

could have been much more carefully chosen for an audience of catholic interests.

Other chapters will find general favour; on radar, on the betatron, etc. Indeed, I read the book from cover to cover with keen interest and am certain scientific men of a variety of callings will do the same.

T. E. ALLIBONE

## PROGRESS IN THE OIL INDUSTRY DURING THE WAR-YEARS

### Reviews of Petroleum Technology

Vol. 7 (covering 1941-45). Pp. viii+535. (London: Institute of Petroleum, 1947.) 21s.

**T**HE last volume in this series (for 1940) appeared in 1941, since when the exigencies of war prevented publication as hitherto. The present volume covers the quinquennial period 1941-45—critical war years—and its contents thus reflect the trend of petroleum technology over a wide field during the most abnormal times the industry has ever passed through.

The format has not changed substantially. Reviews of subjects, each written by an acknowledged specialist in the particular field chosen, follow precedent. Petroleum geology covers origin, migration and accumulation, sedimentation, salt-domes and search for oil. Geophysics ranges from seismic methods to radioactivity. Drilling deals with recent progress, well hydrology, records and completion factors. Incidentally, an oil-well depth record of more than 16,600 ft. was established in Texas in 1945. Production engineering is concerned chiefly with reservoir engineering and control and well engineering generally. Oil transportation includes an account of war-time activities in the United States, and data on pumping stations, pipeline welding and corrosion. Refinery process developments are perhaps the most striking features of the whole technology; there is much that is new and of great future importance in this section, which discusses varied treatments, refinery conversion and integrations, aviation fuel, fuel suitable for jet propulsion, toluene and cumene production, synthetic rubber and lubricants. A chapter on modern analytical and testing methods is followed by more theoretical reviews of the chemistry and physics of petroleum. Natural gas and benzole production are dealt with conventionally, and followed by a full survey of advances made in alternative fields including developments in hydrogenation, the Fischer-Tropsch process, low- and medium-temperature carbonization and other substitute fuels. There is a section on specifications for service fuels with details of aviation, pool, transport spirits (including detector dye), diesel and fuel oils; this has particular interest in the light of recent proposals concerning commercial petrol in Great Britain. A separate chapter on diesel fuels and gas oils, biased to research and development both in British and foreign (including Russian and German) spheres, throws some light on efforts made to combat shortages which were known to be prevalent during the later stages of the War and, for that matter, still continue so to be.

There are short reviews on war-time specifications for lubricants, asphaltic bitumen and road materials; the chapter on special products is comprehensive, ranging from derived chemicals and special hydrocarbon products to synthetic resins and rubber. The

volume is rounded off with a chapter on petroleum literature, concluding with a name and subject index.

The following items find no special place here: gasoline, light distillates and furnace fuel oils, measurement, plant instrumentation, crude oil, petroleum and other waxes, insulating and hydraulic oils, engines and automotive equipment, legislation and statistics for Great Britain; these will be included in the volume for 1946 now in active preparation.

This volume represents a prodigious amount of bibliographical research into international literature published during the war period and reflects the greatest credit on all concerned. As a current work of reference on the aspects of the technology with which it is concerned, it is invaluable. The only blemish is the quality of the paper employed; but that, we are sure, is not the choice of the Institute of Petroleum.

H. B. MILNER

## POTENTIAL THEORY OF AEROFOILS

### Theoretical Aerodynamics

By Prof. L. M. Milne-Thomson. Pp. xix+363. (London: Macmillan and Co., Ltd., 1948.) 40s. net.

**A**ERODYNAMICS is the science of the motion of gases and is of great intrinsic interest; but the present importance of the science lies largely in its applications, for it provides the rational basis for the design of aircraft. The subject is growing rapidly and is already so large that it cannot be adequately covered, even at an elementary level, in a single text-book. Some of the major branches are: theory of aerofoils and of control surfaces, the boundary layer, turbulent flow, flow at speeds near and above the speed of sound, flow at extremely low pressures, heat transfer, theory of aircraft performance, theory of the stability, control and flutter of aircraft, aerodynamics of propulsion including the internal aerodynamics of propelling machinery. However, the theory of the irrotational or 'potential' flow of fluids about aerofoils holds a central position in applied aerodynamics, and it is based on classical hydrodynamics. The book now under review is almost wholly concerned with the theory of aerofoils and with the hydrodynamic basis. The subjects of viscosity and turbulence are not seriously discussed.

The author says in his preface that the book is based on lectures to junior members of the Royal Corps of Naval Constructors, and it is stated on the dust cover that the general standard of the book is that of a first-year university course. This is certainly much too modest; but it is true to say that the book is so clearly and pleasantly written that it could be read with profit by a bright 'freshman' or even by an advanced schoolboy. The author has evidently taken great pains over the exposition and has succeeded in avoiding difficult mathematics. The notation and treatment are, in general, similar to those used in the author's "Theoretical Hydrodynamics". Special features of the book deserving mention are chapters on lifting surface theory, on wind tunnel corrections, on subsonic and supersonic flow, and, notably, a treatment of the design of aerofoils for given pressure distributions. There are about 320 exercises, some of which are extracted from recent research papers.