Dry with a few days of heavy rain

Between 1st and 6th pressure was fairly high and, while weak cold fronts affected the country from time to time, the weather was mostly dry with winds between southwest and northwest in direction. Between 7th and 11th winds were predominantly from a northerly or northeasterly direction and it remained mostly dry but cool. During 12th winds became light and variable with some rain in the east and southeast during the evening. Between 13th and 20th a series of deep depressions moved northeastwards towards Iceland on a track far enough to the west for Ireland to escape the worst of the storms. Nonetheless, it was windy on 15th and especially between 18th and 20th. Fronts gave rain in all areas on 13th, 15th and 18th. Heaviest falls of the month were associated with disturbances developing on a cold front causing it to give spells of heavy rain as it moved slowly eastwards between 20th and 22nd. In mild south to southwest winds we had pleasant conditions on 23rd and 24th as pressure rose gradually. Weak fronts affected the country on 25th and 26th. Winds veered northwesterly on 27th as an anticyclone to the southwest began to move towards us; this high pressure area dominated our weather for the rest of the month.

Rainfall - well below normal

While there was occasional rain chiefly on 1st, 3rd and 6th - 7th most areas escaped quite lightly, the south and east faring better than the north and west. The period 8th - 11th was dry apart from isolated showers. Late on 12th there was enough instability for heavier showers in the east and southeast. On 13th a cold front gave up to 10mm in parts of the west but less than 1mm in the east. A wave disturbance passing by the south coast gave some heavy rain in south Munster and the southeast of Leinster on 14th. An active warm front followed by a weaker cold front gave widespread rain on 15th but 16th and 17th were largely dry. A cold front moving eastwards late on 17th and early on 18th gave a pattern of rainfall similar to 15th. The most active rainfall of the month approached the west coast late on 19th and gave spells of heavy rain as it moved slowly and erratically eastwards during 20th and 21st. During 20th Cahirciveen (Valentia Observatory) had 34mm of rain while a number of other places had more than 20mm. A depression formed to the southeast of Ireland late on 21st and in moving northeastwards on 22nd gave persistent rain in the east and south. Casement Aerodrome had a fall of 32mm on 22nd, its highest daily fall for September in 26 years of records. Between 23rd and 26th there were a few light falls of rain, mostly in the north and west.

The period 27th to 30th was dry.

Percentage totals for the month ranged from 34% of normal at Dublin Airport to 79% of normal at Birr but were less than 70% of normal in most areas. The number of days with rainfall of 1mm or more ranged
Distribution of daily values

September 1989

Rainfall

Sunshine

Temperature

Max
Mean
Min

Cork

Shannon

Dublin

Mullingar

Malin Head

CAHRCWEN

ROSSRAE

KILKENNY

BIRR

BELMULLET
Wednesday the 20th: frontal cloud covers Ireland

The main feature on the satellite picture (taken at 1350Z on 20th) is the active cold-frontal band of cloud over and to the west of Ireland. Wave disturbances on this long trailing front made its eastward progress to be slow and erratic and caused this September's heaviest rainfalls. One of the disturbances developed into a depression which was still causing rain on the east coast during the afternoon of the 22nd.
The graph shows the yearly soil moisture deficits for Oak Park Co. Carlow as compared with normal. The main feature of the graph is the wet conditions in March and April followed by the rapid drying conditions in May leading to a drought in June. Relief from the June drought was short lived due to the intensive drought in the hot spell of July giving a maximum of 85mm in August instead of the normal 155mm. High rainfall in August and early September followed by excessive and continued drying results in high soil moisture deficit values through October.

**Soil Moisture Deficits**

**Meteorological Summary 1989**

| Station          | Rainfall | Air Temperature | Sunshine | Wind | Number of days with
<table>
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**Notes:** Rainfall in millimetres. Temperatures in Degrees Celsius. Sunshine in Hours and Wind in Knots. Gust = Gust of > 32.0 knots. "-'" days with < 0.2mm or more.

All data published in this bulletin are provisional. The final values will be published in the Monthly Weather Report.
from 14 (average 17) at Belmullet to 4 at Dublin Airport (average 11) but in most areas was between 6 and 10 and well below the September average.

