

DEPARTMENT OF TRANSPORT AND POWER - METEOROLOGICAL SERVICE

CLIMATOLOGICAL NOTE No. 3

DISTRIBUTION OF DRIVING RAIN IN IRELAND

by

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Rain carried by the wind strikes walls and other vertical surfaces and the effects of this rainfall deposit are of interest to architects and workers in the construction industry. Rainfall driven against a wall may be partly absorbed if the surface is porous and may also penetrate through cracks in the wall. The material so moistened has increased conductivity and as well as increasing the risk of damage to the building and its decoration, the rain reduces the insulation of the wall thereby increasing heating costs. These effects of rain on a building are related to the speed of the wind when rain is falling and to the intensity of the rain.

Lacy and Shellard (1962) used the product of wind speed and rainfall amount as an index to indicate the relative severity of driving rain at various locations, and they prepared a map showing the distribution of the index of driving rain over Great Britain and Ireland. Lacy (1971) has published a similar map. Values of the driving-rain index over Ireland based on more recent data have now been computed. A map showing the distribution of this index is attached (Fig. 1).

The values of wind speed at the time rain is falling are not readily available from all rainfall stations. However, Lacy and Shellard found that the ratio of mean wind speed while rain is falling to the overall mean wind speed does not vary greatly, and they considered it acceptable to use the product of the mean wind speed and the mean rainfall as an index.

The distribution of mean annual rainfall in Ireland (1931-'60) is shown in Figure 2. A map of mean wind speed (1951-'70) was prepared, based on data from 18 stations, 6 of which had instrumental records covering the full 20 year period while the remainder had instrumental records ranging from 5 to 18 years. This map, showing the mean wind distribution is included as Figure 3. In the preparation of this map, account was taken of the exposure of the stations and also of large scale topographical features. As there was insufficient wind data for mountainous areas, no attempt was made to allow for local variation in wind speed in these areas. It was not possible to use a common period for the mean wind speed and rainfall maps as measured wind speeds were not available for sufficient stations for the period 1931-'60. The product of the mean wind speed (m/sec) and the mean annual rainfall (mm) was computed for a large number of grid points and the results divided by 1000 to give values of the index in units of  $\text{m}^2 \text{sec}^{-1} \text{year}^{-1}$ . The index of driving rain map was then drawn up (Figure 1).

The highest values of the driving-rain index are found in the west. High values are also found over high ground in other parts of the country. A comparison of this map with the maps using earlier data (1901-'30 rainfall and 1926-'40 wind speed) prepared by Lacy and Shellard (1962) and Lacy (1971) suggests that the earlier maps tend to overestimate the index in many areas. The wind speed map used by Lacy and Shellard is based on information for a period during which instrumental wind records were few and it shows generally higher wind speeds than the 1951-'70 map (Figure 3). In Lacy's map (Lacy 1971), the areas of high index in the southeast of the country appear to be accidentally displaced relative to the topography.

Care is necessary in the interpretation of Fig. 1. Because of the insufficiency of wind data for mountainous areas, the map gives only an overall indication of the index in such areas and does not show the local variations. Furthermore it does not take account of differences in exposure to driving rain due to local topography. For example, an unsheltered building situated on a small hill surrounded by level country will in general experience both higher rainfall and higher wind speeds than buildings in the surrounding country while a building in a hollow may be sheltered from driving rain. Finally, a simple index, as shown in Figure 1, gives no information on associated wind directions.

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#### REFERENCES

- |                                  |      |   |
|----------------------------------|------|---|
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| Lacy, R.E.                       | 1971 | An Index of Exposure to Driving Rain.<br>Building Research Digest 127.    |



Fig. 1. Driving rain index ( $\text{m}^2 \text{sec}^{-1} \text{year}^{-1}$ )



Fig. 2. Mean Annual Rainfall (mm), 1931-1960.

