

tion Committee's list of twenty-five, published in 1945 and endorsed by the Wild Life Conservation Special Committee's report⁴ in 1947. Once destroyed, or extensively damaged, it is unlikely that its peculiar conditions can be replaced, nor can any substitute be found elsewhere.

¹ Elliston Wright, F. R., "Braunton, a Few Nature Notes" (Barnstaple, 1926).

² Elliston Wright, F. R., in W. K. Martin and G. Fraser, "The Flora of Devon, 1939".

³ Hepburn, I., *J. Ecol.*, **32** (1945).

⁴ Conservation of Nature in England and Wales. Cmd. 7122 (1947).

POLYMER CHEMISTRY

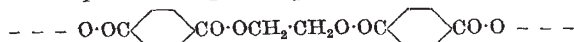
A Chemistry of Plastics and High Polymers

By Dr. Patrick D. Ritchie. Pp. viii+288. (London: Cleaver-Hume Press, Ltd.; New York: Interscience Publishers, Inc., 1949.) 25s. net.

THIS book is based on postgraduate lectures which the author has delivered at Birmingham Central Technical College. It has been carefully planned with the view of filling a rather unexpected gap in the literature of high-polymer chemistry; for, as the author states in the preface, "there appears to be a real need for a more compact and moderately priced single volume dealing mainly with the organic chemistry of polymeric materials as a whole". It has been written primarily for organic chemists, the synthetic and structural aspects of the subject having been kept constantly to the fore; but all chemists will find something of interest and value in this well-written and erudite book.

The opening chapters deal with the definition of the terms plastic and polymerization, and the mechanism and kinetics of polymerization. High polymers, prepared by synthetic addition, are then considered. These include polymers of ethylene, isobutylene, styrene, vinyl and alkyl esters, butadiene, etc. The various factors which govern the degree of polymerization (or D.P., as it is termed) are discussed, and a graph showing the effect of milling on the molecular weight distribution in polymethyl methacrylate is given.

The quotations under the headings of the chapters have been very well selected. The prophecy of Robert Hooke in 1667 that there might be a way of making "an artificial glutinous composition, much resembling, if not full as just, nay better, than that excrement" from the silk worm is a very apt preface to the chapter on polyesters, polyamides and polyethers, in which materials such as 'Terylene' and nylon are described. The former fibre, discovered in the research laboratories of the Calico Printers Association, and now about to be manufactured by Imperial Chemical Industries, Ltd., is prepared by the condensation of ethylene glycol with terephthalic acid to produce long-chain polymers of the structure:



The polymers which can be prepared by the condensation of formaldehyde with phenol or amino-compounds are described in some detail, and the reader will be interested in the discussion of the mechanisms of the formation and structure of the phenoplastics, the commercial importance of which was first realized by Baekeland in the early years of this century.

A comprehensive account is given of naturally occurring high polymers such as the protein, cellulose and rubber groups, and space has been found to include semi-artificial products such as cellulose acetate. In view of the very large amount of research work which has been carried out on wool in the past twenty years, it is pleasing to find that more than four pages have been devoted to the properties of this substance. Four methods are listed for the reduction of felting (shrinkage) by the rupture of the disulphide bond, though the recent, very effective, permanganate process is not mentioned.

The inclusion of inorganic polymers of high molecular weight is another pleasing feature of this excellent book. The author shows how the structure of these polymers can be classified under one of three headings, namely: linear or chain macromolecules (such as asbestos, plastic sulphur), planar or layer-lattice macromolecules (such as talc, mica, graphite), and cross-linked or infinite-network macromolecules (such as diamond, silica, glass). The extraordinary tensile strength of glass fibres is mentioned—it seems incredible that a fibre of diameter 10^{-3} in. can have a tensile strength which is about twenty times greater than that of mild steel.

In the final chapter, the relationship between structure and physical properties is discussed, and the author states "that we are rapidly proceeding beyond the limit of pure empiricism, and that the time is approaching when technologists can expect to produce to order a high polymer with previously specified physical properties, by suitably tailoring the long molecule".

The provision of numerous references for further reading at the ends of the chapters, and the separate indexes for authors, trade names and subject-matter add to the value of this splendid book, which is attractively produced and provides so much information at so moderate a cost.

A. C. CAVELL

NATURE OF PETROLEUM

The Science of Petroleum

Vol. 5, Part 1: Crude Oils; Chemical and Physical Properties. Edited by Dr. Benjamin T. Brooks and Dr. A. E. Dunstan. Pp. ix+200. (London, New York and Toronto: Oxford University Press, 1950.) 48s. net.

IN 1950 world production of petroleum rose to 523 million metric tons. This large quantity accords with the acceleration in production over the years and represents a record achievement which is certain immediately to be broken. The part played by mineral oil in providing fuel for our mechanized civilization has long defied exaggeration; and to this has more recently been added its importance as a raw material for the production of solvents, rubber, plastics, explosives and other groups of commodities, as well as giving promise of still wider application. So it is most appropriate to consider in the light of recent experience the variable nature of petroleum, and the knowledge which has been accumulated regarding the crude oils and their components.

Thirteen years ago a marked advance was made in oil literature by the issue of "The Science of Petroleum". This compendium covers the whole field of the science and technology of oil, and by reason of the high level of its contributions remains the standard treatise on the subject. From its