optimism rather than pessimism; but he is hopeful rather than confident. His firm condemnation of the fanaticism of our times is not matched by the same assurance in giving his reasons for thinking that mankind may avoid the disaster which such fanaticism and refusal to adjust its activities in the light of reason threaten to bring. He discounts unduly the part played by emotions in human affairs, seems to regard emotion as necessarily or essentially evil, and to discard religion with the fanaticism he denounces. Perhaps for this reason—whereas Stamp, calling for an advance in the science of man commensurate with the advance in the science of matter during the past three centuries, leaves us facing the future with some confidence that we can regain control over events—Russell, declining to believe that the world war and world disaster are inevitable, for all the factors which he delineates as tending to bring them, leaves us wishing that wisdom and reason may prevail rather than with the serene confidence of those who have seen and believe in the greatness of man and who share in the appreciation of what is noble, beautiful, gentle and wise, and in the vision of a society, where individuals grow freely and where hate and greed and envy die, of which he spoke in his broadcast reflexions on his eightieth birthday. R. BRIGHTMAN

MOLECULAR SPECTRA AND MOLECULAR DYNAMICS

Molecular Spectra and Molecular Structure

1: Spectra of Diatomic Molecules. By Gerhard Herzberg. Second edition. Pp. xv+658. (New York: D. Van Nostrand Co., Inc.; London: Macmillan and Co., Ltd., 1950.) 9.75 dollars; 73*s*. 6*d*. net.

FROM time to time a landmark appears along the hard road towards the complete understanding of molecular dynamics, serving not only to please and encourage, but also to stimulate us to further effort. Such is this book, a work of authority, of splendour and polish, and—in spite of its encyclopædic content—of absorbing interest. The first edition was published twelve years ago at the outset of the Second World War, and few copies were available outside the United States, so few indeed that my own copy was almost continuously on loan. This new volume is the most thorough treatment and reference work on the spectra of diatomic molecules yet published. It covers ground which is equally important in physics and chemistry, and in revising the book the author has added new sections on microwave spectra, Zeeman and Stark effects, hyperfine structure, and many aspects of photodissociation, as well as giving us some promising new data on astrophysical phenomena.

Dr. G. Herzberg's clarity as a lecturer is well known, and this is reflected in his books. He has assembled here all the salient theory of molecular dynamics required for the interpretation of rotational, vibrational and electronic band spectra, amply illustrated by numerical results and photographs, and directly applied to a variety of typical cases. All this is presented in a logical readable form. There is too often a tendency by some workers in this field to clothe the subject-matter in a shroud of forbidding mathematical formulation, which leaves the ordinary reader or the student both exhausted and in despair. Dr. Herzberg deals properly and adequately with such mathematical theory as is needed for the problems involved and, incidentally, provides a clear exposition of the wave-mechanical principles; he never fails, however, in illuminating asides, to seek some attractive physical picture or visualizable analogy, as, for example, his model to illustrate the meaning and mode of action of the Franck–Condon principle. The somewhat puzzling topics of vector coupling of momenta, of the symmetry properties of different energy-levels, and of ortho- and para-modifications are also clearly discussed, and all the ramifications of the rotational fine structure associated with electronic-vibrational transitions are set out.

The later parts of the book deal with the dissociation processes associated with different kinds of continuous and diffuse spectra, and with the electronic structure of molecules in relation to stability and interatomic forces. The derivation of molecular data such as heats of dissociation and potential energy diagrams is explained fully, and in a critical manner.

Finally, an up-to-date table is given of the energy-levels, vibrational frequencies, anharmonicity coefficients, rotational constants and other desirable data, which will long remain a place of reference for all those working in this field and for many others less directly concerned. More data are now becoming available about the higher vibrational levels of molecules in the electronic ground-state, studied with high-dispersion grating spectrometers and very long absorption paths, and the greater precision which is now possible may well lead to a revision of some of the molecular constants listed in this table. Yet this does not in the least detract from the enormous value of Herzberg's compilation. This is, in fact, an admirable book. H. W. THOMPSON

SUGAR BEET DISEASES IN IRELAND

Sugar Beet Diseases in Ireland

By Prof. Robert McKay. Pp. ix+78+37 plates. (Dublin: At the Sign of the Three Candles, 1952.) 21*s*.

TO his illustrated guides for the recognition and control of flax and tomato diseases Prof. Robert McKay now adds this third volume, and like its predecessors it is attractively produced, beautifully illustrated, and reveals first-hand knowledge of the subject. Sugar beet has been grown commercially in Ireland for a quarter of a century, and the crop is subject there to much the same diseases as occur in England, though not always in the same degree. Black leg, for example, causes considerable loss every year and is not controlled by seed treatment with organo-mercury dusts, whereas in England, where seed treatment is a routine operation, this disease, though common, is rarely destructive.

The very heavy loss in sugar yield (about £6,000,000) experienced in England in 1949 as a result of the worst epidemic of virus yellows known there, has not been paralleled in Ireland, and both mosaic and downy mildew are evidently also of less significance. This may well be due in no small measure to the action of the Irish Sugar Company, which, following moderate epidemics of virus yellows and downy mildew in 1946, insisted on stecklings being grown in complete isolation from seed and root crops,