geneticist and perhaps clinician, the work is difficult to understand and really would be better described as recent advances in the study of blood groups. It would be advisable, therefore, for anyone unacquainted with this particular field, or wishing to gain further knowledge of it, to read some preliminary work in the first instance. The descriptions of techniques in this book are somewhat less complete than one would have liked; but it is probable that the authors feel that practical experience is the only way to learn these techniques properly, since they say, in referring to the testing of *Rh*-antigens, "to achieve accuracy a long apprenticeship in error seems necessary".

Drs. Race and Sanger are to be congratulated on the production of this book, which is packed with knowledge, free from mistakes, and will form an invaluable reference book for all biologists and geneticists; but its proper place for those actually working in this field will be beside them on the laboratory bench.

F. STRATTON

SPECTROSCOPY—EXPERIMENTAL, THEORETICAL AND IMAGINARY

Practical Spectroscopy

By C. Candler. Pp. viii+190+4 plates. (London: Hilger and Watts, Ltd., 1949.) 21s. net.

Absorption Spectrophotometry

By G. F. Lothian. Pp. 196. (London: Hilger and Watts, Ltd., 1949.) 26s. net.

An Introduction to Molecular Spectra

By Dr. Raynor C. Johnson. Pp. xiii+296+8 plates. (London: Methuen and Co., Ltd., 1949.) 40s. net.

The Interpretation of Spectra

By William Mayo Venable. Pp. v+200. (New York: Reinhold Publishing Corporation; London: Chapman and Hall, Ltd., 1948.) 48s. net.

THE first two of these books deal with the experimental side of spectroscopy, mainly with Hilger instruments, and indeed are to some extent glorified instrument catalogues. C. Candler's book is most ably written and gives the benefit of his expert knowledge on the subject, but it is not to be regarded as a comprehensive "Practical Spectroscopy". It is a course for students using a wave-length spectrometer and accessories. It covers qualitative and quantitative spectrochemical analysis, absorption spectra, Raman spectra, the infra-red region and some interferometry. More than a hundred experiments are suggested, and certainly no one with this book who was planning a course in spectroscopy would be short of ideas for experiments, although many of them seem rather elaborate and require a lot of accessory equipment not normally available in a teaching laboratory. The emphasis is rather chemical.

The same is also true of G. F. Lothian's "Absorption Spectrophotometry". This book is, however, a fairly comprehensive treatment of the subject, and, although the use of Hilger instruments is to the fore, others such as the Perkin-Elmer and Grubb-Parsons infra-red spectrometers are briefly described. This book covers the experimental technique, for the ultra-violet and visible, by photographic, photo-electric or visual means, and also for the infra-red. I would like to have seen an extension to cover the technique

of measurements at liquid-air temperatures, and I think that the troublesome Eberhard effect in photographic work is dismissed rather lightly. The book is very well illustrated, both with instrumental photographs and absorption curves. The principles and terminology are clearly dealt with, and the applications of spectrophotometry to inorganic and organic analysis, to biological problems and to the elucidation of the structure of complex molecules are described.

The most important of the four books under review is "An Introduction to Molecular Spectra", by Dr. R. C. Johnson, which covers mainly the spectra of diatomic molecules but includes chapters on the Raman effect, on the electronic and infra-red spectra of polyatomic molecules and on applications of molecular spectroscopy to astrophysics, chemistry and biochemistry. The treatment is from the point of view of an experimental spectroscopist endeavouring to systematize a spectrum, and Dr. Johnson gives the reader the benefit of his very considerable experience in this field, his treatment of the vibrational and rotational structure of the spectra of diatomic molecules being very clear. This section is, however, rather marred by being badly out of date, many examples being, as a result, unsuitable; there are a few errors and omissions—on p. 152 the formulae for rotational intensity factors are likely to lead to trouble because it is not stated that the value of K to be used is whichever is the greater of K' or K'' , the rotational quantum numbers in the upper and lower electronic states. No knowledge of wave mechanics or group theory is assumed, and the book is clearly written and easy to read. It thus forms a valuable introduction to the subject and may be recommended.

In "The Interpretation of Spectra", W. M. Venable gives an original and highly unorthodox interpretation of the cause of spectra. It is difficult to know whether to ignore, laugh at or seriously to criticize this work. The last approach is probably the best; but is the most difficult in a limited space. The whole treatment is rather complex because of the detailed numerical data cited and the use of a lot of algebraic expressions. The first part seeks to establish relationships between the primary and secondary spectrum of hydrogen. Mr. Venable then rejects the Bohr-type model of atomic structure on the grounds that on electromagnetic theory a moving electron will radiate and cannot form a stationary energy state. He assumes that in equilibrium the electron is poised at a distance from the nucleus by the usual attractive force varying as $1/r^2$ and a repulsive force as $1/r^3$. Scattering experiments showing that the $1/r^2$ law alone holds down to very small distances adequately disproves this part of his theory. The author then assumes that a single atom can give only continuous radiation, and invokes oscillations of electrons in the field of complex atom-groups or "line-molecules" to account for line spectra. Such a theory could not explain the line absorption spectra of cold monatomic gases (for example, the absorption of $\lambda 2537$ of Hg in laboratory air) or the absence of marked pressure dependence. Little attempt is made to deal in detail with molecular spectra, the complex structure of which has been explained so well in terms of orthodox theory.

The book may be recommended to nuclear physicists; they will find the last chapter very amusing. It is a pity, though, that so much obviously painstaking work and original thought has not been put to better use.

A. G. GAYDON