Irish Meteorological Society

Newsletter

Number 18 **Sept 1989**

This newsletter contains :

(a) Details of elections to the new committee

(b) The text of a lecture delivered by Mr. T. Keane as part of the one-day meeting of the Society which took place on Saturday 8th April 1989.

(c) Some articles from the Monthly Weather Bulletin of the Meteorological Service which are reproduced with the permision of the Service.

(d) Details of an article on 'The Night of the Big Wind' available from the Meteorological Service

(e) Details of a forthcoming lecture.

Aodhagan Roddy

Aodhagan Roddy
President

A. Kelly

A. Kelly
Secretary

Report on Committee Meeting of Irish Meteorological Society - 14th Sept. 1989

The Committee of the Society consists of the following members (as elected at the AGM in April):

A. Roddy (President - re-elected 1988)
S. Browne (elected 1989)
K. Commins (elected 1989)
M. Connaughton (re-elected 1988)
J. Doyle (elected 1989)
S. Finnegan (re-elected 1988)
G. Fleming (elected 1989)
A. Kelly (elected 1989)
M. Mansfield (elected 1988)
M. Naughton (elected 1989)
J.A. Scott (elected 1988)
P. Vardon (elected 1988)

A committee meeting of the Society took pace on Sept 14th. The following officers were elected from among the committee members:

A. Roddy - President
S. Browne - Vice-President
A. Kelly - Secretary
J. Doyle - Assistant Secretary
S. Finnegan - Treasurer
M. Mansfield - Assistant Treasurer

Discussion of activities

The next lecture organised by the Society will take place on Nov 3rd, details of which are enclosed with this newsletter.

It is proposed to hold the Society's One-day meeting and A.G.M. in the Royal Marine Hotel, Dun Laoighre on April 28th.

The Annual outing has been provisionally scheduled for shortly after Easter, possibly to the Mace Head field station outside Galway.

Other lectures, including the Annual Guest Lecture, are being organised and the committee would be delighted to have suggestions from members on future topics and speakers.

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The Royal Meteorological Society's Christmas cards and 1990 Calendar are now available and should be ordered directly from the R.M.S.

Prices (in Sterling) are as follows:

1990 Calendar	Price	Postage/Packing	Ref
1 Copy	£2.25	£0.65	2115/36
5 Copies	£9.00	£2.50	

Christmas Cards	Price	Postage/Packing	
(Minimum order pack of 20)	£2.00	£1.00	2144/5

Orders should be sent to Royal Meteorological Society
James Glaisher House
Grenville Place
Bracknell
Berkshire RG12 1BX

AGRICULTURAL METEOROLOGY

T Keane , Meteorological Service

Farming for the most part has become a technical and precise industry. Greatest uncertainty in the enterprise now relates to weather, i.e. **weather is the factor that makes farming difficult.** The farmer has constantly to change decisions because of weather. The uncertainty can be minimised by a dependable weather forecast service, which is locally accurate, and has a range as long as possible. A 1986 survey showed that over 40 per cent of farmers needed a short-range forecast (up to 24 hours), 20 per cent preferred a two day range and the remainder required a longer period.

Concern for the Environment

There is increasing recognition among farmers that the environment has an equal demand on the farmer as efficiency. Farmers are said to account for about 20 per cent of river pollution arising from silage affluent, intensive rearing of livestock, slurry and fertilizer spreading. Forecasts of approaching very wet spells are very important in this respect. The AGMET Group, with experts drawn from many agricultural disciplines, are currently studying how meteorological advice could best be employed to help farmers reduce the risks to the environment.

Crop-weather Modelling : Conditional type

The rate of crop growth, attack by pests and diseases on crops, and effective timing of control measures are now better understood and modelled. Criteria on meteorological conditions conducive to a range of diseases, e.g. potato blight, mildew, aphid attacks, have been determined empirically. Such models incorporating various weather parameters are capable of providing useful qualitative guidance on a regional basis—they increase awareness by alerting farmers to current or imminent risk of disease. Based on the forecast conditions, preventative control measures can then be undertaken before the onset of the disease, e.g. potato blight warnings.

