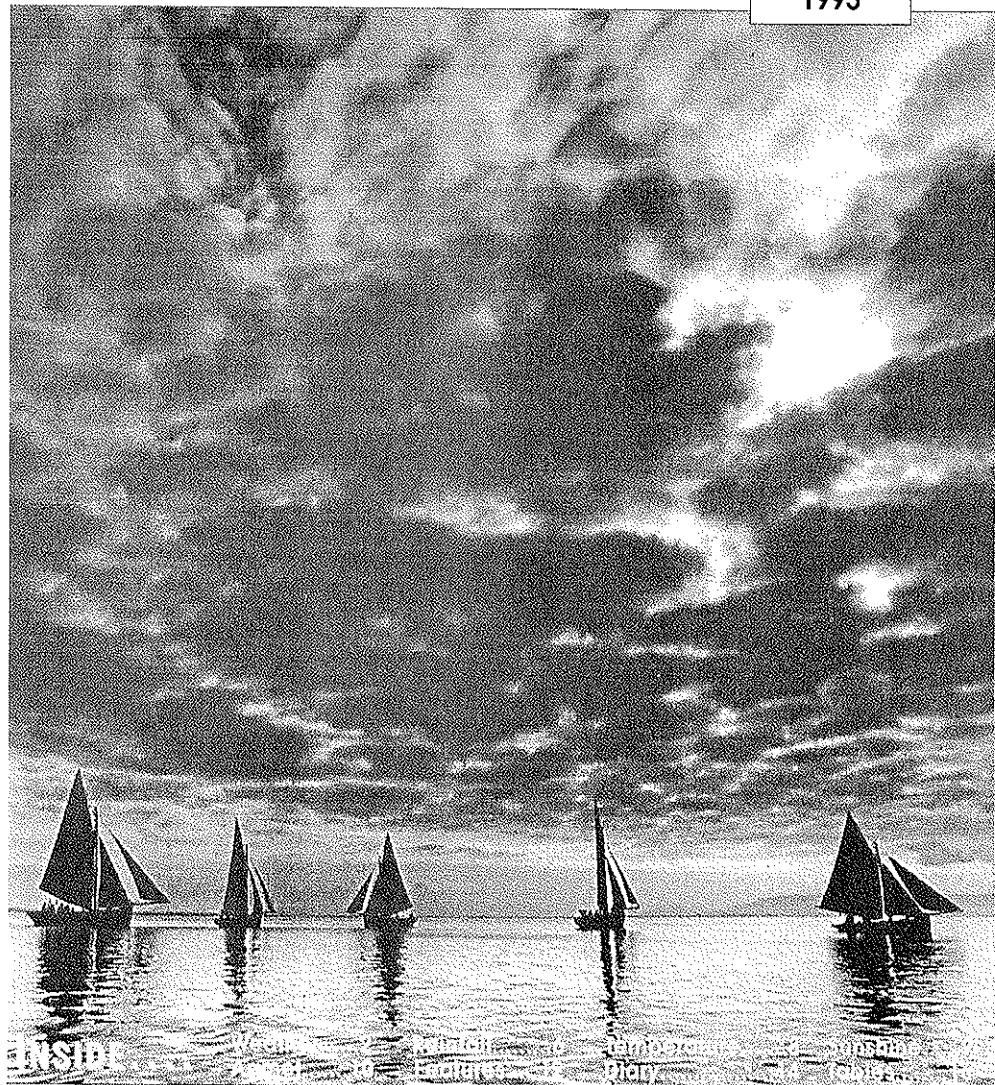


Monthly Weather Bulletin

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**OCTOBER
1993**

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Cover

Saturday the 23rd saw a gathering of hookers in Galway Bay as part of Connadh na Gaeilge's centenary celebrations. The calm sea and dry, settled conditions were due to the dominance of high pressure during the period, although a cold front off the northwest had sufficient influence to generate the layer of stratocumulus cloud that covers most of the sky in the picture. (picture Joe Shaughnessy, Connacht Tribune)

Below

The picture below was taken during the late afternoon of Sunday the 3rd. A deep depression of 964hPa was centred to the northwest of Ireland at the time and its associated fronts had cleared all but eastern areas. (picture Dundee University)



Easterlies dominate

- cold, dry and sunny, except along east coast

October's weather was unsettled during the first fortnight but high pressure became dominant from the middle of the month onwards. It was not a typical October: even during that first rather changeable fortnight, low pressure was usually to be found to the south or east of the country rather than in its more usual location to the north or west. Winds during the first couple of weeks blew mostly from between north and east. During the anticyclonic conditions of the second half of the month winds were mostly light, but became easterly again towards the end of the month. The end result is that October was a cold, dry but sunny month generally - similar to October of last year - except along the exposed east coast, where there was more rain and less in the way of sunshine.

The weather chart at the beginning of the month showed a complex area of low pressure over Ireland which persisted until the 3rd. Its centre swung around from off the west coast on the 1st to off

the south-east coast on the 2nd before a short-lived weak ridge of high pressure replaced the low early on the 3rd. Rainbelts associated with the low pressure area remained near the south and west coast on the 1st and near the east and north-east on the 2nd. Meanwhile another deep low was developing in mid-Atlantic. Warm and cold fronts from this depression swung eastwards over the country during the 3rd bringing rain to all areas. The depression centre stayed off the west coast on the 4th giving southerly winds over the country which led to some of the highest temperatures of the month.

The low pressure centre moved to the south and later to the south-east of the country on the 5th and 6th. The heaviest rainfall of the month was recorded at Warrenstown in Co. Meath when 60mm fell on the 6th. This low pressure was not just a surface feature but extended right up through the atmosphere. This type of synoptic situation favours the development of thunderstorms and thundery activity was indeed widespread between the 4th and the 6th, most of the thunder occurring off the

south and east coasts. The depression stayed close to the south-east of Ireland on the 7th and 8th. Rainbelts moved northwards across the country on the 7th. Again on the 8th there was great instability through the atmosphere, up to about 25,000 feet according to the radiosonde launched from Valentia Observatory. This allowed large cumulonimbus clouds to develop which resulted in further widespread thunderstorm activity during the afternoon and evening of the 8th, mainly over the southern half of the country.

A weak ridge of high pressure moved in over the country late on the 9th and early on the 10th, and the slack winds, wet land surfaces and clear skies allowed temperatures to drop and humidities to rise, with the result that fog became widespread during the night and cleared only slowly during the morning of the 10th. Meanwhile another depression deepened in the middle of the North Atlantic and moved eastwards close to the 45°N line of latitude, south of Ireland, during the 11th and 12th. As the depression moved over the Bay of Biscay on the 12th the airflow over Ireland became more northerly, with air having its origins close to the North Pole making its way down over Ireland late on the 12th and 13th. Ground frost was reported at many stations on the night of the 12th/13th. The depression moved into the English Channel on the 13th, allowing a cold north-easterly airflow down over Ireland. This flow was maintained on the 14th by another depression which moved up from the south into Biscay.

However from the 14th to the 18th a large high pressure area in the North Atlantic gradually moved in over Ireland and as it became more established there were cold, calm, frosty nights and some good sunny days. Fog and air frost in the mornings were a feature of this period, especially in the midlands. The air temperature at Birr dropped below -5°C on the 17th and the ground temperature had reached -11.8°C the previous night, setting new station records for October in both cases. The values recorded at inland

WINDS AND WEATHER

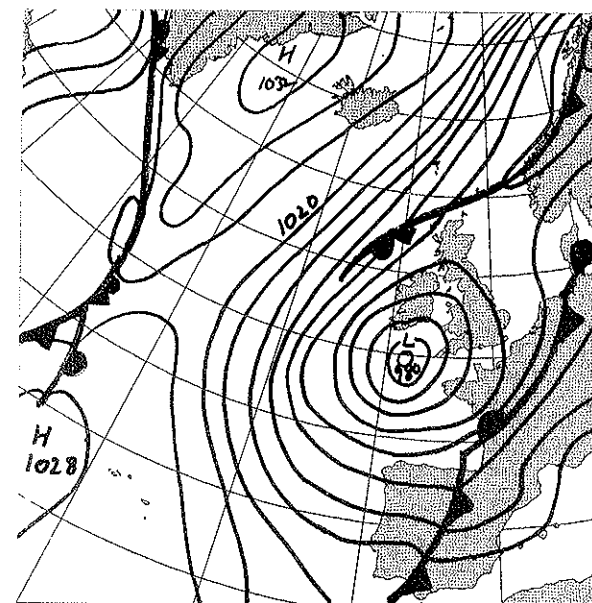
Winds were generally light during the month. Mean wind speeds were the lowest on record for October at stations in the midlands and southwest and the lowest for more than thirty years in the extreme north and northwest. Rosslare was the only station to report winds of gale force. However gusts of gale force or above were reported on occasions, mostly from coastal stations during the first week of the month. The strongest gusts were recorded on the 6th, Belmullet's gust of 49 knots that day being the highest of the month. Gale gusts were also reported from Malin Head and Rosslare between the 12th and 14th.

Thunder was reported in the Dublin area on the 5th and from some southern stations on the 8th. Malin Head reported hail on four consecutive days, from the 13th to the 16th, but there were very few occurrences otherwise. Most stations had between one and six days with fog, although a few escaped altogether. The fog mostly occurred on the 3rd, 10th, 11th, 24th and 25th.

stations during the period were the coldest for October for between 30 and 40 years. Apart from a few showers it was generally a dry period and provided the best sunshine of the month.

