its warmer climate and higher ocean level. And he assigns the initiation of the present coral reefs to the phase of low sea level during the second, or latest, major period of glaciation, and their construction during the waning of the ice caps and in post-glacial time, while the sea level was rising. The reefs built during the long deglaciation interval were destroyed during the low-water stage of the subsequent glacial period. The history so conceived is graphically given in his figure 130. Abundant illustrations, 135 diagrams and maps and 14 photographs, supplement the author's descriptions and enforce his views.

This writing will provoke lively discussion and some friendly disagreement, especially relating to the age of the reefs and the origin and date of the level platforms from which rise most of the wall-like reefs. And the degree of diastrophic effect in comparison with the glacial control may also be subject of debate. But that the chief cause of changes in ocean level in later geologic time was the removal and the restoration of water by glacial processes appears to be well established. The author's "punching hypothesis" in explanation of the crustal downthrow and the recoil, instead of crustal flexure, will receive the attention of the geophysicists.

The arrangement of matter in the volume and the style of presentation are related to the origin of the work, a series of Silliman Lectures at Yale University. The matter relating to coral reefs is the closing part of the volume. The larger part of the handsome and richly illustrated volume is the description of the Pleistocene ice fields of Europe and America, and their diastrophic effects in elastic and plastic-flow distortion of the globe; all this leading to the coral reef problem.

European glaciology is well covered, and the references make a considerable bibliography of European glacial literature. American glaciology is treated briefly and with reliance on older writings and official and "authoritative" publications that are outdated. Later and individual writings are overlooked or neglected. Some omissions and errors in statement and maps are noted.

Admittedly the writing leaves a thousand questions unanswered. And with the author's fertility in hypothesizing it suggests many more than it settles. The great persistent interrogation in glacial science, the cause of Pleistocene glaciation, and especially of multiple ice stages, is untouched.

The work is a stimulating contribution to earth science. Pressing boldly into the area of the theoretic and speculative is more helpful to scientific progress than conservative standstill in acceptance of supposed fact and deference to authority.

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VARIETIES OF HYDROGEN

Orthohydrogen, Parahydrogen, and Heavy Hydrogen. By ADALBERT FARKAS. 215 pages. Cambridge University Press. 1935. Price, $3.50.

FOR the past few years the author of the present text has taken an active part in those rapid research developments which have transformed our knowledge of the element hydrogen. Prior to the discovery of the heavy isotope, deuterium, the ordinary isotope of mass 1 had been shown, by theoretical reasoning and the brilliant experiments of Bonhoeffer, Harteck and Eucken, to exist in two molecular forms, ortho- and para-, determined by nuclear spin. In the study of the chemical and physical properties of these molecules the author and his brother, L. Farkas, were able collaborators of Bonhoeffer. They studied, principally, kinetic properties of the two forms and the important rôle which paramagnetic substances may play in the interconversion of the molecules. It was not surprising, therefore, that they rapidly reoriented their work when the complexity of the element was still further increased by the discovery of deuterium, employing their already acquired technique to the rapid solution of new problems which obviously arose.

Dr. A. Farkas has placed all workers in the field under a debt of obligation to him by this monograph. He has wisely chosen to outline both ortho- and parahydrogen and heavy hydrogen because of the interdependence of the two fields. The book contains an excellent summary of the physical chemistry of both hydrogen isotopes, equally effectively presented on the theoretical, practical, historical and bibliographical sides. It is especially welcome to harassed workers in this feverishly active research field bringing into one volume, without exception so far as the reviewer can find, all the important contributions in the two spheres of work, up to the end of last year. No one can read this book without realizing how a major discovery of this kind has consequences of importance over a wide area of scientific interest. Fundamental problems concerning energy states of molecules, nuclear structure and properties, spectra, reaction kinetics, isotope equilibria, properties of solutions, mechanism in chemical and biological processes, all these have developed under the stimulus of the discoveries concerning the element hydrogen. All are presented in this book in outline, in an orderly presentation, excellently readable in spite of the fact that the author is writing in, to him, a foreign language. The book is indispensable to a wide variety of research men and to graduate students in physics and physical chemistry. It is the best approach that those scientists unfamiliar with the field can take to this new and fascinating development of the last six years.

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