Crop-weather Modelling : Quantitative type

Simulating the growth of grass, winter wheat and sugar beat are examples of the use of quantitative models which have been developed in Teagasc. For example, growth rates at a number of synoptic stations using the grass production model are regularly published in the Farming Press as well as incorporated into the new weekly agricultural weather forecast on RTE. The meteorological parameters used to drive the models, e.g. temperature, radiation and rainfall, both recent and forecast values, are provided by the Meteorological Service each week. Outputs of the models, therefore, not only depend on the model specification but also on the accuracy of the forecast parameters.

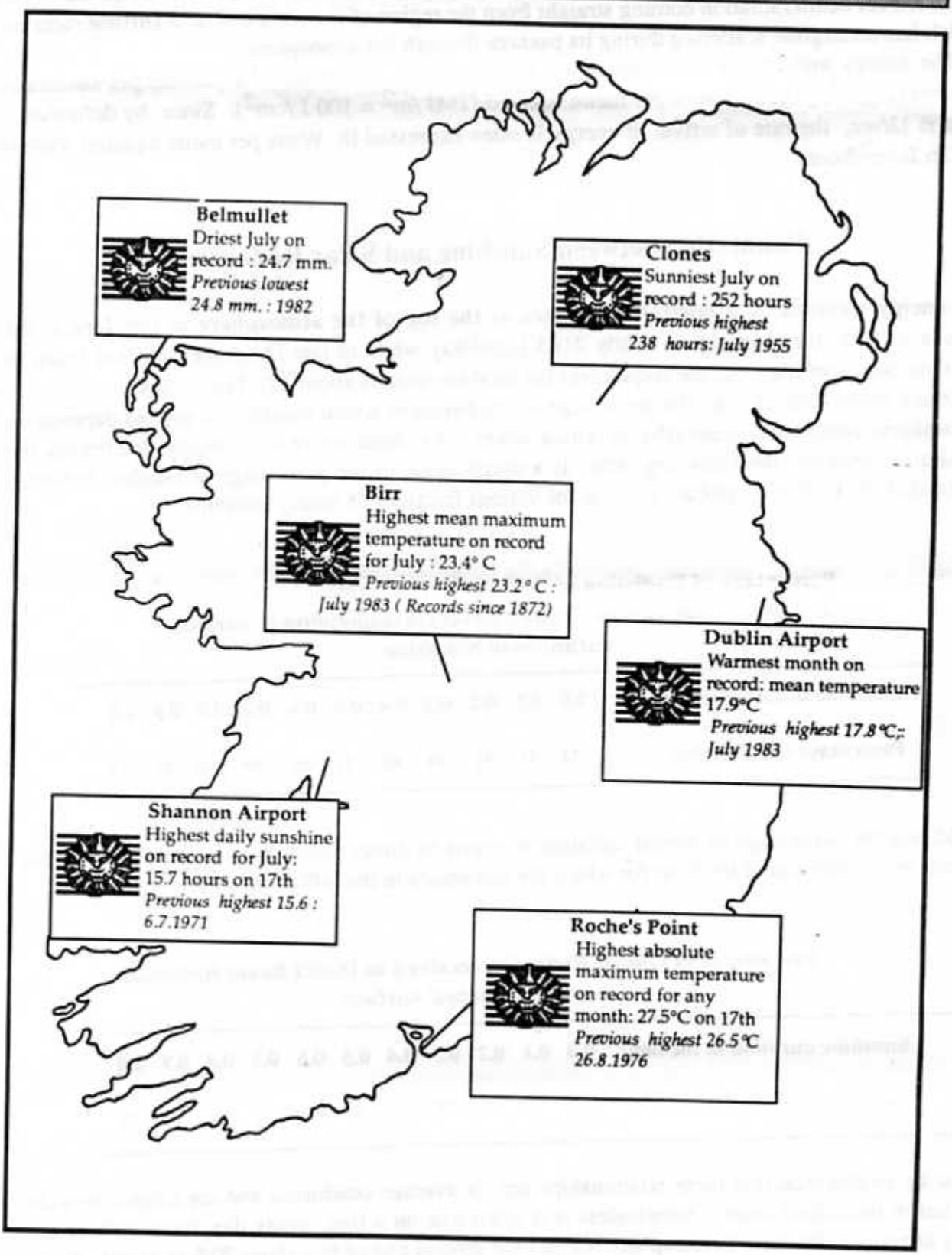
Animal Diseases of Economic Importance

Diseases of animals are of major economic importance to this country. Recent (monthly or seasonal) meteorological conditions are critical in the life cycle of many parasites. The pattern of weather over the recent season can provide valuable insights into parasite development and survival while they are resident in the environment. With the aid of models, the Meteorological Service provides the Veterinary Authorities with estimates of the likely prevalence of certain diseases in animals, e.g. liver fluke, nematodirus, for the forthcoming season. The Authority's recommendations to farmers for the dosing of animals at risk are issued at appropriate times.

Foot-and-Mouth Disease Virus Dispersion

Foot-and-mouth disease has been a rare but much dreaded visitor to this country. The virus is very contagious and affects cattle, sheep and pigs. Primary infection is likely to be brought to this country by transport, infected food, or other contact means. Once diagnosed and the appropriate control measures put in place, further spread of the virus can only occur by airborne dispersion — the exhaled virus is transported away from an infected animal in an aerosol plume. A simulation model using meteorological and veterinary data was purchased from Britain in 1986 by the Department of Agriculture and Food and adopted to run on the Meteorological Service computer. Thankfully the use of the model to date has been confined to seminar workshops with the regional veterinary officers.

July sets new records



Solar Radiation and Sunshine

The **Global** radiation is the total solar radiation received at ground level and is composed of two parts: **Direct** beam radiation coming straight from the region of the sun's disc and **Diffuse** radiation which has undergone scattering during its passage through the atmosphere.

The energy arriving on unit area in a given time may be measured in Joules per centimetre squared (J /cm^2) or megajoules per metre squared (1MJ /m^2 = 100 J /cm^2). Since, by definition, a Watt is 1J/sec, the rate of arrival of energy is often expressed in Watts per metre squared (W/m^2 = 0.36 J/cm^2/hour).

