

METEOROLOGY

Self-Taught Forecasting

Weather Bureau reports individuals can improve on the official forecasts with respect to the low nighttime temperatures for their vicinity, of use to fruit, flower and vegetable growers.

► WEATHER FORECASTING usually should be left to the experts in the U. S. Weather Bureau, but individuals may be able to improve on a Weather Bureau forecast in one respect.

With a little effort, they can probably forecast a more accurate low nighttime temperature for their immediate vicinity than that officially predicted for the general area.

This "weather forecasting self-taught" could be of particular benefit to growers of citrus fruits, flowers and vegetables. To make the job of amateur forecasting easier, the Weather Bureau has now prepared two simple charts and some uncomplicated procedures.

The Bureau points out that when it forecasts 30 degrees Fahrenheit for a particular area, this does not mean that all parts of that city, town or county will have 30 degrees. It is quite common for one part of a farm or city to have a temperature 10 degrees lower than that being recorded at the local Weather Bureau station while another part has a temperature 10 degrees higher.

The Bureau cites one extreme case when a temperature difference of 28 degrees was recorded in a distance of only 225 feet on a steep hillside.

During some types of weather situations, on the other hand, all the temperatures over a general area will be almost identical. For example, in level country with no local influences such as topography, woodlands, air drainage, bodies of water or buildings, temperatures nearly always will be similar over several hundred square miles.

Local variations in sky cover, wind speed and direction, moisture conditions, and the height of the warm layer of air close to the ground, as well as seasonal variations in the hours of darkness, affect the temperature and should be taken into consideration where good accuracy is required.

Table B is suggested as a method by which anyone with a reliable minimum thermometer can collect information to determine, for given conditions, the difference between his own readings of minimum temperatures and the Weather Bureau readings.

If the minimum thermometer reads three degrees lower than the official minimum temperature when the soil is dry on a clear, calm night in May, for example, minus 3 would be entered in the proper column of the chart to indicate that under this set of conditions the local temperature is three degrees below the official temperature recorded by the Weather Bureau. If it reads two degrees higher than the official minimum temperature, plus two would be entered.

For best results, two or three entries should be made in the proper blocks to determine the average correction. In the example given in Table B, the average of the three entries would be minus four. By means of a brief set of comparisons entered in Table B, it will be possible to apply a correction factor to the official minimum temperature forecast, shown in Table A, in order to anticipate the local temperature.

In the above example, four degrees would be subtracted from the official temperature as forecast to determine what local temperature to expect. If the forecast minimum temperature is 40 degrees, then 36 would be entered under the proper heading as shown on Table A. If the forecast is 37 degrees, 33 would be entered. This series of records should be continued until enough figures are collected to fill those portions of the year of concern.

In order for the charts to be of greatest

value, the wind velocity and sky cover during the latter part of the night should be considered. However, when conditions are not expected to be changeable during the night, the sky and wind may be observed during any hour of the evening, say 7 p.m., and this information applied.

If desired, a separate set of charts may be developed for each of the four cardinal wind directions (northerly, southerly, easterly, and westerly.) This would result in greater accuracy in those places where night winds of more than three miles per hour predominate. The wind speed may be estimated as follows:

Less than one mile per hour—calm, smoke rises vertically

One to three miles per hour—wind direction shown by smoke drift, but not by wind vanes.

Four to seven miles per hour—wind felt on face; leaves rustle; ordinary vane moved by wind

A better concept of the chart work will result from an understanding of what happens in the nighttime cooling process. After the sun sets, the air temperature falls steadily throughout the night and reaches its lowest point near sunrise. This cooling is caused by the ground losing heat to the atmosphere, resulting in the soil tempera-

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FORECAST TEMPERATURE	SKY COVER	May June July		August April		September March		October February		November December	
		Ground moist	Ground dry	Ground moist	Ground dry	Ground moist	Ground dry	Ground moist	Ground dry	Ground moist	Ground dry
WIND SPEED (miles per hour)											
0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+											
39-41	Clear			36							
	Partly Cloudy										
	Cloudy										
	Overcast										
36-38	Clear			33							
	Partly Cloudy										
	Cloudy										
	Overcast										
33-35	Clear										
	Partly Cloudy										
	Cloudy										
	Overcast										
30-32	Clear										
	Partly Cloudy										
	Cloudy										
	Overcast										
27-29	Clear										
	Partly Cloudy										
	Cloudy										
	Overcast										
24-26	Clear										
	Partly Cloudy										
	Cloudy										
	Overcast										

TABLE A—Expected local minimum temperatures based on forecast minimum temperatures.

