

but many are known to exist. As in the insects, they control colour-change, moulting and growth, sexual processes, and certain aspects of growth, development and metabolism. Some of these hormones have been hypothesized almost exclusively on the basis of observation, as in the effects of parasitic castration on secondary sexual characteristics. With others, especially hormones involving colour changes, a sound experimental basis for their existence has been laid. The account of the hormonal control of chromatophores by the sinus gland and central nervous organs is especially exciting.

The study of hormones in plants and invertebrates, which began less than thirty years ago, has already wrought a revolution in our understanding of the physiology of these types of organisms, and the increasing tempo of research augurs well for its future. This volume is a valuable chronicle of progress in a vigorously growing field, and it is hoped that it may aid in achieving the unity in biology to which Prof. Thimann dedicates it.

ARTHUR W. GAISTON

THE FULMAR POPULATION

The Fulmar

By James Fisher. (New Naturalist Series.) Pp. xv+496+52 plates. (London and Glasgow: Wm. Collins, Sons and Co., Ltd., 1952.) 35s. net.

THE nucleus for the present work was the British Trust for Ornithology Inquiry into "The Breeding, Distribution, History and Population of the Fulmar (*Fulmarus glacialis*) in the British Isles", conducted by the author and George Waterston (*J. Animal Ecol.*, 10, 204; 1941). In the published paper the spread of the fulmar from one colony in 1874 to 269 colonies in 1939 was considered by the authors to be "due to a biological change which is not understood". As a plankton-eating arctic species the fulmar should have been retreating northwards with the shrinking of the ice-cap and the amelioration of the climate of the northern hemisphere—but, in fact, it was moving south at a great rate. They wrote: "Correlations may exist between the spread of the fulmar and its food, but it will be a Herculean task to discover them".

A simple solution was, however, discovered by Marchant and myself on our visit of nine days at Rockall in June 1948, when we became convinced that the fulmar's increase was related to the availability of the tons of fish offal which are thrown into the sea each hour of each day all the year round by the great fleets of deep-sea trawlers of the maritime nations of Western Europe. We saw up to five thousand fulmars at one moment devouring this offal, which was hosed over the side of the trawler after the gutting of each trawl-load of about a ton of fish every four hours day and night. As it is now known that the larger petrels are capable of long fasts and of flying great distances there is no reason why most of these fulmars at Rockall (or at any other trawling bank) should not be breeding birds from the nearest colonies between two and four hundred miles away. At least fifty thousand fulmars were present on the Rockall Bank during June 1948 (they could not have all been non-breeders), which is 2½ per cent of Fisher's estimated world population of one million pairs of Atlantic fulmars. Once it had

tasted offal in this form the individual fulmar would be likely to attend trawlers regularly and even become quite dependent on this (at present) unfailing and abundant food supply. Hence the rapid colonization by nesting sites along the Iceland-British Isles seaboard within a few hundred miles of the trawling grounds. Making use of this hypothesis, the author has investigated the northern fisheries as far back as the height of the whaling period of the seventeenth century. Whale-flensing provided an abundant, though only seasonal, supply of offal for the scavenging fulmar. His analysis shows a significant correlation: a slight increase in the number of fulmar colonies during two hundred years of whaling, a rapid increase with sixty years of deep-sea trawling; the increases taking place near the sites of these fisheries.

A short review cannot do justice to the excellence of this large monograph. Fisher shows how much of the breeding biology is yet unknown; the incubation period has not been accurately measured; and a theory of intermittent breeding is discredited. Field ornithologists especially will welcome his lucid presentation of the history of the distribution and increase of this remarkable petrel, gathered as it has been from the reading of more than 2,400 references. Disappointingly, none of these is listed in the monograph; but we are promised the bibliography later.

R. M. LOCKLEY

NEW LIGHT ON ALCHEMY

The Alchemists

Founders of Modern Chemistry. By Dr. F. Sherwood Taylor. Pp. x+246. (London: William Heinemann, Ltd., 1951.) 12s. 6d. net.

DR. F. SHERWOOD TAYLOR'S book appeared very appositely just at the time of the recent exhibition of alchemical books at the Science Museum, South Kensington. It is apposite in another way also, for the modern trend in history pays much more attention than ever before to the growth of ideas, and it is from this point of view that Dr. Sherwood Taylor surveys his subject. The literature of alchemy is formidable, not only for sheer bulk but also for its complexity and often deliberate obscurity; many of its students have sooner or later become discouraged by vain attempts to thread their way through the labyrinth, and have indeed doubted whether, if it could be threaded, there would be anything worth discovering at the centre. One may, of course, investigate the alchemical *corpus* solely in order to assess the matter-of-fact chemical knowledge contained in it; but even this is not easy on account of the enigmatic nomenclature so generally favoured by the alchemists. Genuine practical chemistry is, however, only one facet of the alchemical crystal: the sparkle comes mainly from the numerous facets of doctrine. What Dr. Sherwood Taylor has set out to do, and what, in fact, he has succeeded in doing very well, is to examine alchemical doctrine to see if any coherence and continuity can be detected in it. He has the advantage of being a chemist versed not only in chemistry but also in theology, philosophy, and mysticism, and has thus been able to follow clues imperceptible to one less well equipped.

What emerges from this careful and original study is that, in spite of its paraphernalia of alembics, cucurbits, pelicans, and furnaces, alchemy was essen-