape Town	1016.0	- 0.3	101	46	76.5	55.4	65.9	+ 2.7	57.2	82	3.8	1.35	- 0.57	7	...	...
Johannesburg	1015.8	+ 0.3	77	35	70.3	49.5	59.9	+ 0.1	52.2	64	2.1	1.82	+ 0.08	8	8.3	73
Mauritius	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bloemfontein	...	...	77	35	72.4	48.7	60.5	- 0.3	53.0	75	2.4	1.17	- 0.96	4	...	...
Calcutta, Alipore Obsy.	1005.0	- 1.3	103	70	97.5	77.5	87.5	+ 1.8	77.8	81	3.6	2.07	+ 0.18	3*	...	...
Bombay	1008.0	- 0.8	92	73	88.5	76.5	82.5	- 0.6	74.0	74	2.1	0.00	- 0.05	0*	...	...
Madras	1007.3	- 1.1	101	73	94.7	78.9	86.8	+ 1.5	78.3	73	3.5	0.00	- 0.53	0*	...	...
Colombo, Ceylon	1008.6	- 0.5	91	72	88.9	75.4	82.1	- 0.5	78.8	73	6.7	11.00	+ 2.70	15	7.6	62
Hongkong	1013.6	+ 0.9	78	54	71.6	64.1	67.9	- 2.9	64.5	83	8.3	7.13	+ 1.83	16	3.5	29
Sandakan	...	...	91	75	88.8	75.9	82.3	- 0.0	78.0	89	...	3.44	- 0.63	7	...	...
Sydney	1016.6	- 1.9	84	47	70.0	57.0	63.5	- 1.2	59.0	81	6.7	18.58	+ 13.01	18	4.5	40
Melbourne	1020.4	+ 1.0	82	44	65.3	50.5	57.9	- 1.6	52.7	71	5.3	0.57	- 1.68	7	4.5	40
Adelaide	1021.3	+ 1.3	87	45	72.2	52.2	62.2	- 1.7	54.2	55	4.2	0.16	- 1.59	3	7.3	66
Perth, W. Australia	1018.4	- 0.1	94	53	80.8	60.0	70.4	+ 3.8	61.4	55	4.2	1.32	- 0.26	6	8.4	74
Coolgardie	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Brisbane	1015.2	- 2.4	85	55	78.7	61.5	70.1	- 0.2	63.9	73	3.7	2.07	- 1.52	6	7.8	68
Hobart, Tasmania	1017.8	+ 3.3	70	35	60.5	47.2	53.9	- 1.2	48.4	67	7.0	0.52	- 1.37	11	4.8	44
Wellington, N.Z.	1014.3	- 3.8	67	38	62.8	49.9	56.3	- 0.6	52.5	69	5.7	1.53	- 2.35	11	5.7	52
Suva, Fiji	1010.6	0.0	91	71	88.0	74.5	81.3	+ 2.6	76.3	81	6.2	10.46	- 0.82	25	6.4	55
Apia, Samoa	1010.6	+ 0.7	88	71	86.0	74.4	80.2	+ 1.3	77.3	79	4.1	10.68	+ 0.44	14	7.8	66
Kingston, Jamaica	1013.5	- 0.6	89	67	86.3	69.3	77.8	- 0.6	68.8	82	3.0	0.90	- 0.34	5	9.6	77
Grenada, W.I.	1008.7	- 3.7	87	71	84.6	73.9	79.3	+ 0.4	74.9	77	5.7	6.32	+ 4.04	21	...	...
Toronto	1018.8	+ 3.3	74	25	52.3	34.6	43.5	+ 2.1	35.9	61	5.4	1.03	- 1.37	11	7.4	55
Winnipeg	1017.4	+ 0.4	69	14	48.1	31.5	39.8	+ 2.0	32.9	83	6.4	2.43	+ 0.94	10	5.0	36
St. John, N.B.	1009.8	- 3.8	61	19	46.2	30.7	38.5	- 0.5	34.3	71	4.7	2.43	+ 1.08	7	7.1	53
Victoria, B.C.	1016.9	- 0.4	62	32	53.3	40.3	46.8	- 0.9	42.8	72	6.7	0.82	- 0.91	11	6.2	45

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