SKY COVER	May June July		August April		September March		October February		November December	
	Ground moist	Ground dry	Ground moist	Ground dry	Ground moist	Ground dry	Ground moist	Ground dry	Ground moist	Ground dry
WIND SPEED (miles per hour)										
0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+ 0 1-3 4+										
CLEAR										
		-3								
		-4								
PARTLY CLOUDY*										
OVERCAST										

* High thin clouds (those which do not hide the moon) should be disregarded and the sky considered clear.

TABLE B—Departure of local minimum temperatures from official minimum temperatures.



Self-Taught Forecasting

(Continued from p. 290)

ture falling below that of the layer of air in contact with the ground. The air near the ground then becomes cooler and more dense than the air above, and this lower layer tends to remain in contact with the ground. Thus, over level land on a clear, calm night, there is near the ground a thin layer of colder air with a layer of warmer air above it.

On sloping ground, this cooled surface air tends to drain toward lower levels and to gather in depressions so that the temperatures in valleys and at the bottom of hills are lower on a calm night than the temperature on hillsides.

Night winds are of great importance in determining temperature differences, and even a light wind will mix the warm air above and away from slopes with the thin layer of surface air which has been cooled through contact with the ground. A moderate wind may so thoroughly mix the air that there will be little or no temperature difference between the hillsides and valleys.

A layer of low clouds or a thick layer of ground fog helps prevent loss of heat from the earth at night and keeps temperatures from dropping as low as they otherwise would.

• Science News Letter, 81:290 May 12, 1962

PHYSICS

Nuclear Fission Pictured By Model of Fragments

See Front Cover

► THE GLITTERING Lucite rods, shown on the cover of this week's SCIENCE NEWS LETTER, picture the energies of nuclear fragments resulting from neutron-induced fission of millions of uranium nuclei.

The model was demonstrated recently by Dr. Walter M. Gibson of Bell Telephone Laboratories, shown in the picture. Two crystal counters were used to obtain information on which the model is based. The counters allow precise measurement of a large number of fissions in a short time.

The two horizontal axes at the base of the model correspond to the energies of the two fission fragments. The length of the vertical rods indicates the number of fissions that occurred. The three black lines on the left mound correspond to 10,100 and 1,000 fissions.

• Science News Letter, 81:303 May 12, 1962

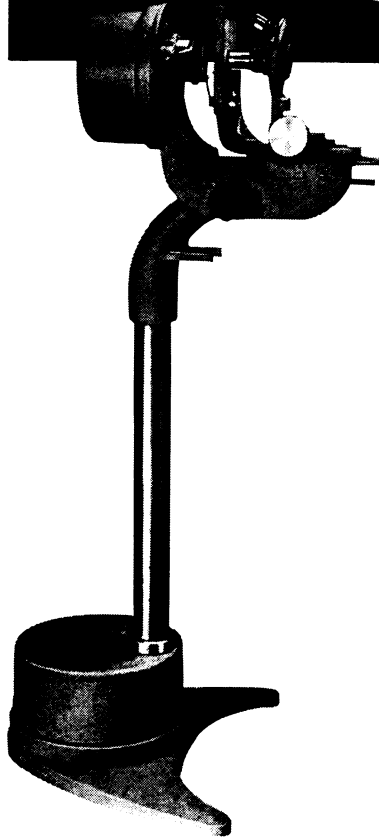
Questions

GENERAL SCIENCE—How many of the Nobel Prize winners visiting President Kennedy were scientists? p. 291.

PALEONTOLOGY—Which other animals do "animal" organisms two billion years old resemble? p. 298.

PHYSICS—How many photographs were analyzed in the discovery of the Eta meson? p. 292.

Photographs: Cover, Bell Telephone Laboratories; p. 290, U. S. Weather Bureau; p. 291, United Press International; p. 293, Piasecki Aircraft Corporation; pp. 294 and 296, National Aeronautics and Space Administration; p. 298, Dr. Elso S. Barghoorn; p. 299, L. O. Nicolaysen; p. 304 (top), Rosi-Trac Rail, Inc.



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