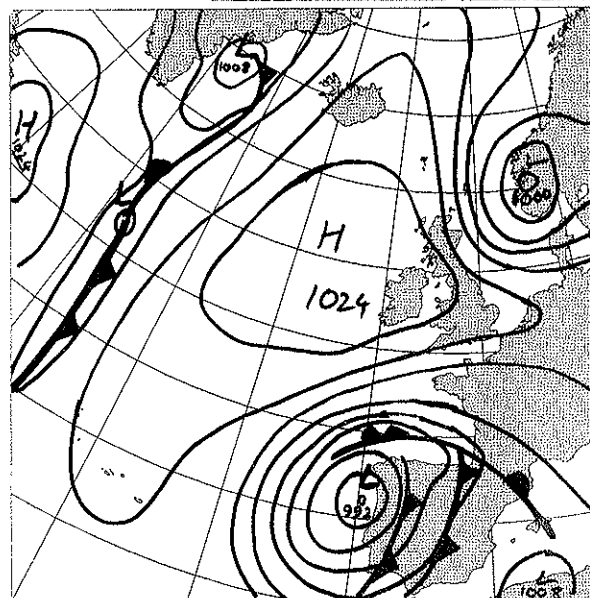
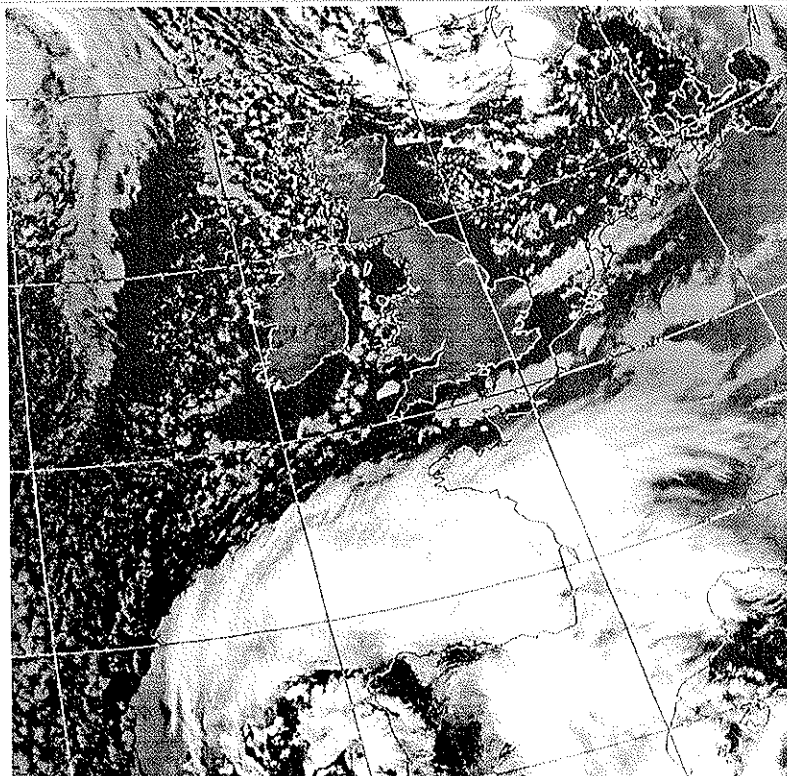
Below

The depression to the south of Ireland at midday on the 5th gave some of the heaviest rain of the month.

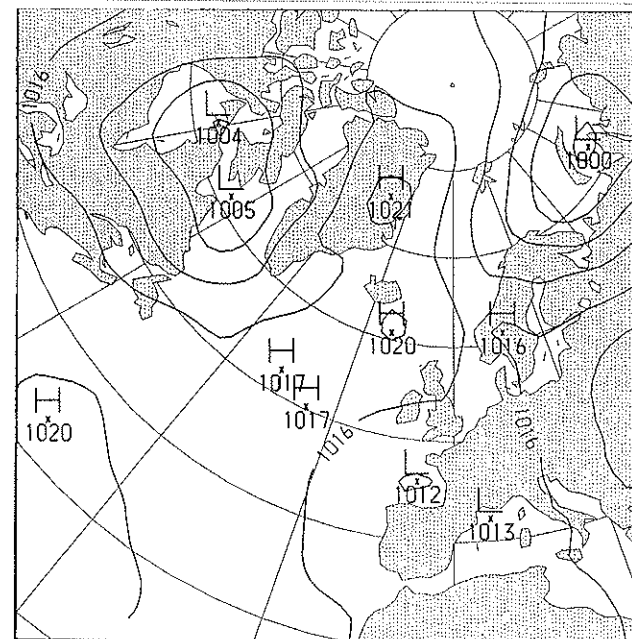


Right
This infra-red satellite picture was taken around 5a.m. on Saturday the 16th. A large area of cloud to the south indicates an active depression centred off the coast of Portugal, and the characteristic swirl of cloud near the Norwegian coast represents a second depression. However high pressure was the dominant weather influence in the vicinity of Ireland during this period, giving mostly clear, calm, cold nights. (picture Dundee University)

Below
The chart below shows the synoptic situation at midday on the 16th.

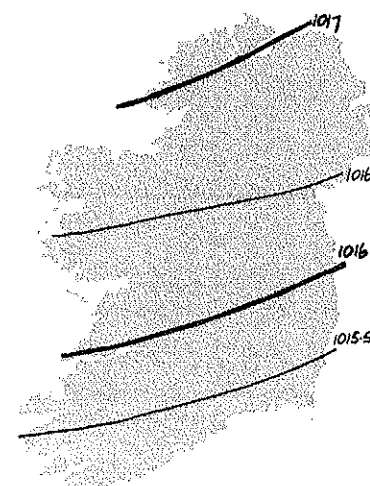


The high pressure wavered a little from the 19th to the 21st allowing weak rainbelts to move southwards across the country. However another large high pressure which had built up over Greenland moved down over Iceland on the 20th and in over Ireland on the 21st. This anticyclone stayed over Ireland until the 28th but it was a more cloudy high than the earlier anticyclone. Rainbelts to the north and to the south-east of Ireland were steered away by the high pressure but cloud from these systems encroached at times. On the 28th the centre of the high drifted north-eastwards over Scotland allowing a moderate southeast to easterly airflow over the country. This backed east to north-easterly for a time on the 29th and 30th as the centre of the high built again to the north of Ireland due to the addition of another high from the Atlantic.

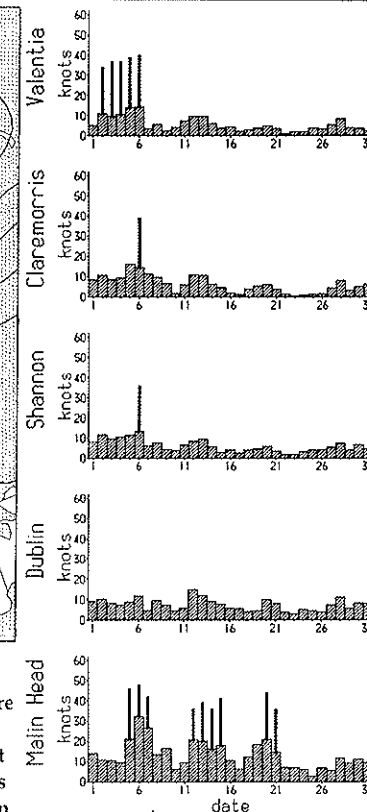


MEAN ATMOSPHERIC PRESSURE

The most notable features in the map of mean pressures above are the large area of high pressure in the middle of the Atlantic and the prevalence of low pressure in the Bay of Biscay. The resultant airflows led to a predominance of easterly or northeasterly winds over Ireland, which is reflected in the map below. October's mean pressure pattern over the country is a complete reversal of the normal pattern of low pressure to the north and a mean southwesterly flow.



Mean pressure values in the south of the country are 1 to 2hPa above normal, rising to 5hPa above in the extreme north. The lowest pressure values occurred on the 1st as a depression moved from west of the country to the south and later the south-east. Cork Airport's barometer fell to 977.3hPa. The second half of the month was dominated by high pressure, the mercury rising to 1040.6hPa at Clones on the 25th.



Daily mean wind speeds and maximum significant gusts (34 knots or more)

SEA TEMPERATURES

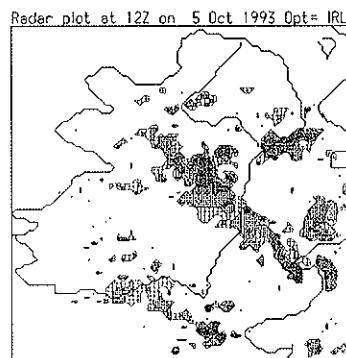
By the end of October the sea had cooled by about two degrees, from between 13°C and 14°C generally at the beginning of the month to between 11°C and 12°C, the cooler waters as usual being those off northern coasts. Malin Head's mean monthly sea temperature was 11.6°C, a full degree lower than the normal October value.

Mostly dry
after the 9th

It was drier than normal over most of the country. Indeed less than half the normal October amounts of rain fell in northern and in many midland areas and in parts of the southwest; less than a quarter fell in some places. It was only in North Leinster and the extreme southeast that amounts exceeded the normal values, reflecting the dominance of easterly winds during the month.

