

The words on scales of barometers should not be so much regarded for weather indications as the rising or falling of the mercury, for if it stand at "changeable" and then rise towards "fair," it presages a chance of wind or weather, though not so great as if the mercury had risen higher; and, on the contrary, if the mercury stand above "fair" and then fall, it presages a change, though not to so great a degree as if it had stood lower, besides which, the direction and force of the wind are not in any way noticed. It is not from the point at which the mercury may stand that we are alone to form a judgment of the state of the weather, but from its rising or falling, and from the movements of immediately preceding days as well as hours, keeping in mind effects of change of direction and dryness or moisture, as well as alteration of force or strength of wind.

By a thermometer the weight of air is not shown. No air is within the tube. None can get in. But the bulb of the tube is full of mercury, which contracts by cold and swells by heat, according to which effect the thread or metal in the small tube is drawn down or pushed up so many degrees, and thus shows the temperature.\*

If a thermometer have a piece of linen round the bulb, wetted enough to keep it damp by a thread or wick dipping into a cup of water, it will show less heat than a dry one, in proportion to the dryness of the air and quickness of drying.† In very damp weather, with or before rain, fog, or dew, two such thermometers will be nearly alike.

For ascertaining the dryness or moisture of air, the readiest and surest method is the comparison of two thermometers, one dry, the other just moistened and kept so. Cooled by evaporation as much as the state of the air admits, the moist (or wet) bulb thermometer shows a temperature nearly equal to that of the other one when the atmosphere is extremely damp or moist; but lower at other times, in proportion to the dryness of air and consequent evaporation—as far as  $12^{\circ}$  or  $15^{\circ}$  in this climate,  $20^{\circ}$  or even more elsewhere. From  $4^{\circ}$  to  $8^{\circ}$  of difference is usual in England, and about  $7^{\circ}$  is considered healthy for inhabited rooms.

Briefly, the barometer shows weight or pressure of the air; the thermometer, heat and cold, or temperature; and the wet thermometer, compared with a dry one, the degree of moisture or dampness.‡

It should always be remembered that the state of the air foretells coming weather, rather than shows the weather that is present—an invaluable fact too often overlooked, that the longer the time between the signs and the change foretold by them, the longer such altered weather will last; and, on the contrary, the less the time between a warning and a change, the shorter will be the continuation of such foretold weather.

To know the state of the air, not only barometer and thermometers should be watched, but the appearance of the sky should be vigilantly noticed.

If the barometer has been about its ordinary height, say near 30 inches (at the sea level),§ and is steady, or rising, while the thermometer falls, and dampness becomes less, north-westerly, northerly, or north-easterly wind, or less wind, less rain or snow may be expected.

On the contrary, if a fall takes place with a rising thermometer and increased dampness, wind and rain may be expected from the south-eastward, southward, or south-westward.

A fall with a low thermometer foretells snow.

Exceptions to these rules occur when a north-easterly wind, with wet (rain, hail, or snow) is impending, before which the barometer often rises (on account of the direction of the coming wind alone), and deceives persons who from that sign only (the rising) expect fair weather.

\* Thirty-two degrees is the point at which water begins to freeze, or ice to thaw.

† Evaporation.

‡ The two thus combined making a hygrometer; for which some kinds of hair, grass, or seaweed may be a makeshift.

§ It differs, or stands lower, about a tenth of an inch for each 100 feet of height directly upwards, or vertically, above the sea; its average height being 29.04 inches at the mean sea level in England. Allowances must therefore be made for barometers on high land or in buildings.