As regards theoretical principles, the general method, based on contour integration and steepest descents, is the same as before, the main difference being that quantum statistics are presented from the very first, whereas until the last chapter the earlier edition used the quantal adaptation of Boltzmann statistics. For many problems, it is immaterial which version is used, but the new form is necessary, for instance, in the discussion of conducting metals, where the exclusion principle plays such an important rôle, or of chemical constants, which may involve the enumeration of nuclear spins.

In the applications, the subject-matter which is treated is distinctly more comprehensive than in the first edition. The electric and especially the magnetic susceptibilities of solids are now discussed in considerable detail, in the author's usual terse and accurate style. The reviewer has detected only one error, *viz.*, the incorrect statement on p. 480 that the apparent number of electrons in nickel is lower above the Curie point than at saturation. There is a very illuminating discussion of the conditions under which the local field is E or is instead $E + 4\pi P/3$. However, it should have been more succinctly emphasized that in polar media the statistical fluctuations may limit the rigor and applicability of the local field method. Almost a hundred new pages have been inserted on the electron theory of metals, thermionics and metallic conduction, including the rather spectacular recent work on "energy bands" and on the influence of impurities in semiconductors. An interesting section is added at the very end of the book on the timely subject of the production of extremely low temperatures by the magnetic method. The presentation of the applications covered in the earlier edition, notably astrophysical problems and the equations of state of gases and solids, has been thoroughly modernized. One usually thinks of the most striking developments of the last decade in extra-nuclear physics as in theory rather than experiment, but actually a very high percentage of the relevant experimental measurements quoted in the volume are subsequent to the first edition. On the whole, the documentation of the literature is quite complete, although occasional oversights may be noted, *e.g.*, Roebuck's determination of the second virial coefficient of helium by the porous plug experiment, as calculated by Whitelaw in *Physica*. The rapid tempo at which the material treated in the volume has been, and still is, developing both on the theoretical and experimental sides shows that even the portion of physics which is not concerned with either cosmic rays or nuclear disintegration is far from being a dead subject!

J. H. VAN VLECK

METEOROLOGY

Manual of Meteorology, Volume II, second edition. By SIR NAPIER SHAW, xlviii + 472 pp. 1936. Cambridge: at the University Press. New York: The Macmillan Company, $10.00.

THE first edition of the second volume of Shaw's great four-tome manual—the volume of facts without explanations—is far too valuable to discard, but this second edition contains so much additional material that no one who tries to keep well informed about the circulation of the atmosphere, normal, seasonal and transitory, can afford to be without it.

The book begins with discussions of a number of technical terms, so clear and detailed as to merit reading and rereading by physicists as well as meteorologists. This is followed by an 8-page discussion of units and measurement that gives much valuable and even some surprising information.

This finishes the Roman-numbered pages, a valuable treatise apart even from the rest of the volume. The first six chapters of the book proper (there are ten in all) cover, in order, solar and terrestrial radiation; distribution of land, ocean, ice, volcanoes, earthquakes, thunderstorms, magnetic lines, etc.; composition of the atmosphere; temperature of the surface air the world over and through the seasons; clouds and rainfall; pressure and winds. Much of this information is given in scores of full-page hemispherical charts.

Chapter 7, which lists a great number of reputed weather cycles and correlations, must have cost the author more labor to compile than any other in the entire manual. It deals with prodigious labors that essentially came to naught, for cycle study long has been, as presumably it long will continue to be, the fatal candle for the meteorological moth.

In Chapter 8 are discussed the several transitory variations of pressure, especially the tropical cyclone, the tornado, waterspouts and line squalls. The first portion of Chapter 9 consists of accounts of the earlier ideas of the structure of the mid-latitude cyclone, and the rest to an explanation of our present notions of this structure based on air-mass analysis. Chapter 10, the last in the book, and bringing it up to date, is a meteorological potpourri consisting of a number of interesting discussions of rather disconnected matters —the solar constant, duration of snow cover, arctic ice, the upper atmosphere, dust storms, weather in Greenland, etc. This is followed by an extensive and conveniently arranged bibliography, and that in turn by a 20-page, double-column index.

Here and there throughout the volume are delightful passages that "sample" pretty nearly pure Shaw, rather than mere meteorology, but they are none the less informative for all that and twice as interesting.

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