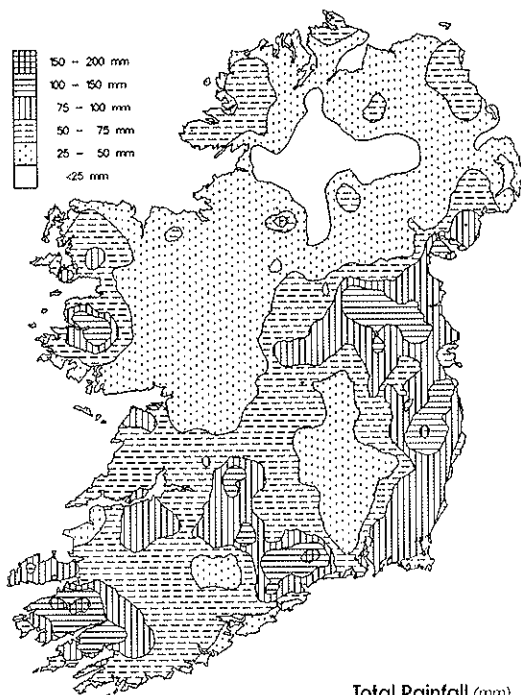
Rainfall totals ranged from 19mm at Cathleen's Fall near Ballyshannon in Co. Donegal, to 122mm at Warrenstown in Co. Meath, which comes to 42% above normal. The localised nature of the rain is shown by the fact that while Rosslare measured 111mm of rain during the month, just 36mm was recorded not too far away at Kilkenny. Overall it was the driest October since 1951 at Clones, since the station opened at Belmullet in 1956, and since 1962 at Claremorris.

There were only between five and twelve days with significant amounts of rain during the



Left-This radar rainfall image shows a band of rain affecting parts of the midlands and the east on the 5th.

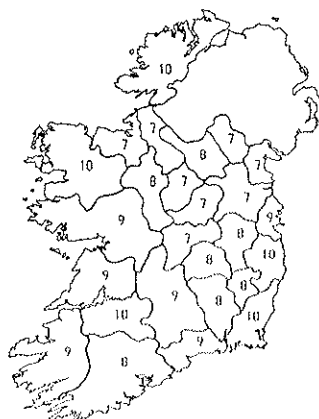
Right - The number of wetdays - days with 1mm or more of rain - in each county during October.



Total Rainfall (mm)

month, most of which occurred between the 1st and the 9th. Half of Warrenstown's monthly total is accounted for by the rain from a depression that moved slowly eastwards just to the south of the country on the 5th and 6th. The heaviest rain occurred during the first eight days, Warrenstown's 60mm on the 6th being the heaviest fall of the month. It was mostly dry from the 10th onwards, although there were significant falls here and there between the 12th and 17th and on the 20th. Some places escaped with hardly a drop during this period however, with the result that the

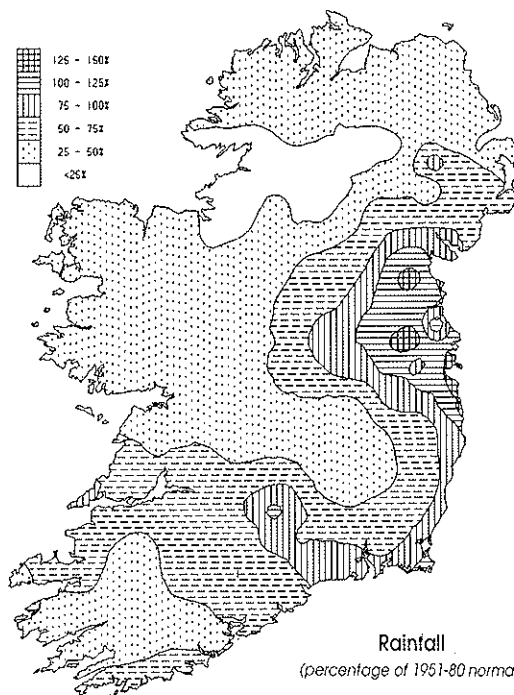
midland stations at Clones, Mullingar, Kilkenny and Birr have had dry spells since the 10th. (A dry spell is a period of 15 or more consecutive days none of which has more than 1mm of rain.) A dry spell began in Dublin a little later, on the 14th.



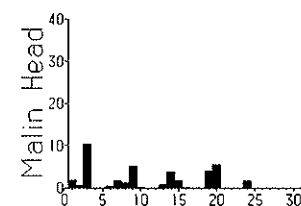
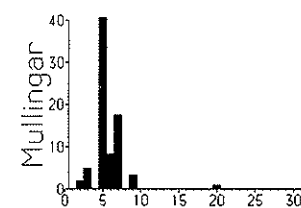
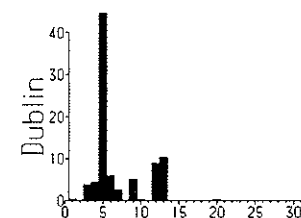
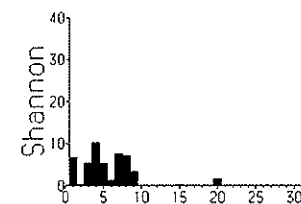
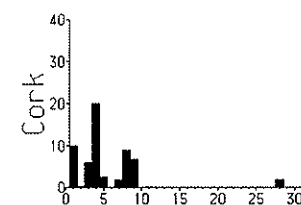
DAILY RAINFALL EXPRESSED AS % OF MONTHLY NORMAL (1951-80)

[illegible]

NOTE: In the above table, each value represents the percentage of the monthly normal that fell on each day. Stations within each county are averaged together. For example, 2% of the average monthly rainfall in Co. Carroll fell on the 2nd.



Rainfall
(percentage of 1951-80 normals)



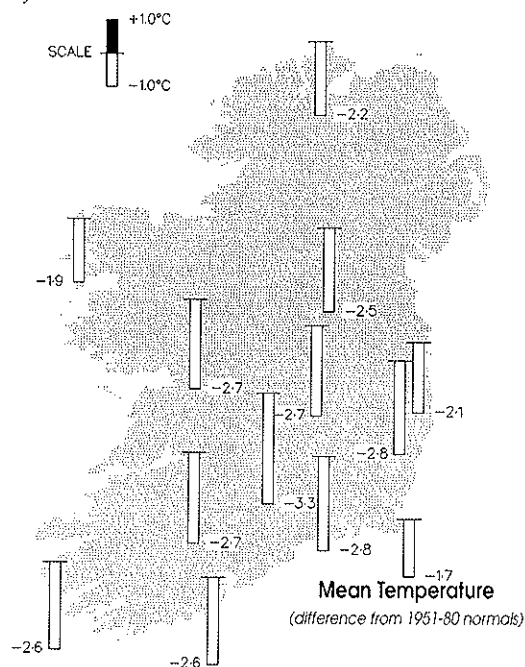
Daily rainfall amounts (millimetres)

Very cold everywhere

October was a very cold month. It was the coldest on record at Shannon and Cork Airports and at Birr. Mean temperatures varied between 6.6°C at Markree Castle in Co. Sligo and 9.8°C at Rosslare. Values were well below normal everywhere, ranging from 1.6 degrees below at Johnstown Castle in Co. Wexford, to 3.5 degrees below at Markree.

Night-time minimum temperatures fell below freezing on a number of occasions at stations away from the coast during the period from the 13th to the 25th. Almost all stations recorded their lowest air and ground temperatures between the 15th and the 19th. The air temperature at both Straide in Co. Mayo and at Markree fell to

-6°C on the 17th, setting a new station record at Straide; the ground temperature had reached -14°C the previous night at Derrygreenagh in Co. Offaly. The values recorded at inland stations during that period were the coldest for October for between 30 and 40 years. Overall there were up to twelve nights with air frost at inland stations and more than twenty nights with ground frost in some places. Although all stations reported some occurrences of ground frost during the month, air temperatures at some coastal stations and at Merrion Square in Dublin's city centre, remained above freezing throughout. Maximum values reached 15°C or more on a few occasions during the first ten days but hardly ever thereafter. Belmullet's maximum of 16.5°C on the 4th was the highest temperature of the month.



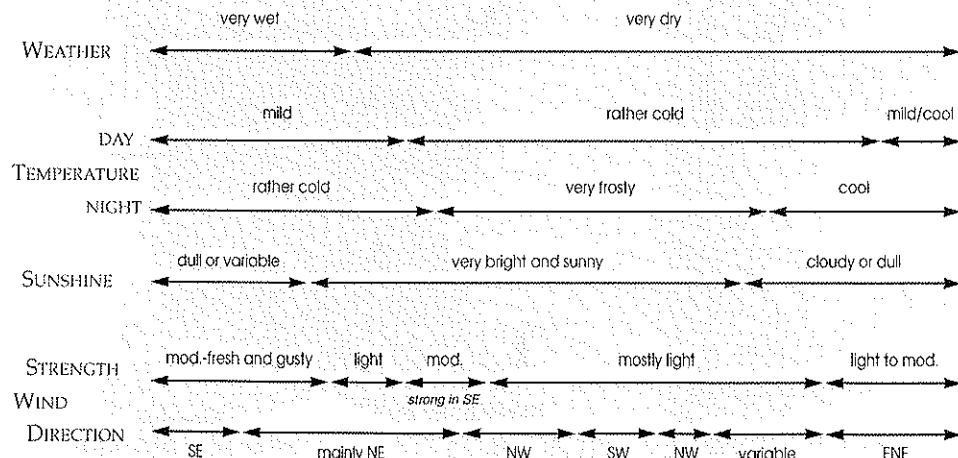
Autumn farm work resumed after long wet spell

1st - 9th: The spell of very wet weather which prevailed in September continued until the 9th of October. The heavy rain and wet land made grazing, harvesting and autumn sowing difficult, and "a sense of despair" was said to prevail among many tillage farmers.