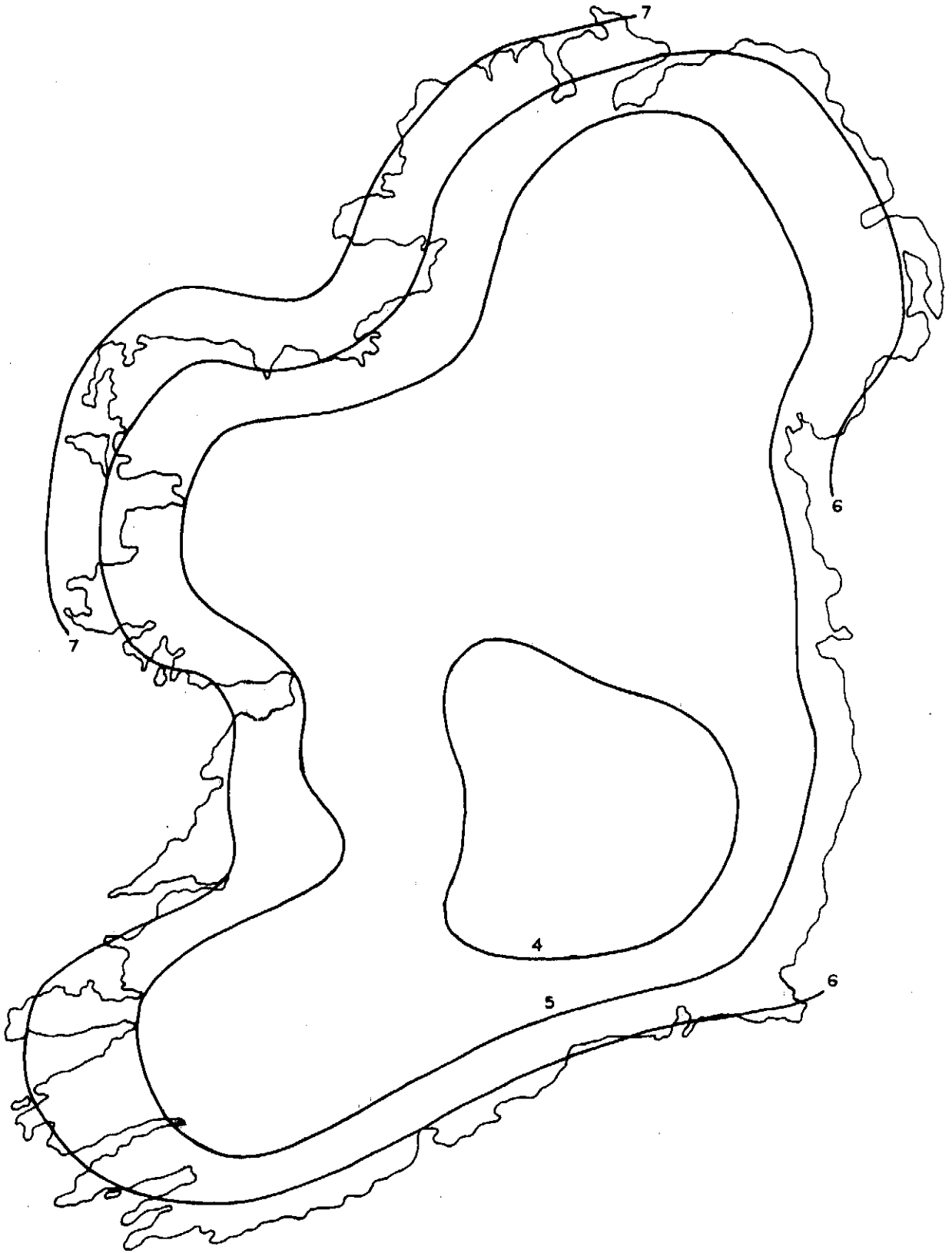


Fig. 3. Mean annual wind speed (metres/sec.), 1951 - 1970.