Connection between Sunshine and Solar Radiation

The energy received by a **horizontal surface at the top of the atmosphere** in late June at the latitude of Birr (for example) is nearly 4165 J/cm^2/day while in late December this has fallen to less than 600 J/cm^2/day. At the enquinoxes the total received is about 2270 J/cm^2/day.

At any given time of year, the percentage of the radiation which reaches the ground depends on atmospheric conditions, especially on cloud cover. As cloud cover also largely determines the amount of sunshine, the following table is a rough guide to the percentage of incident radiation received at the surface as global radiation for various fractions of hourly sunshine:

Percentage of Radiation arriving at Top of Atmosphere received as Global Radiation at Ground Level corresponding to various durations of Sunshine

Sunshine duration in the hour	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Percentage of Radiation	22	37	41	44	48	51	55	59	63	67	71

In addition the percentage of global radiation received as direct radiation on a horizontal surface depends on the fraction of the hour for which the sun shines in the following way:

Percentage of Global Radiation received as Direct Beam Radiation on a horizontal surface

Sunshine duration in the hour	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Percentage as Direct Beam	3	12	18	25	31	37	42	47	53	58	70

It must be emphasised that these relationships are for average conditions and are subject to wide variation in individual cases. Nonetheless it is often true on a fine, sunny day about 70% of the energy arriving at the top of atmosphere reaches the ground and of this about 70% is usually direct radiation. However, on a cloudless but hazy day the direct radiation may be reduced to less than 40% of the daily total.

Solar Radiation and Sunshine

The main points about the annual course of the sun in these latitudes are:

— In late June the sun rises north of east and sets some 17 hours later at a point in the northwestern sector of the observer's horizon circle. Its altitude at the maximum is about 60° and is achieved at solar noon.

— In late December the sun describes a smaller arc as it rises in the southeast and sets some 7 to 8 hours later in the southwest having a maximum altitude of less than 15°.

— On March 21st and September 23rd (termed the equinoxes because the sun rises due east and sets due west giving a solar day of 12 hours) the maximum altitude is about 37°.

The 1951 - 1980 sunshine averages show that:

— May has the highest average sunshine except at some stations near the south and southeast coasts where June is sunnier than May.