10th - 31st: This period was in dramatic contrast as high pressure became dominant. The period was very dry except for occasional local rain. The bright, settled conditions were accompanied by night frosts during the period from the 14th to the 25th. These were at their most severe around the middle and later in the period when air temperature values fell to -5°C at some stations and grass temperatures went as low as -11°C. Land trafficability conditions were very good and all autumn work proceeded well. Frosts were a problem for harvested sugar beet.

TIME-LINE SEQUENCES OF WEATHER IN OCTOBER

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31



10-DAY VALUES FOR SELECTED AGROMETEOROLOGICAL STATIONS		RAINFALL				TEMPERATURE													SUNSHINE		mean wind speed (m/s) 2m agl. P.E. (Fennany) (mm)					
Station	period	amount	% of average	rain days	wet days	mean max.	mean min.	mean daily	diff. from average	lowest min.	date	days with air frost	degree days > 4.4°C	degree days > 10.0°C	lowest grass-min.	date	days with ground frost	mean 10cm at 0900h	mean 30cm at 0900h	total no. of hours	% of average	mean wind speed (m/s) 2m agl. P.E. (Fennany) (mm)				
Co. Cork Fermoy	1-10	45.1	-	8	6	13.2	6.5	9.9	-	1.5	8	0	55	10	-2.6	8	1	10.6	11.7	17.0	-	2.6	-			
	11-20	0.0	-	0	0	10.7	0.8	5.8	-	-4.5	18	5	27	2	-10.0	18	7	7.0	9.5	39.0	-	2.1	-			
	21-end	1.3	-	1	1	10.6	2.1	6.4	-	-4.6	22	4	32	2	-9.1	22	6	6.9	8.3	31.8	-	1.5	-			
	month	46.4	50	9	7	11.5	3.1	7.3	-3.2	-4.6	22	9	114	14	-10.0	18	14	8.1	9.8	87.8	109	2.1	15			
Co. Donegal Letterkenny	1-10	26.7	-	10	7	13.2	6.6	9.9	-	3.3	8	0	55	11	-	-	-	-	-	-	-	-	-	-		
	11-20	14.2	-	9	5	10.7	2.2	6.5	-	-5.5	18	4	31	3	-	-	-	-	-	-	-	-	-	-		
	21-end	0.4	-	1	0	9.7	3.7	6.7	-	-0.3	25	1	29	1	-	-	-	-	-	-	-	-	-	-		
	month	41.3	-	20	12	11.1	4.2	7.7	-	-5.5	18	5	115	15	-	-	-	-	-	-	-	-	-	-	-	
Co. Kerry Ardara	1-10	60.2	-	9	9	13.8	6.6	10.2	-	2.1	8	0	58	12	-1.7	8	1	-	-	-	-	-	-	-	-	
	11-20	4.6	-	3	2	11.3	0.4	5.9	-	-3.9	17	5	27	4	-8.5	16	7	-	-	-	-	-	-	-	-	
	21-end	0.0	-	0	0	11.2	3.3	7.3	-	-0.9	21	1	36	3	-5.3	22	6	-	-	-	-	-	-	-	-	
	month	64.8	-	12	11	12.0	3.4	7.7	-	-3.9	17	6	122	19	-8.5	16	14	-	-	-	-	-	-	-	-	
Co. Leitrim Ballinamore	1-10	30.2	-	9	5	13.2	5.6	9.4	-	1.9	4	0	51	9	-0.5	8	2	10.6	11.3	24.6	-	2.4	-	-	-	
	11-20	0.7	-	1	0	10.5	0.0	5.3	-	-5.6	16	6	25	2	-11.0	16	7	7.7	9.4	46.5	-	1.6	-	-		
	21-end	1.2	-	2	0	9.7	1.7	5.7	-	-2.4	22	3	23	1	-7.5	22	6	7.2	8.2	19.7	-	1.1	-	-		
	month	32.1	29	12	5	11.1	2.4	6.8	-3.1	-5.6	16	9	99	13	-11.0	16	15	8.4	9.6	90.8	118	1.7	7	-		
Co. Louth Ardee	1-10	109.5	-	10	7	13.6	5.2	9.4	-	2.0	8	0	52	11	-5.0	8	6	10.1	11.3	-	-	-	-	-	-	
	11-20	1.3	-	1	1	10.8	-1.1	4.9	-	-5.2	18	6	22	3	-13.2	16	10	5.7	8.4	-	-	-	-	-	-	
	21-end	0.4	-	2	0	11.0	1.4	6.2	-	-3.1	22	6	29	3	-9.6	22	8	5.9	7.4	-	-	-	-	-	-	
	month	111.2	136	13	8	11.7	1.8	6.8	-	-5.2	18	12	103	16	-13.2	16	24	7.2	9.0	-	-	-	-	-	-	-
Co. Waterford Dungarvan	1-10	61.9	-	8	7	14.5	6.6	10.6	-	3.0	2	0	62	15	0.8	2	0	-	11.1	26.5	-	1.6	-	-	-	-
	11-20	2.1	-	1	1	12.6	1.8	7.2	-	-2.7	18	6	37	7	-4.4	18	6	-	9.6	45.3	-	1.4	-	-	-	-
	21-end	2.6	-	1	1	12.0	4.8	8.4	-	-1.9	22	2	48	6	-4.6	22	4	-	8.7	29.7	-	0.9	-	-	-	-
	month	66.6	-	10	9	13.0	4.4	8.7	-	-2.7	18	8	147	28	-4.6	22	10	-	9.7	101.5	-	1.3	14	-	-	-
Co. Wexford Johnstown Castle	1-10	71.4	-	8	6	14.1	8.0	11.1	-	5.7	16	0	66	15	1.8	10	0	10.5	11.9	34.5	-	1.5	-	-	-	-
	11-20	18.2	-	3	3	11.3	5.0	8.2	-	0.7	16	0	40	7	-1.5	19	5	7.3	9.6	41.5	-	1.2	-	-	-	-
	21-end	0.0	-	0	0	11.2	6.3	8.8	-	2.5	22	0	49	3	-1.4	22	2	7.5	8.8	34.4	-	1.3	-	-	-	-
	month	89.8	87	11	9	12.1	6.4	9.3	-1.6	0.7	16	0	156	26	-1.5	19	7	8.4	10.1	110.4	112	1.3	14	-	-	-

MEASURED POTENTIAL EVAPOTRANSPIRATION (P.E.) AND SOIL MOISTURE

County/ Station	Period	P.E. (mm)		Soil Moisture (mm)	
		Amount	Deficit	Accumulated Deficit	Surplus
Co. Carlow Carlow (Oak Park)	1-10	4.6	---	33	26
	11-20	8.7	3	36	---
	21-end	9.3	9	45	---
	month	22.6	---	---	---
Co. Dublin Kinsealy	1-10	0.0	---	---	34
	11-20	6.6	8	8	---
	21-end	10.5	11	19	---
	month	17.1	---	---	---
Co. Kerry Valentia Obs.	1-10	5.8	---	---	92
	11-20	13.0	9	9	---
	21-end	8.5	9	18	---
	month	27.3	---	---	---
Co. Leitrim Ballinamore	1-10	1.0	---	---	29
	11-20	8.9	8	8	---
	21-end	0.0	---	7	---
	month	9.9	---	---	---
Co. Wexford Johnstown Castle	1-10	6.1	---	---	7
	11-20	5.1	---	---	13
	21-end	5.1	5	5	---
	month	16.3	---	---	---

See back page for notes on the data

GLOBAL SOLAR RADIATION (MJ/sq.m.) P.E. (Mokink)

County/ Station	10-day totals			total for month	total for month (mm)
	1-10	11-20	21-end		
Co. Donegal Malin Head	62.34	69.14	34.30	165.78	23
Co. Dublin Dublin Airport	63.52	79.00	44.76	187.28	25
Co. Kerry Valentia Obs.	71.34	80.60	58.09	210.03	29
Co. Kilkenny Kilkenny	60.00	80.71	50.70	191.41	25
Co. Mayo Belmullet	64.77	73.69	43.49	181.95	26
Co. Monaghan Clones	55.15	77.68	39.02	171.85	23
Co. Offaly Birr	55.61	80.99	51.98	188.58	25

Summary of significant weather worldwide during October 1993

Temperatures exceed 40°C in parts of Africa, the Middle East and Australia

The Libyan capital Tripoli had a hot start to October with temperatures rising to 40°C on the 1st, some 12°C above normal. Perth in Western Australia had a cold night when the temperature fell to 2.8°C on the 1st, beating the known October record by 1.6°C. The monsoon season officially finished and Indian meteorologists have been compiling the seasonal rainfall figures. The highest total was at Ratnagiri, where 3457mm fell, around 1000mm more than usual. Mangalore came second with 3339mm over the 4-month period.

