GREAT BRITAIN'S WONDERFUL WEATHER BUREAU

Greenwich Observatory, as Seen Through the Scientific Spectacles of E. Walter Maunder, F. R. A. S.

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"He that is weatherwise
Is seldom otherwise."

Says the proverb, and the saying is not without a shrewd amount of truth. For prompt weather cue, we find a more striking combination of imperfect observation and inconsistent deduction than in the ways in which from the stock in trade of the ordinary would-be weather prophet. How common it is to get now full of the conviction that the weather must change at the revealed "omens of the moon," forgetful that

"It will be moon at all—
And may and may not change—
We will should have weather
That's subject to change."

They will say truly enough, no doubt, that they have known the weather to change in "new" or "full" or "quarter" or "change" of the moon, and they argue that it therefore must always do so. But in fact they have only noted a few chance coincidences and have let the great number of disconfirmed "omens" go unnoticed.

But observations of this kind seem scientific and responsible compared with those authentic weather proverbs which are based upon the mere gauge of a thumb, as

"If the ash be out before the oak,
You may safely make a thorough stroke"—

a proverb which is deftly inverted in some districts by making "oak" rhyme to "choke."

Others again are based upon a mere childish fancy, as, for example, that "a young moon, lying on her back, is supposed to hold a spell of dry weather, because it looks like a cup, and so might be thought of as able to hold the water."

During the present reign, however, a very different method of weather guess has come into vogue, and the prognostications of a few months have been told. There have been some, for an fanciful analogies or odd whims, to make a forecast of the weather depend, not upon observations carried on for long periods of time, and verified with scientific and thoroughness in this century without selection and bias. Above all, mathematical analysis has been applied to the motions of the air and ether, over gulfing in grounding the uniformities, laws and constitution of the general constitution of the atmosphere.

As compared with its sister science, astronomy, meteorology appears to be still in a very undeveloped state. There is a little difference between the motions of the astronomer to forecast the precise position of sun, moon and planets for months to come, and the motions of wind, and the failure of the meteorologist to predict the weather for a single week, which, this impression has been widely spread that there is yet no true meteorological science at all. It is a question that astronomy is defined as, in the movements of the heavenly bodies, the very simplest and easiest problem of related motion. Yet we have many thousands of years did men watch the planets and speculate concerning them before the laws of Tycho, Kepler and Newton untangled in the revelation of their meaning? For another science it was supposed that their movements resulted the sun, characters and private fortunes of individuals and the nations on earth. It was thought that the new moon coming on Saturday or two full moons coming in a month, the same, would bring bad weather.

Today we suppose, to forecast the weather change for long ahead, but in some countries, especially in the United States, it has been found possible to predict the weather of the coming twenty-four hours with considerable correctness and often to forecast the course of a great storm some days ahead. This is the chief purpose of the new system of observation of storms over Indian and Chicago seas. Hence, Tokio and Mauritius, and the value of the work which they have done in predicting the loss of ships and the consequent loss of lives and property has been beyond all estimate.

The Royal observatory, Greenwich, is a meteorological as well as an astronomical observatory, and it is the chief home any weather forecasts. The Greenwich observatory of weather has sent to the meteorological office, there to be combined with similar records from every part of the Heavens, so to form the basis of the daily forecasts which the latter office publishes. To each of these three offices, the Royal, the Meteorological and Greenwich, stands in the relation of a purveyor. It supplies them with the original observations, more or less refined and corrected form, without which they could not carry on their important labors in the world.

Let it be noted how nearly the three several departments—the Nautical Almanac office, the Meteorological office and the meteorological office—are related to weather forecasting. Whatever calculation of future motions of the heavenly bodies, in so far as it is made in advance, may arise out of the following up of the problem of motion of the air, the ether, the sun, the moon, the planets, or even thought, the first principle of each is to render navigation more safe.

The first of all meteorological instruments is the barometer, which, under its two chief forms of mercurial and aneroid, is simply a means of measuring the pressure exerted by the atmosphere.

There are two important corrections to which its readings are subject. The first is for the light of the station above the level of the sea, the second is for the effect of temperature upon mercury in the barometer itself, lengthening the column, and so giving a false light of the standard barometer at Greenwich where sea level has been most carefully ascertained, and the lights relative to it of the other barometers of the observatory, particularly those in rooms occupied by meteorological telescopes, have also been determined. The self recording barometer is mounted in a basement, where it is almost completely protected from changes of temperature.

Next in importance to the barometer as a meteorological instrument comes the thermometer. The special duty in the observatory use of the thermometer is to assure a perfectly accurate equal exposure so that the thermometer may be in free and perfect contact with the air and yet completely shielded from any direct ray of the sun. This is secured in the great thermometer shed at Greenwich by a double roof of "louvers" towards the north and west sides of the shed, but north side fully open. The shed itself stands a very little above the ground in order to give access to a greater body of air.

A most important use of the thermometer is to the hygrometer, for the amount of moisture in the air. To this end a pair of thermometers are mounted close together, the bulb of one being covered by damp muslin, and consequently the two thermometers will read the same, but if the air be not saturated, dry the air bulb and its temperature will stick to that at which the air would be quite saturated with the moisture it already contained. For the higher the temperature the greater the power of containing moisture. The difference of the reading of the two thermometers is therefore an index of humidity. The greater the difference the greater the power of absorbing moisture, so, in other words, the drier the air. The great shed already alluded to is devoted to these meteorological observations.

Very closely connected with atmospheric pressure, as shown on the barometer, is the study of the direction of the winds. If we take a map of the British isles and the neighboring seas, and put on it upon them the barometric readings from a great number of observation stations and then connect the points of equal pressure, we shall find that there are certain lines which are called "isobars" or "isobars" or "isobars" to indicate the balance.

If we then draw a perpendicular from these curves observing stations of the direction in which the wind was blowing, we shall find that it is almost perpendicular. For instance, if we found that the barometer read about the same at Valentia and Valencia, we should find that it was higher to the north or the British Isles to the south, we should find that the wind was blowing from east and a similar relation would hold good if the barometer was higher in Paris and Valencia than in Valencia. Storms will usually come from a higher to a lower region to the pressure, in order to restore the balance.

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