

METEOROLOGY AS A CULTURAL SUBJECT

Ways of the Weather

A Cultural Survey of Meteorology. By Dr. W. J. Humphreys. Pp. v+400. (Lancaster, Pa.: The Jaques Cattell Press, 1942.) 4 dollars.

DR. W. J. HUMPHREYS is well known among meteorologists the world over as the author of a number of valuable books on meteorology. In his latest book Dr. Humphreys aims at providing "an easy stairway, or even a gentle ramp for some, in this corner of the temple of knowledge". Here and there he discusses aspects of the weather which find little or no mention in the ordinary text-book, while the sixteen chapters of this book will give the reader a sound basis for building a fuller structure of detailed knowledge.

The aim of the book is to treat meteorology as a cultural subject, which presents a myriad facets of interest to the intelligent man, entirely apart from any application to the business of life, though these applications are indicated in the course of the book. Technical expressions are almost entirely avoided, even when they might have facilitated the discussion of the point at issue.

Methods of observation are described in an early chapter, and subsequent chapters deal with the distribution over the earth and at different heights in the atmosphere of temperature, water vapour, pressure and wind, the travel of sound through the air, meteorological optics, electrical phenomena and thunderstorms. The function of the sun as the source of all atmospheric energy is brought out clearly. One of the best parts of the whole book is that which deals with the formation and classification of clouds; this is illustrated by an extremely well-selected and beautifully reproduced series of cloud photographs.

The author draws no distinction between cloud droplets and rain-drops except that of size. It would have been worth while at this stage to give some indication of Findeisen's theory, according to which the distance through which a drop of water can fall through the air before it is completely evaporated is proportional to the fourth power of its initial radius. Thus, if the relative humidity of the air beneath a cloud is 90 per cent, a cloud droplet of initial radius $10\ \mu$ will only fall through a vertical distance of about 2 in. before being completely evaporated; a cloud droplet of initial radius $100\ \mu$ will fall through a distance of about 500 ft. before complete evaporation occurs; any droplet having a radius appreciably greater than $100\ \mu$ will fall to the ground as rain. This fixes $100\ \mu$ as a rational and useful limit between cloud and rain. The reader would also have been interested in Bergeron's theory that the formation of rain-drops large enough to fall to the ground is due to the fall of ice crystals through clouds of liquid droplets. The medium in which the water drops are suspended must be supersaturated relative to ice, so that rapid condensation takes place on the ice crystals, with consequent drying out of the medium and evaporation of the water drops. The ice crystals grow and fall to the ground, being melted into rain-drops on the way down.

I have few faults to find with Dr. Humphreys' book. It has achieved its aim to a remarkable degree, and while avoiding difficult concepts has contrived to give the reader a clear picture of many of the phenomena of weather. The author has a scholarly

mind, and a pleasing way of quoting passages from the Bible or from the Latin and Greek classical authors when, and only when, they illustrate the point under discussion. Thus on p. 227, in the course of a discussion of St. Elmo's fire, we find the following passage from Caesar's Commentaries: "In the month of February, about the second watch of the night, there suddenly arose a thick cloud, followed by a shower of hail; and the same night the points of the spears belonging to the Fifth Legion seemed to take fire". After a careful perusal of this book, the reader will have acquired some idea of what makes the wind blow, why the trade winds blow from the east, why it is generally colder on a hilltop than in the valley, why a rainbow is never seen at noon on the equator, why 'Aurora's fingers' are rosy; and if he has sorted out the appropriate factors, he will also have learned how to select the ideal site for a home, either for himself or for his apple trees.

One question recurs to me, as it always does after reading any book which aims at presenting a complex subject in simple terms: Will the reader of this book of nearly 400 large octavo pages really be as non-technical as the author assumes? Is that reader in fact helped by the statement made on p. 128, concerning the molecules in air, that "if 500,000 people were each picking them out at the rate of 100 per minute, day and night, it would take them 1,000 years to accumulate enough to make a volume of the air we breathe as large as the head of a pin". Would it not be better to give the number of molecules in, say, a cubic centimetre or in a cubic inch, possibly supplementing it by the statement that it is a 'whale' of a large number? D. BRUNT.

MOUSE GENETICS

The Genetics of the Mouse

By Dr. Hans Grüneberg. Pp. xii+412+14 plates. (Cambridge: At the University Press, 1943.) 30s. net.

THE study of inheritance must always be more laborious than most other forms of biological investigation which concern themselves with only one phase of an animal's whole life-history. It is therefore not surprising that there are only very few animals, and not many more plants, about the genetics of which we know enough to feel confident of having even a crude picture of their commoner modes of variation. Among these animals the mouse holds a very important place. The rapidity of its breeding, the comparative ease of maintaining colonies, and the large number of variations bred by 'the fancy', have made it perhaps the favourite mammal for geneticists. It shares, with *Drosophila* and maize, the distinction of having a 'hot news' journal (*Mouse Genetic News*) devoted to the technicalities of its genetics and circulated semi-privately to scientific murephils. A new monograph summarizing the enormous literature which supports the mouse's standing in the world of geneticists will therefore be welcomed, both by specialists, who will find it a convenient summary of their field, and by non-murine geneticists, who want a guide through the tangles of the subject. Both these groups will find Dr. Grüneberg's treatise, with its classified list of 1,141 references, entirely satisfactory for their needs.

"The Genetics of the Mouse" is, however, something more than a merely competent summary of available data. The particular richness of mouse genetics, at its present state of development, lies in its wealth of