The first full week of October brought some heavy falls of rain. In South Africa a very intense thunderstorm hit Bloemfontein and 92mm, or twice the monthly average, fell in a just a few hours. At Newcastle, southeast of Johannesburg, where the average for October is 30mm, 165mm fell. At Yamoussoukro in Ivory Coast, showers deposited October's normal rainfall in a day when 101mm fell on the 4th. In the French Riviera Nice was virtually washed out after 70mm of rain on the 5th - half the average for the month - and a further 92mm fell on the 7th. In Hungary heavy rain affected Budapest when 54mm, another monthly normal, was recorded. The Swiss town of Locarno recorded 450mm between the 1st and the 9th, well over their monthly normal of 170mm.

Two towns in west Africa set new October temperature records: at Matam in Senegal, 42.5°C was recorded, and at N'Guigmi, in Niger, 41.8°C. In the United States on the 6th, Rapid Falls in South Dakota had a rapid rise in temperature when the mercury rose to 34.4°C, almost twice the average maximum of 17.3°C. The Azores failed to escape the wet weather. On Faial Island, 169mm or over 6.5 inches was recorded, 2 inches more than the normal total for all October.

During the second week, exceptionally heavy rain over southern Britain hit the headlines. During the 12th and 13th RAF Coltishall near Norwich measured 87mm. Hemsby had 68mm, Heathrow measured 56mm, Farnborough had 57mm and Bracknell had 46mm. By the end of the week, the emphasis had turned from rain to cold. On the 15th Aberdeen reported 4 centimetres of snow, making it their earliest date for snow lying since records began 51 years ago. Benson in Oxfordshire had its lowest October temperature on record with -5°C. In complete contrast, parts of southeastern Europe enjoyed an Indian summer. In Italy the mercury topped 32°C at Bari, and 31°C in Naples and Plevin in Bulgaria recorded 38°C.

In the third week, the Middle East was the focus of weather stories. Tel Aviv reported a record-breaking temperature of 38.2°C and Jeddah measured 41°C, equalling the previous record three days in a row. Taif had some incredible rainfall on the 19th with 55mm or five times the monthly average, and at Yenbo, where the October average is just 1mm, there was 8mm of rain on the 20th. Intense thunderstorms and large hailstones affected Texas and the southwest of the United States.

Two tornadoes were reported near Waco and over 100mm of rain fell at Texarkana on the 18th. San Antonio had 61mm in 24 hours, the normal total for the month.

Winter high pressure, normally expected to form at this time of year over Siberia, started developing over central Asia in the fourth week. At Uç-Aral near Lake Balkhash, barometers rose to nearly 1050 hectoPascals. As a result cold air swept across Mongolia, reducing temperatures to -11°C at Ulan Bator. A small depression brought more snow to Moscow, raising depths there to 9cm. On the far side of the world a late autumn heatwave affected California. In San Francisco and Sacramento 31.1°C was recorded on the 26th while at Eureka, 30.6°C beat the previous October record, and was a remarkable 15°C above normal. On the 27th eight weather stations in Australia reported temperatures of 40°C or higher, including 41.1°C on the Kimberley Plateau and 41°C in the Gibson Desert. At Cook on the Nullarbor Plain, northerly winds ahead of a cold front rocketed the temperature to 40°C, ten degrees higher than the day before. Northwesterly Föhn winds crossing the New Zealand Alps pushed temperatures on 30th to 25.9°C at Christchurch, 9°C above normal and one of the warmest October days on record. At Invercargill the thermometer hit 21.6°C.

On 26th, half of the normal October rainfall came to Bermuda, as a belt of tropical showers from the Gulf of Mexico deposited 84mm. A slow-moving weather system gave torrential rain across Sicily. Palermo received 140mm between the 24th and 26th or 81 percent more than the October average. A deep depression anchored itself near Madeira, and Funchal almost received its monthly quota with 65mm on 28th. At the end of the week Parana in Argentina recorded 166mm in 24 hours, nearly twice the maximum daily fall for an October storm.

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A CLIMATE SCENARIO FOR WESTERN EUROPE

for the early part of the 21st century

TEMPERATURE

Warming is expected to be at a minimum near the Atlantic coast (0.2°C per decade; 0.75°C by 2030) rising to about 0.35°C per decade in eastern Europe. In particular there is expected to be a decrease in the intensity of very cold spells in winters and an increased number of hot summers. Confidence in this prediction is fairly high as the UK lies between an ocean to the west, which will warm only slowly, and land to the east which will warm much more rapidly. The largest warming will therefore occur with winds from the east, which will mitigate the cold spells associated with easterly winds in winter, and enhance the warm spells accompanying easterlies in summer. The expected warming is likely to produce a marked decrease (of order 25%) in the occurrence of frosts. For comparison there are observed inter-annual variations of up to 1°C in the annual-mean surface

air temperature over Western Europe in some decades. Consequently, over a period of one or two decades, natural variability could mask any warming due to increasing greenhouse gases.

PRECIPITATION

In winter most experiments suggest that northern and central Europe are likely to experience an increase in precipitation, a few regions experiencing up to 40% more but most having an increase of about 20%. The UK will probably experience a similar trend and, for the same reason as the reduction in frosts, the frequency of snowfall is expected to be markedly reduced. The area in Europe where decreases are most probable is the Iberian Peninsula. In summer the south of Europe is expected to become drier but the models give no firm guidance on the sign of change elsewhere; in the Hadley Centre model there is reduced

precipitation from the Mediterranean up to the latitude of Northern UK. The models also indicate a change in the character of the rainfall with convective precipitation (showers) becoming more frequent. It is therefore likely that, even in areas where the precipitation increases, there will be a decrease in the number of rain days, and an increase in the amount of rain falling on a 'rain' day. The inter-annual variability in seasonal rainfall over Western Europe is typically some 30-40%, rising occasionally to in excess of 60%. A few decades of data will therefore be necessary to separate the anticipated trend due to global warming from the natural variability.

SOIL MOISTURE

The models provide little indication on the sign of changes of soil moisture during winter for most of Europe; the implication is that there is likely to be little change from present day values. The exception is the Iberian Peninsula where there will probably be a drying. In summer most models predict that southern Europe will become drier but there is considerable disagreement between the models as to how far north the drier area will extend; the Hadley Centre model suggests that it would extend to cover much of the UK.

STORMINESS

In the Hadley Centre experiment there is a slight indication that the storm tracks in the North Atlantic will extend eastwards as the climate changes. This could indicate a small increase in the number of storms crossing northern UK. However, there is poor agreement amongst the different models and more work is required to establish the veracity of this prediction.

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This scenario is based on the latest climate change research, particularly the results of the transient experiments with coupled Atmosphere-Ocean General Circulation Models carried out in the UK, USA and Germany. The scenario was prepared by the Hadley Centre for Climate Prediction and Research in the UK, which is jointly funded by the Department of the Environment and the Meteorological Office. The Hadley Centre's first transient, climate-change experiment was concluded in 1992. The experiment sought to determine the climate response, over a 75-year period, expected to arise from a scenario in which atmospheric carbon dioxide (CO₂) concentrations increased by 1% per year (compound). Under this scenario CO₂ concentrations would double in about 70 years. All present-day GCM results must be treated with caution. The models contain many approximations, and hence uncertainties which, through a lack of full understanding of the underlying physical and chemical processes of the climate system, cannot (yet) be quantified and/or removed.

Friday 1st: A depression south of Ireland moved slowly southeastwards. Light to moderate southeasterly winds became northerly overnight. Some rain in the south and east, elsewhere mostly dry.

Rainfall: nil to 7mm generally, 10mm in the south with 32mm in the southwest
Temperature: max. 12°C to 16°C, min. 4°C to 10°C
Sunshine: nil to 7 hours

Saturday 2nd: Low pressure near Scotland gave a northwesterly airflow over Ireland. Showers or longer spells of rain. Winds, fresh on exposed coasts but mainly light.

Rainfall: nil to 3mm
Temperature: max. 12°C to 16°C, min. 3°C to 11°C
Sunshine: trace to 6 hours

Sunday 3rd: As the low to the northeast moved away, fronts crossed the country from the west bringing rain to all parts. Light variable winds became light to moderate southwesterly and the rain cleared to showers.

Rainfall: 1 to 11mm generally, 15 to 28mm in the west
Temperature: max. 11°C to 16°C, min. 5°C to 9°C
Sunshine: nil to 2 hours

Monday 4th: A deep depression became slow-moving close to the southwest coast. The light southerly flow became moderate to fresh over Munster and south Leinster. Light east or northeasterly elsewhere.

Rainfall: nil to 7mm generally, 10 to 33mm in the southern half
Temperature: max. 13°C to 17°C, min. 4°C to 9°C, ground frost in the midlands
Sunshine: 1 to 9 hours in the north

Tuesday 5th: The depression off the southwest coast drifted eastwards during the day to be close to Land's End by midnight. The flow over the country slowly veered to the northeast, fresh to strong with gale gusts in Connaught and west Ulster, with rain, showers and light to moderate winds elsewhere. Thunder reported in the east.

Rainfall: nil to 9mm in the north, west and south, 6 to 58mm in the east, southeast and midlands
Temperature: max. 11°C to 15°C, min. 8°C to 11°C
Sunshine: trace to 3 hours generally, 4 hours in the northwest, 6 hours in the north

Wednesday 6th: The depression over the southwest of England drifted slowly northwards during the day to be over Anglesea at midnight. An unstable light to moderate northerly flow was maintained over much of Ireland, the flow being much stronger in the northwest, up to gale force at times. Rain or showers in most areas.

