

Band Spectra of Diatomic Molecules*

DURING the last ten years, few branches of physical inquiry have called forth a greater output of published work than that of molecular spectra. Many reasons may doubtless be adduced to account for this. On the theoretical side, it is generally recognised that the anharmonic vibrating-rotating molecule with its complex magnetic couplings, and the interaction of these energy types with each other and with the electronic energy, provides one of the most fascinating applications of the quantum theory. On the experimental side, æsthetic considerations (and the interest of unravelling and ordering what is often a very complex system of spectral lines) must be given no little weight. Whatever may be the impressions given by a reading of the theory, the experimentalist is well aware that scarcely any band system is really typical or without peculiarities of particular significance for the structure of the emitting molecule.

Further reasons are found also in the variety of other fields of physical inquiry with which this subject has become closely related. The determination of the heats of dissociation of molecules from their spectral data is a well known possibility. The method is applicable to molecular ions and other diatomic molecules incapable of direct thermo-chemical investigation. In another field—that of isotopy—the discovery and quantitative estimation of comparatively rare isotopes of several common elements are well known. The prolific output of work on the spectrum of light scattered by molecules—the Raman effect—has among other things provided a new weapon for studying the solid and liquid states and the vibrations of complex molecular groupings. Molecular spectra have also made a definite contri-

bution to astrophysical knowledge, while photochemical investigation stands clearly in a very close relationship to the subject. The nature of valency and of related topics, which has been clarified in recent years by the work of Heitler, London, and others, provides another link with chemistry.

For a subject with such wide associations, the collected literature has been remarkably scanty, even when we make due allowance for the difficulty of providing it during a period of rapid development. The present writer, faced with the problem of advising men wishing to undertake post-graduate research in this subject as to their reading, has found the answer one of perennial difficulty. The advice given has usually been: "Read certain sections of the National Research Council Bulletin on 'Molecular Spectra' and afterwards follow the original papers of some leading worker in this field, tracing the development of his thought in recent years". With the publication of the eminently readable report by the Physical Society referred to below, this difficulty should be resolved for many years.

Dr. W. Jevons is to be congratulated on the completion of a valuable piece of work. He has produced a model report, subsuming on the part of the general reader no previous specialised knowledge of the subject and yet providing for the expert a most useful compilation of data. Within the limits which Dr. Jevons has prescribed for himself, he has written a clear and well arranged account of the subject for which physicists and chemists alike will wish to thank him; research workers will do so more especially for the valuable appendices he has included. Through the tables and classified bibliography given here there is now provided a rapid and reliable approach to the literature of almost all known band spectra of diatomic molecules.

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* The Physical Society. "Report on Band-Spectra of Diatomic Molecules". By Dr. W. Jevons. Pp. vi+308. (London: Physical Society, 1932.) 17s. 6d. net.

International Auxiliary Languages*

IN the pamphlets referred to below, Dr. Ritter gives us an excellent survey, with statistics, of the language situation of the world, and of the cogent reasons in favour of the adoption, by formal agreement, of some easily learned international language.

The complacent assurance, once almost universal, that the 'blessings' of industrial civilisation, and of 'English, well and clearly spoken', would rapidly extend to the whole of humanity, has given place to a sceptical attitude towards our own culture. A powerful reverse current has set in; many of our own eminent thinkers set the highest value upon a multitude of cultures, upon competition rather than fusion between them, even upon war itself. Innumerable students all over the world are being educated in languages, sometimes limited to one or two millions of people, which give them no access to English, French, and German literature. Those who are very good natural linguists may acquire all three of these, but the majority will acquire only one, and many, ungifted as linguists, will never

read easily in any but their mother tongue. A point worthy of strong emphasis is the fact that inability to acquire foreign languages is in no way a sign of mental inferiority generally.

Dr. Ritter points out that the above facts limit the field of selection for persons who are to assist in international co-operation, as in the League of Nations. It is obvious that discussions carried on through interpreters are severely handicapped. The same argument applies, of course, over much wider fields. Dr. Ritter pleads for the formation by the League of a commission to study the problem, and hopes for the endowment out of private funds of an institute as well. He also puts forward his own suggestions for a world language; a phonetic, orthographic, and grammatical simplification of Mr. Ogden's "Basic English". It is much altered, but readily intelligible to an English reader, as soon as the rules of simplification are grasped. It is somehow less of a shock than the efforts of our own more advanced spelling reformers, or Prof. Zacharisson's "Anglic". Those whose hearts are set upon the retention of stylistic elegancies, even in the statement of pure matters of fact, will not like it any better than Mr. Ogden's "Basic".

* "Die Sprache im internationalen Verkehr" (2nd ed., pp. 48) and "Die Weltverkehrssprache" (pp. 12), by Dr. Erwin Ritter, of the International Labour Bureau, Geneva. Printed as M.S., 1932.