While none of our stations reported thunder, there were indications of thundery activity late on 12th and during the period 20th to 22nd. Hail was reported only at Galway on 19th. The 32mm fall at Casement Aerodrome on 22nd exceeded by 7mm the monthly total at nearby Dublin Airport.

Temperatures
Mean temperatures for the month were generally about 0.4°C above normal in the east and south and just about normal in the north, west and midlands. However, they ranged from 0.5°C above normal at Rosslare and Dublin Airport to 0.2°C below normal at Belmullet.

Mean maximum temperatures ranged from 0.8°C above normal at Roche's Point (as the Cork stations recorded their highest mean maxima for 8 years) to 0.3°C below normal at Brr; in most areas they were about or below normal.

Warmest days were 5th, 6th, 12th, 15th, 16th, 20th, 23rd and 24th. Highest temperature of the month was 21.5°C recorded at Kilkenny on 5th. Coolest days occurred between 7th and 10th and between 27th and 30th.

Mean minimum temperatures ranged from 1.0°C above normal at Kilkenny to 0.3°C below normal at Belmullet. Coolest nights were 3rd, 11th, 14th, 17th and 29th. Lowest temperature was 2.4°C recorded at Kilkenny on 3rd. Mildest nights were 18th, 20th and 24th to 26th.

Sunshine
Total sunshine ranged from 138.8 hours at Roche's Point to 77.5 hours at Brr while percentages for the month varied between 70% of normal at Brr and 115% at Cahirciveen (Valencia Observatory). In the midlands, east and southeast it was generally the dullest September for 6 to 12 years but at Brr it was the dullest since 1969.

Highest daily totals were recorded on 5th and 6th, between 8th and 11th and during 29th-30th. There were no days which were sunny at all our stations. During September possible sunshine varies between nearly 14 hours at the beginning and about 11.5 hours at the end. The number of days with a relatively modest 8 hours or more of sunshine ranged from 1 to 3 in most places; Roche's Point and Malin Head had 5 such days while Cahirciveen had 7. Highest daily duration was 11.5 hours recorded at Cork Airport on 6th.

Winds
Widespread strong and gusty winds were confined to 15th and period 18th to 20th. On 15th winds gusted 40 to 50 knots. Between 18th and 20th winds gusted 40-60 knots generally with gusts in excess of 60 knots near the coasts of Connacht and Ulster. Highest gust of the month was 70 knots recorded on 19th at Belmullet which also recorded 68 knots early on 18th. The number of days with gale gusts ranged from 10 at Malin Head to less than 5 at all the inland stations.

Fog
Fog was fairly widely reported on 6th, 7th, 12th and 17th but generally did not persist for long.

Soil Moisture Deficit
Soil loses its moisture by evaporation or evapotranspiration as well as through percolation and drainage. The process of transpiration requires a transport of water through plants which offers resistance to flow. A soil is said to be at field capacity when it contains all the moisture it can freely hold against gravity. Clearly this quantity varies with the soil characteristics such as pore size and the hydraulic conductivity.

Excessive moisture may lead to a state of saturation or even waterlogging but after a low rainfall period the soil will return again to its field capacity state. Further evaporation, or where there is a crop cover, evapotranspiration, leads to a Soil Moisture Deficit (SMD). If evapotranspiration continues to exceed incoming rainfall or irrigation the SMD will increase, whereas if excess rainfall occurs the SMD may be reduced or eliminated.

SMD is usually expressed in terms of depth of water in the same manner as rainfall amounts. The amount of rainfall needed to replenish the SMD can easily be calculated whereas if irrigation is undertaken, the volume of water required is estimated considering the area, e.g. to reduce SMD by 25mm over a hectare of ground requires an application of 250,000 litres of water.

Tillage is best undertaken when the soil is dry - the existence of SMD makes for improved cultivation and good trafficability. While a moderate SMD in April is good for spring sowing conditions, a large SMD in April/May can lead to poor establishment and uneven emergence of crops. High SMD in June may not be unwelcome to those concerned with silage and hay making but excessively large soil moisture deficits in July and early August can inhibit the growth of many crops, especially the shallow rooted or bulking root crops, e.g. grass or potatoes. Again in August or September, a moderately large SMD leads to good harvesting conditions. See graph of 1989 values inside.