Rainfall: less than 8mm generally, with 19mm to 60mm in the northwest and parts of the east
Temperature: max. 10°C to 15°C, min. 6°C to 9°C
Sunshine: nil to 3 hours

Thursday 7th: The low over Anglesea at midnight filled during the day and was replaced by another off the southwest coast. Winds became northeasterly, fresh to strong on the northwest seaboard, but were light to moderate over the rest of the country, southeasterly over Leinster and east Munster, northeasterly in west Munster and south Connacht.

Rainfall: 3 to 18mm
Temperature: max. 11°C to 13°C, min. 4°C to 10°C
Sunshine: nil to 4 hours generally, 7 hours in the southeast

Friday 8th: The depression, now in the Celtic Sea, slowly filled. Moderate east to northeasterly airflow over Ireland. Widespread showers, many heavy and thundery in Munster and south Leinster.

Rainfall: nil to 11mm generally, 18 to 30mm in the south and southeast
Temperature: max. 12°C to 15°C, min. 3°C to 10°C, ground frost -2°C inland
Sunshine: 1 to 8 hours

Saturday 9th: The depression, moved slowly northwards over Ireland. Wind light to moderate northeasterly at first, later light variable. Scattered showers, fog at night.

Rainfall: 1 to 7mm
Temperature: max. 13°C to 16°C, min. 4°C to 11°C
Sunshine: 1 to 7 hours

Sunday 10th: Low pressure to the south maintained a slack northeasterly flow over the country. Fog was widespread during the morning and slow to clear.

Rainfall: nil or trace
Temperature: max. 10°C to 16°C, min. 3°C to 8°C inland, 5°C to 10°C coastal
Sunshine: nil to 8 hours

Monday 11th: A depression over Wales gave a northeasterly airstream over Ireland. Mostly dry with some fog in the morning.

Rainfall: nil to 1mm
Temperature: max. 12°C to 15°C, min. 3°C to 8°C inland, 5°C to 11°C coastal
Sunshine: trace to 7 hours

Tuesday 12th: A northeasterly airflow covered Ireland. Fresh to strong in the southeast with gale gusts. Some rain in Leinster and Munster.

Rainfall: nil or trace generally, 8 to 20mm in the east and southeast
Temperature: max. 10°C to 13°C, min. 5°C to 9°C
Sunshine: nil to 2 hours generally, 5 to 7 hours in the north and northwest

Wednesday 13th: Light to moderate north to northeasterly winds, strong in the southeast. Rain in Leinster. Isolated showers elsewhere with hail in the north.

Rainfall: nil to 3mm generally, 5 to 11mm in the east and southeast
Temperature: max. 9°C to 11°C, min. 1°C to 7°C
Sunshine: nil to 2 hours in the east and south, 5 to 10 hours generally

Thursday 14th: Cold northerly flow continued giving mostly clear skies, with night frosts and daytime sunshine. Light northerly winds, moderate on exposed coasts. One or two hail showers in the north.

Rainfall: nil to 4mm
Temperature: max. 9°C to 11°C, min. -2°C to +5°C
Sunshine: 5 to 10 hours

Friday 15th: Pressure continued to rise giving slack conditions. Cloud in the west but generally sunny after a cold night. Northerly winds were light except on the southeast coast. Some hail showers in Ulster.

Rainfall: nil to 2mm
Temperature: max. 8°C to 12°C, min. -2°C to +4°C
Sunshine: 3 to 8 hours

Saturday 16th: An anticyclone over Ireland giving a slack airflow over the country. A few hail showers in northern coastal areas. Cold with air frost away from coasts and

widespread ground frost and some fog. Calm or light variable or northerly winds.

Rainfall: nil to 2mm
Temperature: max. 8°C to 11°C, min. -6°C to +3°C, ground frost down to -12°C inland
Sunshine: 4 to 10 hours

Sunday 17th: High pressure over the country. A very cold frosty night with some fog in places. A fine sunny day with just a few coastal showers in the southeast and east.

Rainfall: nil generally with 11mm in the southeast
Temperature: max. 9°C to 12°C, min. -6°C to -2°C inland, -2°C to 3°C coastal, ground frost -12°C inland
Sunshine: 5 to 10 hours

Monday 18th: A ridge of high pressure extended across Ireland from an anticyclone over the North of England. Winds were generally light variable except in the northwest where a light to moderate south-southwesterly flow became established. Dry with some mist but no fog. Frost at night.

Rainfall: nil or trace
Temperature: max. 10°C to 14°C, min. -6°C to -1°C inland, just below zero to 3°C coastal, with 7°C in the southeast, ground frost down to -11°C inland
Sunshine: 4 to 10 hours

Tuesday 19th: A ridge of high pressure over the country drifted southwards to allow a light to moderate southwesterly flow to cover the country. Some rain in the northwest, dry elsewhere.

Rainfall: nil to 4mm in the north
Temperature: max. 10°C to 13°C, min. -5°C to +4°C inland, 2°C to 10°C coastal
Sunshine: nil to 3 hours

Wednesday 20th: A cold front moved southwards followed by a northerly airflow. Frontal rain followed by some showers. Winds southwesterly at first, generally light but moderate in the north, later northerly generally light to moderate but strong in the north with gale gusts.

Rainfall: nil to 4mm generally, 6mm in the north
Temperature: max. 11°C to 14°C, min. 2°C to 4°C inland, 4°C to 7°C coastal
Sunshine: nil to 5 hours

Thursday 21st: An anticyclone established itself over the country. Northerly winds became light variable. Dry with sunny spells. Frost at night.

Rainfall: nil or trace
Temperature: max. 9°C to 12°C, min. -3°C to zero inland, 2°C to 6°C coastal
Sunshine: 6 to 9 hours

Friday 22nd: Weather dominated by area of high pressure over Ireland. Slack winds dry with a few sunny periods. Frost at night.

Rainfall: nil or trace
Temperature: max. 9°C to 12°C, min. -5°C to -1°C inland, -1°C to +5°C coastal
Sunshine: nil in the north, 3 to 9 hours generally

Saturday 23rd: Weather continued to be dominated by the anticyclone. Dry with sunny spells. Fog in places.

Rainfall: nil or trace
Temperature: max. 11°C to 14°C, min. -5°C to +2°C inland, 1°C to 7°C coastal
Sunshine: 3 to 9 hours

Sunday 24th: Anticyclonic conditions. Cold night. Light winds. Fog in places. Dry, rather cloudy.

Rainfall: nil to 2mm in the north
Temperature: max. 11°C to 15°C, min. -1°C to +3°C inland, 2°C to 7°C coastal
Sunshine: nil or trace in the east, 2 to 8 hours generally

Monday 25th: Anticyclone conditions. Cold night. Light winds. Dry and rather cloudy. Fog patches.

Rainfall: nil
Temperature: max. 9°C to 14°C, min. just below zero to 5°C inland, 3°C to 10°C coastal
Sunshine: nil to 4 hours generally, 7 to 8 hours in the northwest and southwest

Tuesday 26th: Anticyclone over Scotland continued to feed dry, cloudy conditions over Ireland. Winds, generally light and variable.

Rainfall: nil
Temperature: max. 8°C to 11°C, min. 6°C to 9°C
Sunshine: nil to 1 hour

Wednesday 27th: Anticyclonic conditions. Cool. Light variable, mainly easterly winds. Generally dry. Cloudy and hazy.

Rainfall: nil
Temperature: max. 9°C to 12°C, min. 6°C to 9°C
Sunshine: nil

Thursday 28th: An east to southeasterly airflow over the country as the anticyclone moved over Scotland. A few spots of rain but generally dry and cloudy. Winds light to moderate.

Rainfall: nil to 2mm in the south
Temperature: max. 8°C to 11°C, min. 6°C to 9°C
Sunshine: nil

Friday 29th: An easterly flow. Mostly cloudy and misty to start with but the cloud broke in southern areas to give some sunshine. A few specks of drizzle, but generally dry. Winds light easterly, moderate later in the southeast.

Rainfall: nil or trace
Temperature: max. 9°C to 14°C, min. 4°C to 10°C
Sunshine: nil to 3 hours generally, with 6 hours in the southeast

Saturday 30th: Generally dry with light variable winds but the odd spot of drizzle. Fresh northeasterly winds on south Leinster coast. Sunny spells, especially in the southwest.

Rainfall: nil or trace
Temperature: max. 8°C to 13°C, min. 3°C to 10°C
Sunshine: nil to 5 hours generally, 7 hours in the southwest

Sunday 31st: Cloudy all day everywhere. A little drizzle but very isolated. Light variable winds everywhere.

