

MONTHLY WEATHER REPORT OF THE METEOROLOGICAL OFFICE.

SUMMARY OF OBSERVATIONS COMPILED FROM RETURNS OF OFFICIAL STATIONS AND VOLUNTEER OBSERVERS.

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JULY, 1923: HOT AND THUNDERY.

General.—The first few days of the month were characterised by westerly winds with mainly overcast skies and a temperature slightly below normal. After the 4th the continental anticyclone spread north-westwards and the weather became fine and sunny with high day temperatures and warm nights. Maximum temperatures of 90°F. and over were recorded locally. Thunderstorms developed in the west and north about the 6th and continued at times throughout the following week. On the 8th floods, associated with a severe thunderstorm, caused considerable damage at Carrbridge, Inverness, while on the night of the 9th-10th remarkable thunderstorms lasted throughout the night in London and the neighbouring counties, only passing northward on the morning of the 10th. Heavy rainfalls were associated with these storms. After the middle of the month depressions from the Atlantic spread further south across the British Isles, causing cooler and more cloudy weather with much rain and occasionally strong westerly winds on exposed parts of the coast.

The general character of the month is illustrated by the following remarks taken from observers' notes and returns:—Copdock (Suffolk).—The most remarkable spell of heat which I have ever recorded in any month in my 22 years' observation here occurred during the period 4th—23rd. Rainfall considerably below average, sunshine above average. Southport.—One of our warmest Julys, yet exceptionally dull, the warmth being due to a general southerly component in the prevailing westerly winds, instead of the normal summer northerly component. Hence also the cloudiness. Torquay.—The month was consistently warm and dry throughout, and although the total sunshine was below the average the days were generally sunny and free from heavy cloud. Walton-on-Naze.—A great absence of easterly winds, with extremes of temperature and low rainfall. Insect pests were abnormal. Arisaig (Inverness).—An unusually dark, wet and gloomy month. Jardington (near Dumfries).—July was a month of remarkable vegetable growths. Dublin.—The weather was exceptionally fine and warm until the last few days which were cool and unsettled.

Pressure and Winds.—The mean pressure of the month was below normal in the northern part of the British Isles and above normal in the extreme southern part. The departure of the monthly means of pressure at fixed hours varied from -2.9 mb. at Stornoway to +1.8 mb. at Scilly. The isobars of mean pressure trended essentially from W.S.W. to E.N.E. and lay closer together than those of the normal map for the month.

Two primary depressions traversed the British Isles, the first (Track J) on the 28th and the second (Track K) on the 31st. One secondary depression crossed northern Scotland on the 15th. The highest pressure recorded during the month was 1031 mb. at Pendennis Castle, Falmouth, on the 21st and at Scilly on the 22nd; the lowest was 990 mb. at Spurn Head on the 31st.

The strongest winds of the month occurred mainly within the last few days, notably on the 26th and 28th. On the 26th the anemometers at Fleetwood and Southport registered gales of 3 hrs. and 2 hrs. duration respectively. The highest recorded gust of the month was one of 57 m.p.h. at Paisley on the same date. The thunderstorm in the London area on the evening of the 10th gave rise to a gust of 52 m.p.h. at Croydon at 18h. 15m.

Temperature.—The mean temperature of Districts 1-10 was 61°F. The mean temperature of each District was above the normal for the month as a whole and for each of the first three weeks of the month taken separately. The largest excess was in England east, +4.0°F., the mean temperature being 65°F., and the smallest excess, +1.5°F., was in Scotland north, Scotland east and the Channel Isles, with mean temperatures of 56°F., 58°F., and 63°F. respectively.

On the 7th some maxima exceeding 90°F. were recorded, viz:—92°F. at Camden Square and 91°F. at Lincoln and Raunds. The 12th and 13th were the hottest days generally, and the day maxima exceeded 90°F. at most stations in England east, south-east and the Midland Counties; the highest was 96°F. at Camden Square on the 13th. In London the high values of August 1911 were not equalled, but at Kew on the 12th and 13th the maximum of 91°F. was slightly higher than any other July reading. Several records were established. The maxima of 95°F. at Isleworth on the 12th and 13th were the highest since August, 1911; that of 91°F. at Tenbury on the 12th was the highest temperature during 23 years observations; that of 87°F. at Torquay on the same date was the highest recorded since official statistics were first compiled. The temperature of 92°F. registered at the old-established station at Cullompton (Devon) on the 12th was a record, as also was that of 85°F. read at Falmouth on the same day. At Copdock (Suffolk) the maximum exceeded 90°F. on 3 days and 80°F. on 10 days. At Meltham (Yorks) the earth tem-

perature at 1 foot on the 14th was the highest in any month during the last 39 years. 86°F. was reached at three Scottish stations on the 6th and 81°F. at Aberdeen on the 12th.

