thinking about technological possibilities. They should be continually exchanging ideas about problems. The first object of a scientific policy of defence should be to promote as effectively as possible the broad, intimate and vigorous discussion between scientists and Service officers on the problems of defence.

BIOLOGY AND RADIATION

Radiation Biology

Edited by Alexander Hollaender. Vol. 1: High Energy Radiation. Part 1: Chapters 1 to 8. Pp. ix+626. Part 2: Chapters 9 to 19. Pp. 627-1265. (Prepared under the Auspices of the Committee on Radiation Biology, Division of Biology and Agriculture, National Research Council, National Academy of Sciences, Washington, D.C.) (London: McGraw-Hill Publishing Company, 1954.) 140s. the two parts.

Medicina Nucleare

Introduzione alle Applicazioni Medico-Biologiche della Fisica Nucleare. Di Aldo Perussia, e coll. Pp. xii+878. (Roma: Il Pensiero Scientifico Editore.) 7000 lire.

Biological Effects of External X and Gamma Radiation

Edited by Prof. Raymond E. Zirkle. Part 1. (National Nuclear Energy Series: Manhattan Project Technical Section. Division 4—Plutonium Project Record: Vol. 22B.) Pp. xxvi+530. (London: McGraw-Hill Publishing Company, Ltd., 1954.) 58s.

RADIATION biology is an artificial creation of man: Can it rank as one of the natural sciences? A reviewer of "Radiation Biology", edited by A. Hollaender, may well wonder whether it is indeed a subject in the academic sense any more than, for example, arsenic biology would be. The importance to mankind of the biological effects of radiation is clearly increasing, and in fact has provided the stimulus and support for most of the newer work summarized here. But radiation, apart from its toxicological importance, may be a useful investigating tool (pre-eminently perhaps in genetics), and also sometimes a useful technological accessory, as in the development from irradiated *Penicillium* of strains giving a higher yield of penicillin. These diverse aspects do not really make up a logical whole. A symptom of a common confusion of thought is the statement that the use of radioisotopes as a research tool is omitted because adequate texts are already available; a more valid reason is logical incompatibility.

In these volumes, about one-quarter is devoted to effects of radiation on the mammal, two-fifths to various aspects of chromosomal damage, one-fifth to the physical principles underlying the interaction of radiation and matter, and one-twentieth to biochemical effects. In general, the many authors have provided a fair historical perspective within which to set more recent advances, and their treatment, if not exhaustive, is comprehensive. The earlier chapters on the interaction of radiation and matter are more didactic in manner than those written by biologists; but the primary effects of radiation are reasonably well understood, whereas as yet there are few general principles which might unify the great variety of biological observations. The way in which

the primary effects of radiation are converted into chemical and hence biologically observable changes is almost unknown. These volumes should serve well their declared purpose of providing a standard book of reference.

"Medicina Nucleare", edited by Aldo Perussia, is an introduction to the biological and medical applications of nuclear physics. It is divided into four main parts dealing respectively with theoretical bases and general techniques; instrumentation, techniques and methods of detection and measurement of radiations; radioactive isotopes in biological research and clinical investigation; and applications of nuclear physics to radiotherapy. Of the twenty-one chapters, fifteen are by A. Perussia; the remaining six are by C. Salvetti (elements of nuclear physics), E. Gatti (the artificial production of radiations), M. Silvestri (nuclear reactors and the production of radioisotopes), L. Malatesta (radiochemistry), E. Gatti and A. Perussia (the principal means of instrumentation), and U. Facchini and A. Perussia (techniques and methods of measurement). There are appendices on the biological risks of ionizing radiations and isotopic data, and a bibliography of books and journals. The book deals adequately with the present status of a large and rapidly expanding branch of biological science: it will probably become the standard Italian-language text-book in its subject.

"Biological Effects of External X and Gamma Radiation", edited by R. E. Zirkle, is in rather a different category. As the editor points out, the work reported was carried out between 1942 and 1945 as war-time research; it was written hastily and not afterwards edited carefully for a variety of good reasons. It is therefore not meant to be a polished and complete work in any respect. To radiobiologists much of the work described is now past history. The individual papers are the records of investigations carried out at the National Cancer Institute by the late Egon Lorenz and his group, and at Chicago by L. O. Jacobson, E. S. Guzman Barron and their colleagues. These were at first considered as classified information; later they were made available with limited circulation, and parts were published in scientific journals. The novelty of many of the papers has thus faded; but some contributions have been brought up to date. Even if their current interest is limited, nevertheless it is valuable to have these reports now in a bound collected form ready for the library shelf in any part of the world.

R. H. MOLE
T. C. CARTER
J. F. LOUTIT

PROGRESS IN PHYSICS

Reports on Progress in Physics

Edited by A. C. Stickland. Vol. 17 (1954). Pp. iv+280. (London: Physical Society, 1954.) 50s.

VOL. 17 of the "Reports on Progress in Physics" is on similar lines to its immediate predecessors. It contains eight rather specialized articles of varying length, each dealing with recent advances in a particular branch or field of physics, the emphasis this time being on theoretical aspects. A useful innovation now introduced is that, in addition to the bound volume, paper-covered copies of the individual articles can be purchased separately at appropriate rates.