Rainfall: nil or trace
Temperature: max. 8°C to 11°C, min. 6°C to 8°C
Sunshine: nil

TABLES

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County / Station	TEMPERATURE (°C)							
	Mean max.	Mean min.	Mean/ deviation from average		Highest max./date		Lowest min./date	
CO. CARLOW								
CARLOW (OAK PARK)	11.8	3.4	7.6	-2.8	15.2	5	-3.3	22
CO. CLARE								
SHANNON AIRPORT	12.3	4.7	8.5	-2.7	15.1	2	-2.0	17
CARRON	10.5	4.2	7.4		13.9	2	-2.0	17
CO. CORK								
FERMOY (MOORE PARK)	11.5	3.1	7.3	-3.2	14.6	3	-4.6	22
CORK AIRPORT	11.1	4.7	7.9	-2.6	14.5	10	-0.9	16
SHERKIN ISLAND	12.6	6.5	9.6	-2.1	15.6	2	-0.2	17
CO. DONEGAL								
MALIN HEAD	10.7	6.7	8.7	-2.2	13.5	2	0.4	18
CATHLEEN'S FALL	11.0	4.8	7.9	-2.7	15.2	9	-1.8	17
LETTERKENNY (MAGHERENAN)	11.1	4.2	7.7		14.8	8	-5.5	18
CO. DUBLIN								
DUBLIN AIRPORT	11.4	5.7	8.6	-2.1	15.1	4	-1.1	16
CASEMENT AERODROME	11.0	4.0	7.5	-2.8	14.5	4	-4.1	16
DUBLIN (MERRION SQUARE)	11.6	6.3	9.0	-2.6	14.5	4	1.1	16
CO. GALWAY								
GALWAY (UNIV. COLLEGE)	11.9	5.3	8.6	-2.4	15.4	9	-1.0	17
MAAM VALLEY	11.5	5.9	8.7		14.8	24	-1.7	18
BALLYGAR	11.9	3.3	7.6		15.3	9	-4.7	17
CO. KERRY								
VALENTIA OBSERVATORY	12.5	5.8	9.2	-2.6	16.1	10	0.2	15
ARDFERT (LISCANANE)	12.0	3.4	7.7		15.9	10	-3.9	17
CO. KILDARE								
NAAS (GOWRAN GRANGE)	10.6	3.6	7.1		14.2	4	-4.3	17
CO. KILKENNY								
KILKENNY	11.8	3.4	7.6	-2.8	15.1	5	-4.8	18
CO. LEITRIM								
BALLINAMORE	11.1	2.4	6.8	-3.1	15.1	10	-5.6	16
CO. LIMERICK								
MOUNT RUSSELL	10.5	4.1	7.3		14.0	3	-1.9	16
CO. LOUTH								
ARDEE (BOHARNAMOE)	11.7	1.8	6.8		15.7	4	-5.2	18
CO. MAYO								
CLAREMORRIS	11.5	3.3	7.4	-2.7	15.0	24	-4.3	17
BELMULLET	12.6	6.2	9.4	-1.9	16.5	4	-1.7	17
NEWPORT (FURNACE)	11.8	5.9	8.9	-2.3	15.1	8	-0.2	17
CO. MEATH								
WARRENSTOWN	10.9	3.8	7.4	-2.7	14.7	4	-2.7	17
CO. MONAGHAN								
CLONES	10.8	3.9	7.4	-2.5	14.5	10	-3.0	17
CO. OFFALY								
BIRR	11.3	2.9	7.1	-3.3	14.7	4	-5.2	17
DERRYGREENAGH	11.0	3.1	7.1	-2.6	14.5	4	-3.6	17
CO. SLIGO								
MARKREE CASTLE	10.9	2.3	6.6	-3.5	15.6	10	-6.0	17
CO. TIPPERARY								
FETHARD (PARSONSHILL)	10.5	4.2	7.4		14.0	9	-1.5	17
CO. WATERFORD								
WATERFORD (TYCOR)		5.2					-4.9	19
DUNGARVAN (CARRIGLEA)	13.0	4.4	8.7		16.3	2	-2.7	18
CO. WESTMEATH								
MULLINGAR II	11.0	3.1	7.1	-2.7	15.1	9	-4.4	18
CO. WEXFORD								
JOHNSTOWN CASTLE	12.1	6.4	9.3	-1.6	15.0	5	0.7	16
ROSSLARE	11.9	7.7	9.8	-1.7	15.2	5	3.4	16
CLONROCHE	11.5	5.0	8.3	-1.9	14.6	5	-2.0	16
JOHN F. KENNEDY PARK	12.0	5.5	8.8	-1.9	14.2	2	-0.4	22

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County / Station	RAINFALL (MM)				SUNSHINE (HRS)			
	Total amount	% of average	Most in a day/date		Daily mean (hrs./day)	% of average	% of possible	Most in a day/date
CO. CARLOW								
CARLOW (OAK PARK)	34.3	45	6.5	4	2.92	108	28	9.0 14
CO. CLARE								
SHANNON AIRPORT	43.5	52	14.0	4	3.63	132	34	9.6 14
CARRON	60.6	41	12.4	4				
CO. CORK								
FERMOY (MOORE PARK)	46.4	50	21.1	4	2.83	109	26	8.9 14
CORK AIRPORT	50.5	42	20.2	4	3.28	109	31	9.6 16 17
SHERKIN ISLAND	65.7	60	32.1	4	3.86	125	36	9.3 16
CO. DONEGAL								
MALIN HEAD	36.6	35	10.4	3	3.15	130	30	9.2 4
CATHLEEN'S FALL	18.9	18	7.3	3	3.14	127	30	8.5 18
LETTERKENNY (MAGHERENAN)	41.3		7.3	3				
CO. DUBLIN								
DUBLIN AIRPORT	86.2	127	31.8	5	3.06	95	29	8.9 14 17
CASEMENT AERODROME	78.0	115	23.0	5	3.01	96	28	8.4 21
DUBLIN (MERRION SQUARE)	78.8	127	23.2	4				
CO. GALWAY								
GALWAY (UNIV. COLLEGE)	38.4	33	13.0	3				
MAAM VALLEY	81.3		27.7	3				
BALLYGAR	36.8	38	11.1	5				
CO. KERRY								
VALENTIA OBSERVATORY	74.0	52	15.3	3	4.06	155	38	9.0 14 17
ARDFERT (LISCANANE)	64.8		17.7	4				
CO. KILDARE								
NAAS (GOWRAN GRANGE)	72.6		19.7	12				
CO. KILKENNY								
KILKENNY	36.4	44	9.7	8	3.54	127	33	9.8 16
CO. LEITRIM								
BALLINAMORE	32.1	29	13.3	5	2.93	118	28	8.6 21
CO. LIMERICK								
MOUNT RUSSELL	87.0		33.3	4				
CO. LOUTH								
ARDEE (BOHARNAMOE)	111.2	136	58.0	5				
CO. MAYO								
CLAREMORRIS	42.6	37	17.1	3	3.27	130	31	8.4 17
BELMULLET	56.8	50	18.9	6	3.37	123	32	9.3 17
NEWPORT (FURNACE)	53.7	36	16.8	3				
CO. MEATH								
WARRENSTOWN	122.1	142	60.2	6				
CO. MONAGHAN								
CLONES	35.0	40	13.1	5	3.21	131	30	9.5 13
CO. OFFALY								
BIRR	34.0	43	11.0	6	3.24	116	31	8.5 14
DERRYGREENAGH	69.8	84	28.2	6				
CO. SLIGO								
MARKREE CASTLE	23.1	20	10.5	3				
CO. TIPPERARY								
FETHARD (PARSONSHILL)	60.7		18.4	8				
CO. WATERFORD								
WATERFORD (TYCOR)	87.6	87	30.4	8				
DUNGARVAN (CARRIGLEA)	66.6		18.2	4	3.27		31	9.5 16
CO. WESTMEATH								
MULLINGAR II	78.2	87	34.9	5	3.52	126	33	9.6 17
CO. WEXFORD								
JOHNSTOWN CASTLE	89.8	87	29.9	8	3.56	112	33	9.1 18
ROSSLARE	110.8	123	23.9	8	3.44	98	32	9.6 18
CLONROCHE	71.2	62	21.3	8	3.45	113	32	8.9 21
JOHN F. KENNEDY PARK	63.8	60	19.0	8	3.36	116	31	9.2 18

TABLES

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County / Station	WEATHER — NO. OF DAYS WITH									MEAN 0900 SOIL TEMPERATURES (°C)		
	Rain days	Wet days	Air frost	Ground frost	Snow lying	Hail	Thunder	Fog		10cm	20cm	30cm
CO. CARLOW												
CARLOW (OAK PARK)	10	8	6	11						6.8	7.6	9.4
CO. CLARE												
SHANNON AIRPORT	12	8	5	12	0	0	1	6		7.5	9.3	10.4
CARRON	11	10	4	10						6.9		8.3
CO. CORK												
FERMOY (MOORE PARK)	9	7	9	14						8.1	9.0	9.8
CORK AIRPORT	9	6	4	10	0	0	1	2		7.1	8.6	10.4
SHERKIN ISLAND	12	8	1	6								
CO. DONEGAL												
MALIN HEAD	12	7	0	3	0	0	4	1		8.2	9.1	10.9
CATHLEEN'S FALL	11	5	3									
LETTERKENNY (MAGHERENAN)	20	12	5									
CO. DUBLIN												
DUBLIN AIRPORT	10	9	2	8	0	0	2	4		8.7	9.5	10.7
CASEMENT AERODROME	11	9	7	11	0	0	0	5		6.7	7.8	8.7
DUBLIN (MERRION SQUARE)	9	8	0									
CO. GALWAY												
GALWAY (UNIV. COLLEGE)	8	8	4									
MAAM VALLEY	12	11	4	9								
BALLYGAR	11	6	8	12								
CO. KERRY												
VALENTIA OBSERVATORY	9	8	0	8	0	0	1	0		7.8	9.3	11.3
ARDFERT (LISCAHANE)	12	11	6	14								
CO. KILDARE												
NAAS (GOWRAN GRANGE)	12	8	8	13						7.4		
CO. KILKENNY												
KILKENNY	10	7	8	15	0	0	0	5		7.4	8.5	9.7
CO. LEITRIM												
BALLINAMORE	12	5	9	15						8.4	9.4	9.6
CO. LIMERICK												
MOUNT RUSSELL	14	9	4	10						6.5	8.0	
CO. LOUTH												
ARDEE (BOHARNAMOE)	13	8	12	24						7.2	8.0	9.0
CO. MAYO												
CLAREMORRIS	11	10	7	12	0	0	1	2		6.9	8.4	9.5
BELMULLET	16	12	1	6	0	0	2	0		9.3	10.3	11.5
NEWPORT (FURNACE)	14	10	2	6								
CO. MEATH												
WARRENSTOWN	11	8	6	16						7.1	8.3	9.2
CO. MONAGHAN												
CLONES	9	6	5	13	0	0	0	5		7.8	9.0	10.4
CO. OFFALY												
BIRR	11	7	9	15	0	0	0	5		7.4	8.5	10.2
DERRYGREENAGH	9	8	7	21								
CO. SLIGO												
MARKREE CASTLE	12	5	12									
CO. TIPPERARY												
FETHARD (PARSONSHILL)	13	10	4	10						8.1	8.4	
CO. WATERFORD												
WATERFORD (TYCOR)	13	10	2	17						9.0		9.7
DUNGARVAN (CARRIGLEA)	10	9	8	10								
CO. WESTMEATH												
MULLINGAR II	9	8	7	12	0	0	0	6		7.1	8.2	9.9
CO. WEXFORD												
JOHNSTOWN CASTLE	11	9	0	7						8.4	9.3	10.1
ROSSLARE	12	11	0	1	0	0	1	1		8.9	9.9	11.4
CLONROCHE	12	11	3	15						9.1	9.7	10.5
JOHN F. KENNEDY PARK	12	8	2	29						8.3	9.4	11.2

