published has, however, severely limited its usefulness to Western European entomologists, and this translation will be widely welcomed.

The two volumes deal with the three families Tetrigidae, Eumastacidae and Acrididae, and the area treated includes Scandinavia, Germany, Austria, northern Yugoslavia, the satellite countries of Eastern Europe, Turkey, northern Persia, north Afghanistan, Mongolia, Palaearctic China, Korea and northern Japan, as well as the whole of the U.S.S.R. As a result of this very broad scope a total of 833 species are covered by the work and over 40 per cent of them are known only from outside the U.S.S.R.

Vol. 1 begins with a useful introduction of some 70 pages, dealing with such topics as the morphology, biology, ecology and economic importance of grasshoppers and locusts, and this is followed by a bibliography with over 200 entries. The remainder of this volume is devoted to a systematic treatment of the Tetrigidae, Eumastacidae and all but two subfamilies of the Acrididae; these two subfamilies, Acridinae and Oedipodinae, form the subject of the second volume.

By far the greatest value of this work lies in the fully illustrated identification keys, which are provided for every level in the classification from family to subspecies, and are the result of years of painstaking study. As many characters as possible have been incorporated into these keys, and for categories below the level of genus no further descriptions are given.

Bibliographical references are given to all original descriptions and to other works of taxonomic importance. The account of each species includes a few measurements, a brief indication of its distribution, and references to any work on its biology. Drawings of whole insects are given for many species, representing a fair proportion of the genera; these drawings were excellent in the Russian edition (though not always well printed), but in the Israeli edition they are reduced in size and badly reproduced. Almost all the shaded illustrations have suffered in this way and represent the worst feature of the translated edition; they are, however, irrelevant to its main purpose.

Unlike their original counterparts, the two volumes are printed on good quality paper and are adequately bound. The Canadian orthopterist Dr. R. L. Randell has acted as technical consultant to the translators, and mistakes in translation resulting from the technicalities of entomology are few. The Russian abbreviations used for labelling the anatomical drawings in the introduction have been replaced by numbers; this has been carried out successfully in most cases, though there are a few minor errors.

In so competently bringing this valuable work, which comes near to covering all the Palaearctic Acridoidea, to the English-speaking world, the Israel Program for Scientific Translations is to be warmly congratulated.

David R. Ragge

SOCIAL HABITS OF WATER MOLECULES

Water and Solute-Water Interactions

By Prof. J. Lee Kavanau. Pp. 101. (San Francisco and London: Holden-Day, Inc., 1964.) 5.50 dollars.

ASK the reflective person what water consists of, and the reply will probably be on the lines of two parts hydrogen to one part oxygen. Address the same question to one of to-day's science graduates and the answer will of course be more sophisticated (being very likely embellished with murmurings about dipole moment and ionization), but little enlightenment in terms of any structural arrangement among the myriads of jostling molecules can be expected. It is not that our teachers or students have been remiss, but that no one knows for certain what a snapshot of water on a molecular scale would look like. It is not for lack of speculation either that our knowledge is so doubtful, for there has been great theoretical activity in the field of ice and water structure in the past twenty years, and to say the present outlook for solving the principal problems is promising is to do the minimum justice to the situation.

No devotee believes that water in bulk and in any state of aggregation consists of molecules so estranged as to form no mutual attachments, however temporary. After all, ice is crystalline, cold water is denser than ice, and steam is not a perfect gas. Modern approaches to the structure of water do not view the liquid as if it were a highly concentrated steam (although Callendar suggested water dissolved steam), but they favour instead a retention of ice-crystallinity in the liquid. One idea is that the act of melting makes some lattice-bond rotations so irregular that the continuity of the lattice cannot persist for more than a few molecular diameters. Increase of temperature then twists the lattice apart still more. On the other hand, it may be the intermolecular vibrations that overcome the unity of the lattice, so that individual molecules break free in increasing numbers as the temperature is raised and take up intermediate positions in the array that remains. Another view allows the water molecules a much greater degree of promiscuity, while satisfying a continual compulsion to assemble in very short-lived clusters of about 50 molecules each. Taking this concept to an extreme produces a molecular orderliness where there are only neat clusters, and water can justifiably be described as its own hydrate.

Prof. Kavanau had all these considerations in mind when he recently completed a monograph on the structure and functions of biological membranes, for he included a substantial discussion of water structure and of molecular and ionic segregation in aqueous solution. His discussion has now been published separately and on the whole has withstood extraction from its original context very well. A certain amount of biological connotation survives, but this is neither intrusive nor irrelevant, and the text can be read with profit by chemists and physicists. Prof. Kavanau's treatment is largely descriptive and avoids mathematics, but sets out to comment in detail on the successes and shortcomings of present-day theories. The text has been carefully produced and is well supported by up-to-date references and indexes. The reader should not be dismayed by some apparent confusion between atoms and protons in the opening pages, and need not be dispirited by Prof. Kavanau's concluding passages, where there is a glimpse ahead to formidable problems concerning the role of water in biochemical processes.

E. C. Potter

GLASS-CERAMICS IN U.S.S.R.

Catalyzed Crystallization of Glass

Editor-in-Chief: E. A. Porai-Koshits. (The Structure of Glass, Vol. 3.) Authorized translation from the Russian by E. B. Uvarov. Pp. 208. (New York: Consultants Bureau, Inc., 1964.) 20 dollars.

CATALYZED Crystallization of Glass differs from Volumes 1 and 2 in this series which were reports of meetings where very varied topics were brought together under the heading of the "Structure of Glass". The concentration on the one topic has resulted in a volume which leaves a better overall impression than the earlier volumes. In all 44 papers are divided into four sections: (1) general aspects of the crystallization of glass (7 papers); (2) two-component systems (5 papers); (3) the Li_2O Al_2O_3 SiO_2 system (18 papers); (4) other three- and four-component systems (14). The book may therefore be taken as a