The extreme screen temperatures for the month were:—(England and Wales) 96°F. at Camden Square on the 13th, 41°F. at Aldershot on the 5th; (Scotland) 86°F. at Kilmarnock, Ruthwell and Cargen on the 6th, 36°F. at West Linton (Peebles) on the 19th; (Ireland) 86°F. at Waterford (Gortmore) on the 12th and 44°F. at Markree (Sligo) on the 14th. The lowest reading of a thermometer exposed over grass was 29°F. at West Linton (Peebles), on the 19th.

During the spell of hot weather the nights were remarkably warm; from the 6th-16th the temperature only once fell below 60°F. at Kew and on the night of the 12th-13th it remained as high as 68°F. throughout. On the same night the minimum was also 68°F. at Tavistock and Lympe. At Renfrew on the nights of both the 5th and 6th the minimum was as high as 60°F.

Precipitation.—Rainfall was in excess in five Districts, viz:—Scotland north, Scotland west, England east, England north-west and Midland Counties. In all other Districts there was a deficit. There was, however, considerable variation in the percentage of the normal falls recorded at different places in the same District owing to the prevalence of thunderstorms. Thus at Eastbourne, where heavy rain fell on the occasion of the great thunderstorm on the night of the 9th-10th, 146 per cent. of the normal for the month was registered; at Tenterden, Kent, 26 miles away, the percentage was only 27, no rain falling on that night. At Mickleover (Derbyshire) 251 per cent. of the normal fall was recorded and at Fort William 178 per cent. Very heavy falls occurred on the night of the 9th-10th in England south-east. (see below)

The thunderstorms of the month fell into three main groups. The first group began on the night of the 6th-7th and the line of storms progressed eastwards over the Kingdom, but the greatest intensity was reached in the north of England and Scotland. Great damage to bridges and railway embankments occurred in the Carrbridge district of Inverness-shire from what is popularly known as a "cloud-burst" on the afternoon of the 8th. The second series began with the memorable all-night storm which affected London and parts of Sussex and adjacent counties on the night of the 9th-10th. The main characteristic of this storm was the extraordinary frequency of the lightning, which continued for a period of 6-8 hrs. Mr. Spencer Russell's brontometer at Chelsea recorded 6,924 flashes in the 6 hours from 22h. on the 9th to 4h. on the 10th. The average number of flashes per minute during the hour 23h-24h. were 26. At Wadhurst (Sussex) counts of the flashes indicated a frequency of 1,600-1,700 flashes per hour at the height of the storm. Some very heavy rainfalls were registered near the Sussex Coast in the Brighton neighbourhood, the greatest being 103mm. during the night at Seaford Waterworks. The largest London rainfall was 65mm. at Hampstead Observatory. The Rev. H. H. Breton, who observes at Alfriston (Sussex), writes that a man 97 years old with an excellent memory stated that no such terrible storm had occurred in that neighbourhood during his lifetime. Further storms occurred locally during the early evening of the 10th. A third series of storms began on the 12th, affecting chiefly south-west England and the West Midlands. On the whole the damage wrought by the storms was not excessive and there were no hailstorms of great severity. (See *Meteorological Magazine* for August for a fuller account of the July thunderstorms.)

Sunshine.—The duration of sunshine was above the normal in England south-east, east and north-east and in Scotland north. In all other Districts the duration was below the normal. The largest excess occurred in England south-east, where a mean daily value of 8.10hrs. corresponded with an excess of 1.14 hr.; the largest deficit was in England south-west, where a mean daily value of 5.16hrs. corresponded with a deficit of 1.23hr. In consequence, the mean sunshine gradient was very steep along the south coast of England and was also steep down the east coast from Yorkshire to Kent. England south-east had 51 per cent. of the possible sunshine, while Scotland north had only 25 per cent. and Ireland north only 26 per cent. A number of good sunshine records were obtained, notably on the 6th, 9th and 12th. On the 12th Seskin (Waterford) had 15.5 hrs. and Aspatria (Cumberland) had 15.2 hrs. On the 9th 15.0 hrs. were measured at Folkestone.

Fog.—Inland fog was of infrequent occurrence. Some sea fog was observed, notably on the northern coasts of Cornwall and Devon.

Miscellaneous Phenomena.—Solar halos were observed at Oxford on 15 days and on one or two occasions at a few other stations. Several lunar halos were also reported.