— December is month of least sunshine.

— Coastal areas are sunnier than neighbouring inland areas.

— Eastern and southern areas get more sun than northern and western regions, the southeast corner being the sunniest area in the country.

— Mountain areas have got less sunshine than nearby lowlands. The leeside or sheltered side of a mountain also has the advantage over the windward slope.

The long-term averages of radiation have a broadly similar pattern to the sunshine and in all months show a decrease from south to north. June has a higher long-term average than May although May has more sunshine— the mean daily radiation arriving at the top of the atmosphere is some 9% higher in June than in May and in the long run this more than compensates for the decrease in sunshine.

Because of the increased cloudiness in Ireland, diffuse and direct radiation account for some 60 per cent and 40 per cent respectively of global radiation. Inside there is a more detailed analysis of the connection between sunshine and solar radiation.

SUMMER 1989

June : Warm and sunny
July : Hot sunny and dry
August : Duller and wetter but temperatures above normal

It was the driest, warmest summer for 5 or 6 years, and the sunniest for up to 40 years.

Broadly, rainfall totals ranged from over 240 millimetres near the north and west coasts to less than 160mm over much of the south, east and midlands. However, as a few days of thundery rain in both June and August contributed a large part of these totals, there were wide local variations; thus Casement Aerodrome had 106% while Dublin Airport had only 85% of normal summer rainfall. Heaviest fall was 39.3mm at Claremorris on 9th June but Kilkenny had 39.2mm on 30th August.

Mean maximum temperatures were generally the highest since 1983 or 1984 but the 20.1°C at Dublin Airport was the highest since recording began there in 1942. Kilkenny (21.1°C) had the highest mean maximum but Shannon Airport had the highest daily temperature 30°C recorded on 18th July. However the most notable temperature was 27.5°C recorded at the coastal station, Roche's Point on July 15th; by 1°C this was its highest temperature in any month in over 34 years of recording.

While mean maximum temperatures were about 2°C above normal at some stations, mean minima were mostly less than 1°C above normal. In early June Casement Aerodrome recorded 0.7°C, the lowest temperature of the summer but the 2.8°C at Malin Head on June 8th was the lowest summer temperature recorded there in over 30 years.

Sunshine totals ranged from over 639 hours at Cork Airport, Roche's Point and Rosslare to 446 hours at Belmullet. Percentage totals varied from less than 100% near the north and west coasts to 138% of normal at Clones; at seven of our fifteen stations percentage totals were 20% or more above normal. At Clones and Mullingar, both of which have some 40 years of record, it was the sunniest summer ever. In the east, south and southwest it was the sunniest summer for 20 to 30 years.

THE 'NIGHT OF THE BIG WIND' IN IRELAND, 6 – 7 JANUARY 1839

by Lisa Shields, Librarian, and Denis Fitzgerald, Head of Climatological Division

Meteorological Service, Dublin 9.

ABSTRACT

The notorious storm of 6–7 January 1839 is re-examined, and its effect on Ireland outlined. The country-wide damage as reported by contemporary newspapers and observers is described, source material is listed, and consideration is given to the social and cultural legacy of the storm.

The meteorological situation of the night of 6–7 January has been reconstructed from the available data, and displayed in map form. A comparison with the recent storm of 9 February 1988 is made. The much greater damage caused by the 1839 storm suggests that there could have been thundery or even tornado-type activity in places at the height of the storm.

The article outlined above has just appeared in ***Irish Geography***, Vol. 22, part 1, 1989, pp 31–42.

A limited number of offprints are available, and interested members of the Society may obtain a copy on applying to Lisa Shields, Librarian, Tel: (01) 424411, ext. 325.

APPEAL TO MEMBERS

The Meteorological Service Library is unable to complete its bound sets of ***Weather*** and ***Weatherwise*** because of missing issues.

If any member has an unneeded copy of any of these issues to donate, or would be willing to lend their copy for photocopying, the Librarian would be eternally grateful. Issues needed are the following:

Weather: June 1984, February 1985; October 1986; November 1987

Weatherwise: April and August 1982; December 1984; February and August 1986; April, June and August 1987