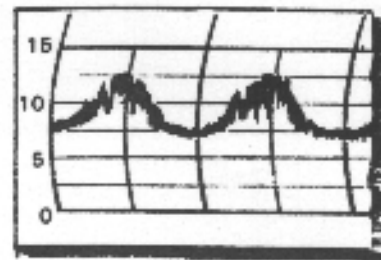
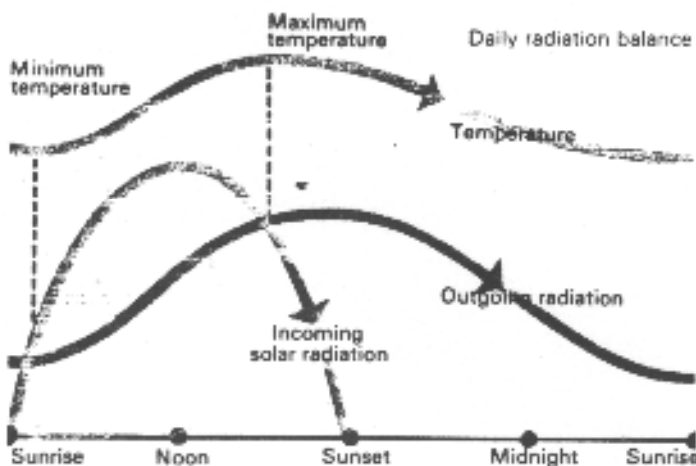


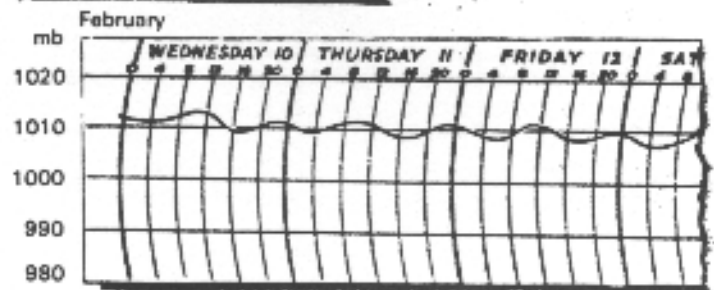
### Daily variations of weather factors

The daily cycle of sunshine and darkness gives rise to corresponding variations in the elements of weather. An obvious consequence is that night is, as a rule, colder than the daytime, but the daily cycle of temperature is not quite so simple as this might suggest. Radiation is received from the Sun during the period from sunrise to sunset, yet the temperature does not go on increasing all day; it reaches its highest value in the early afternoon, then decreases. This happens in spite of the fact that at 3 pm, say, the Sun is just as high in the sky as it was at 9 am, and then the temperature was rising. The reason is that the Earth's surface is constantly losing heat by radiation; the higher the temperature the greater the rate of loss. In the early afternoon the Earth's radiation begins to outweigh that received from the Sun, so that cooling sets in. It continues throughout the evening and night, the lowest temperature being reached at about sunrise.

The foregoing applies to land areas when the sky is clear. If there is a layer of cloud, both the incoming and outgoing radiation are restricted; the same kind of temperature cycle occurs but it is less pronounced, the days being cooler and the nights warmer. Clear nights in winter have sharp frosts; cloudy nights are, as a rule, less cold. Over the sea the difference between day and night temperatures is much less than over land. This is because the Sun's rays penetrate and



Normal wind record (left) showing a doubling of wind during the day time. (Below) tropical barogram illustrating the twice-daily cycle of pressure change.



spread their heating through a considerable depth of water. The movement of the water also spreads the heating, instead of restricting it to a thin surface layer, as on land.

Relative humidity, being to a large extent controlled by temperature tends to be low in the middle of the day and high at night – hence the greater drying power of the air by day, especially on warm days.

It was mentioned on page 34 that the surface wind is largely controlled by the interchange of fast moving upper air with air, slowed down by friction, near the surface. This interchange is most vigorous when the lapse rate is unstable, that is, when the surface air is warmest. It explains the well known tendency, in fine weather, for the wind to freshen by day, and to die away in the evening and night.

In the tropics there is a regular twice-daily cycle of pressure changes, with maxima at about 10 am and 10 pm and minima at 4 am and 4 pm, local time. The total variation amounts to 2 or 3 millibars. Outside the tropics this variation is barely detectable, being swamped by the much greater irregularities caused by depressions and anticyclones (pages 86 to 91).