

near to being enthroned as a dogma instead of being pursued as an ideal. It is the aim of every man of science to include more and more experience, of every kind, in a common logical system, but he is no true man of science if he does not recognize, first, that he may be aiming at the impossible, and secondly, that he is most likely to succeed in his object if he starts with different groups of experiences and correlates them by independent concepts, using independent languages, until by the growth of knowledge they may be united into a common system. Heat and mechanics began as independent studies, speaking independent languages, and later grew into the science of thermodynamics, for which the single language of energetics is sufficient. If the concepts and terms of the calorific theory had been denied to Carnot, what would have been the state of this science now? Magnetism and electricity, radiant heat and light, chemistry and spectroscopy—examples are legion—all tell the same story; and if, as we may hope, physics, biology and psychology are potentially one science, there would be little chance of their being recognized as such if the behaviourists, armed with the dogma of the logical empiricists' "physicalistic language", succeeded in depriving the infant science of psychology of all terms and concepts which physics at present does not need.

Prof. Frank devotes some attention to the social aspects of science, dealing in particular with the relation of logical empiricism to dialectical materialism. Here he is less convincing than in the more fundamental sections of the book. He introduces some special pleading in order to establish a likeness between the two systems of thought, and is accordingly forced to ignore the most essential elements of dialectical materialism. For example, he finds (p. 149) Lenin's doctrine that propositions such as "Matter is infinitely divisible" "are never to be labeled as true or false; they are to be judged by their practical consequences" to be "very closely related" to the logical empiricists' view that "the truth of a proposition can only be judged if the methods of testing it are given". He omits to mention, however, that the "methods of testing" are utterly incompatible in the two cases, although two pages earlier he has stated that dialectical materialism "understands by test, above all, the test of a principle in social life, in revolutionary practice, as they put it". Does logical empiricism find the meaning of infinite divisibility in revolutionary practice? Again, on p. 125 it is stated that a recent tendency to find support in modern physics for philosophical idealism has "no connection with any 'crises in physics' or with any 'new physical conception of nature'. It is rather associated with a crisis in human society arising from quite different processes". This is a remarkable statement from one who holds that the truth of a proposition can only be judged if the methods of testing it are given. By what test has Prof. Frank found a connexion between Jeans's 'mathematical God', which is particularly mentioned, and a "crisis in human society"? And how has he established that the conception of that God has no connexion, not even an illogical one, with the quantum theory? It is to be feared that here Prof. Frank is neither logical nor empirical; he has used combinations of words which must not be introduced into the physicalistic language.

This, however, is a minor aspect of a book which, in the main, may be received with praise and gratitude. It is characteristic of the logical empiricists

that (except in the later developments of their language analysis, which reveal everything about language except that it is intended to mean something) they express themselves clearly, unambiguously and, for the most part, convincingly. Prof. Frank has retained these qualities for thirty-five years. Let us hope that he will continue to interpret the development of one of the most significant of modern schools of philosophy.

HERBERT DINGLE.

SCIENCE AND INDUSTRY OF PLASTICS

Synthetic Resins and Allied Plastics

By Various Authors. Edited by Dr. R. S. Morrell. Second edition. Pp. xiii+580. (London: Oxford University Press, 1943.) 35s. net.

THE second edition of "Synthetic Resins and Allied Plastics", edited by R. S. Morrell, reflects the spectacular advances made in this field of applied chemistry, inasmuch as ten experts have been called on to collaborate in the production of the present volume. It is only five years ago since the first edition, compiled by four authors, made its appearance, endeavouring in one volume to cover the whole of the plastics industry from both technical and theoretical points of view. The present edition is structurally similar to the first edition, but considerably expanded to cover the progress made during the past five years. Each chapter is a condensed review of individual fields of plastics.

For the ordinary reader the introductory chapter is almost, in itself, a sufficient review of the industry and science of plastics, but the succeeding chapters on resins derived from proteins, cellulose, phenols, and urea in combination with formaldehyde, on the vinyl, acrylic and coumarone polymers, the ester gums, and finally on the alkyd and petroleum hydrocarbon resins, are exhaustive in their detail, and possibly only those intimately connected with this branch of applied science can thoroughly appreciate the vast strides made in recent years.

There are also special sections on the application of phenol and urea-formaldehyde resins as components of varnishes and enamels, and a very interesting chapter on miscellaneous resins wherein are described many plastics which command attention either on account of their mode of formation or because of their specialized application, but which have not yet been sufficiently developed to justify classification into groups. Included in this edition also are chapters on electrical tests carried out on resins and on methods of identification of resins. This latter, together with two sections on the theory of resinification, will give much food for thought and should be productive of new ideas and methods of approach in the elucidation of this problem. Finally, there are many illustrations, and each chapter is amply supported by a very comprehensive list of references to original publications.

This brief summary of the contents of the work will serve to show the wide field of readers to whom this valuable book should appeal. Not only the technician but also the more secluded research worker will find a very full account of the progress of the science of plastics, and also much theoretical information. Undoubtedly this edition will be eagerly sought after by all those interested in the science or engaged in the manufacture of modern plastics.