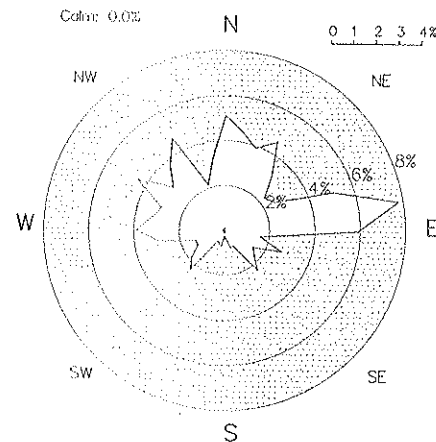
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TABLES

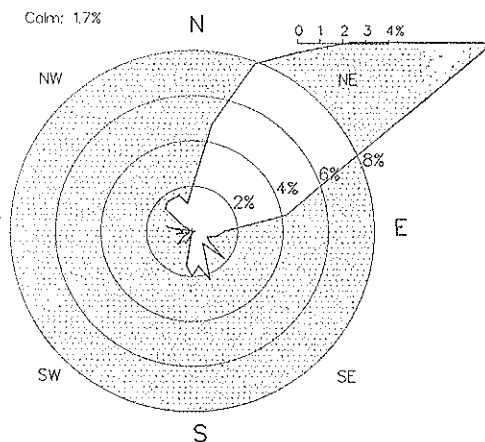
County / Station	WIND (KTS)										Days with gales	Hours with gale gusts
	Mean speed	Max. 10-min. dir.	mean speed	date/time	Max. Gust dir.	speed	date/time					
CO. CLARE												
SHANNON AIRPORT	6.0	250°	22	3/16	340°	36	6/ 846	0	1	5		
CO. CORK												
CORK AIRPORT	7.2	310°	24	2/15	140°	35	4/1958	0	2	4		
CO. DONEGAL												
MALIN HEAD	12.9	10°	37	6/ 3	360°	48	6/ 359	2	9	70		
CO. DUBLIN												
DUBLIN AIRPORT	7.3	360°	21	6/ 6	360°	30	6/ 530	0	0	0		
CASEMENT	5.9	120°	19	1/10	30°	30	12/ 922	0	0	0		
CO. KERRY												
VALENTIA OBSERVATORY	5.5	10°	24	6/ 5	10°	40	6/ 358	0	5	22		
CO. KILKENNY												
KILKENNY	5.1	330°	19	6/12	310°	33	2/2024	0	0	0		
CO. MAYO												
BELMULLET	10.1	30°	33	6/23	40°	49	6/2211	0	3	46		
CLAREMORRIS	6.1	30°	25	6/ 4	30°	39	6/ 355	0	1	3		
CO. MONAGHAN												
CLONES	4.4	310°	18	20/13	360°	32	6/ 505	0	0	0		
CO. OFFALY												
BIRR	2.7	170°	13	3/13	270°	28	3/1450	0	0	0		
CO. WESTMEATH												
MULLINGAR	4.6	30°	16	12/10	30°	31	12/ 930	0	0	0		
CO. WEXFORD												
ROSSLARE	12.1	50°	36	12/20	40°	45	12/1933	1	6	51		

FREQUENCY OF WIND DIRECTION

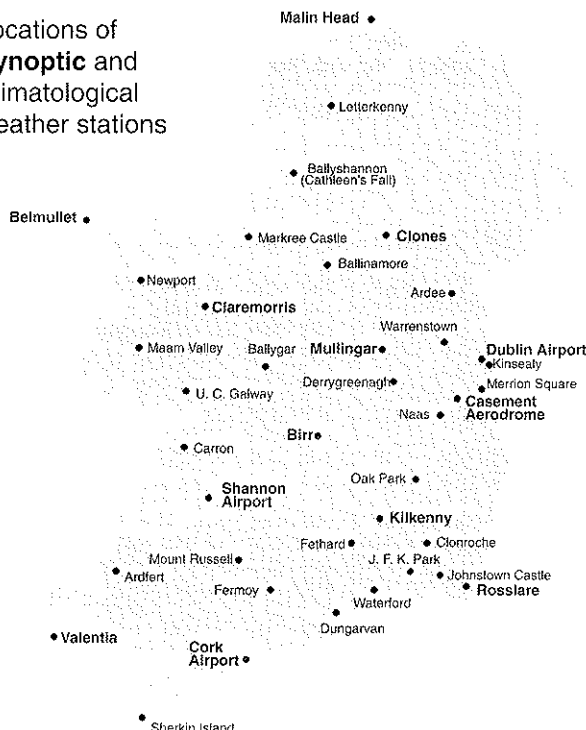
Dublin Airport



Valentia Observatory



Locations of Synoptic and Climatological weather stations



Notes on the tables

A. General

1. Rainfall amounts are given in millimetres, temperature in degrees Celsius, sunshine duration in hours and wind speed in knots.
(1 knot=1.15 m.p.h.)
2. Rainfall amounts are measured at climatological stations at 0900GMT and credited to the previous day. At synoptic stations daily totals refer to the 24-hour period ending at 0600GMT the following day. The term rainfall includes all forms of precipitation, such as snow and hail, and deposition from dew or frost, measured as equivalent rain.
3. 'Raindays' and 'wetdays' are days during which the total rainfall is not less than 0.2mm and 1.0mm respectively.
4. A 'day' for the purposes of this publication refers to the period from 0900GMT on a particular day to 0900GMT on the following day. (This is because climatological stations make their daily observations at 0900GMT.)
5. The mean daily air temperature over a period is taken as the mean of the daily maxima and daily minima (averaged separately over the period).
6. Days with air frost are those during which the minimum air temperature was below 0° C. Similarly days with ground frost indicate days when the grass minimum temperature was below 0° C. (Grass minimum temperatures are measured by a thermometer placed horizontally on pegs just above the tips of short grass.)
7. Mean soil and earth temperatures are based on readings taken at 0900GMT.
8. A gale is a mean wind over a 10 minute period of 34 knots or more. A gale gust is a gust of 34 knots or more. All wind speeds refer to the wind at an effective height of 10 metres above the ground.
9. 'e' denotes that the value is calculated using one or more estimated readings.
10. Data from Northern Ireland is kindly provided by the Belfast Weather Centre.

B. Agmet

11. Calculated Potential Evapotranspiration (P.E.) values are based on values of temperature, sunshine, wind speed and vapour pressure using the Penman formula. Because of formula limitations, negative values can occur in winter; these are replaced in the table by zero. Measured P.E. values are those measured by means of soil-filled tanks sunk into the ground with their upper grass-covered ends at surface level.
12. Soil moisture deficits and surpluses are computed from the differences between rainfall and actual evapotranspiration (A.E.). Estimates of A.E. are derived from measured values of P.E. (See Agmet. Memo No. 1, 1986). Soil moisture surpluses are assumed to be removed by drainage and surface run-off and are not therefore carried forward from one period to the next. Soil moisture deficits are regarded as being cumulative. Where heavy rain occurs near the end of the fixed period, the date of cut-off may be adjusted to avoid error due to insufficient run-off time.
13. Degree day totals are calculated using the method set out by McVicker in the Journal of Heating and Ventilating Engineers (Vol. 14 No. 18, Nov-Dec 1946).
14. Global solar radiation values are given in MJ/sq.m. correct to two decimal places (3.6MJ=1kWh).

The MONTHLY WEATHER BULLETIN is produced by the Climatology and Applications Division of the Meteorological Service. An annual subscription to the bulletin costs £36. Further climatological information is available from the Climate Enquiries Office, Glasnevin Hill, Dublin 9, telephone 01-375436, fax 01-369115.