

that diffusion is preceded by molecular dissociation. Some difference of opinion exists as to whether hydrogen released in electrolysis at a platinum electrode penetrates the metal or not by

true diffusion. As the rate of diffusion of heavy hydrogen is about three fourths of that for ordinary hydrogen, the difference is not enough to facilitate the separation of the isotopes.

## THE CONQUEST OF ENERGY

### Atoms in Action

The World of Creative Physics. By George Russell Harrison. Pp. x+370+16 plates. (London: George Allen and Unwin, Ltd., 1940.) 12s. 6d. net.

IT is sincerely to be hoped that no one will be misled by the title of this book. "Satan's invisible World Displayed" was not, as Herr Teufelsdröckh imagined, a history of the British Press; nor is "Atoms in Action" just another addition to the number of books which attempt to convey to a bewildered, and by now rather blasé, public the latest inside information about the structure of the atom. Of course, atoms come into it—atoms, as everyone who has ever attempted high vacuum technique knows only too well, leak in everywhere—but the operative word in the title of Prof. Harrison's book is not "Atoms" but "Action". "Almost every material problem of living," writes Prof. Harrison, "turns out in the last analysis to be a problem in the control of energy. That part of the cost of a lady's hat which does not represent business actmen on the part of the milliner is for stored and directed energy—the atoms of matter of which the hat is composed are permanent, and will still exist when the hat has been discarded and burned. Only energy and knowledge of how to apply it are needed to recreate a hat from its smoke and ashes."

Energy, its control, distribution, and utilization in modern times is the theme of the book, and a very stimulating theme it is. "Every dweller in the United States," we are reminded, "is now served, on the average, by energy equivalent to that which could be provided by thirty slaves such as sweated at the command of an ancient Egyptian king. In making this much energy available, science has contributed only a small fraction of what it can contribute. Human beings can be made twenty thousand times as wealthy as they are to-day; but only fundamental investigation of nature, such as is involved in 'atom smashing', will show how."

Prof. Harrison's main purpose in producing this book—which by the way was written at the instance of the American Institute of Physics—is neither entertainment nor instruction, though he gives his readers plenty of both. Essentially the book is a plea for research, and still more research. "Experience," he claims, "has shown no better

way of eliminating poverty than by well-directed 'atom-smashing'," and in successive chapters of the book he drives home his statement by examples drawn from many branches of modern industry. He tells us, to mention but a few of the topics, of the applications of physics in farming and in medicine; of cold storage and illumination; of radio and television; and of the harnessing of the electron for electrical control; nor does he overlook such mundane, but important, matters as "profits" and "costs".

Even to a physicist who, for various reasons, has kept in fairly close touch with industrial developments of the subject, it is a thrilling story when compressed, as it is here, into a single volume; and Prof. Harrison tells it extremely well. He has a charming style, a flair for the exact phrase, an eye for illuminating and unusual comparisons, and a sly sense of humour which, without being obtrusive, gives sparkle and zest to the text. The chapters run on with the informality, the clarity, and the absence of intrusive technicalities which characterize the very best kind of talk; and at the end the reader finds that he has learned almost all he wanted to know of the subject, and (perhaps equally important) he has not been bored with things he did not want to know. In writing his progress reports, Prof. Harrison has been able to tap original sources of information (some of it unpublished) available in many of the largest research organizations in America. It may be taken that his stories are as authentic as they are interesting.

Some appreciation of the achievements of science, and the methods by which they have been reached, is nowadays an essential part of a good general education, and no better mentor has yet appeared than Prof. Harrison. In particular, it is much to be desired that "Atoms in Action" might find its way into the hands of all Cabinet Ministers, present or prospective, of heads of departments, and business directors. For, as its author reminds us, the end is not yet!

"Still o'er the earth hastes opportunity,  
Seeking the hardy soul that seeks for her."

Much will depend in the future on our preparedness to seize the opportunity presented to us in the almost infinite possibilities of well-directed physical research. J. A. CROWTHER.