

show how they have been utilised or applied, and emphasises the consequences. To some extent the title chosen by him is misleading, as the book contains no account of the working of any actual processes in which the principles of catalysis are applied, nor does it provide any clue as to which of rival processes have stood the test of economic success: it is essentially a theoretical treatise, though exceedingly full and thorough in its consideration of the considerable scientific and patent literature of the subject.

After a brief survey of the history of catalysis, a longer chapter is devoted to the consideration of the phenomena, followed by an explanation of such physico-chemical theory as is required and a discussion of the theories of catalysis. These sections will be found of considerable value by the initiated, though, for ourselves, we find the wood to be rather full of trees and could wish the author had given us a clearer lead as to the path to follow. He sums up that only the intermediate compound theory and the adsorption hypothesis amongst the numerous suggestions of the past have stood the test of time, and rightly emphasises that the two theories possess one fundamental idea in common, namely, that the catalyst first associates itself chemically with one of the reacting substances, forming an intermediate complex—either a true chemical compound or a surface combination—which is more reactive than the initial substance. The further explanation of the progress of the reaction is the problem which awaits solution; of much interest, therefore, is the suggestion of Lewis that the specific energy conferred by the catalyst is in the nature of radiant energy of definite frequency.

The consideration of the great mass of detail is divided into chapters headed respectively oxidation and combustion, nitric acid, hydrogen and hydrogenation, ammonia, dehydrogenation, dehydration, and lastly the utilisation of coal. Mention of this last subject is sufficient to show how wide the ramifications of catalysis are about to become; undoubtedly the many workers in this field will derive useful hints from Mr. Green. E. F. A.

*Science and Reality.* By R. A. Sampson. (Benn's Sixpenny Library, No. 37.) Pp. 80. (London: Ernest Benn, Ltd., 1928.) 6d.

THE Astronomer Royal for Scotland has written an admirable essay on the general character of scientific knowledge. The argument, though much condensed and avoiding no difficulties, should be intelligible to any normal person who is prepared to apply his mind seriously to the matter. No special scientific or philosophical knowledge is assumed. It is to be hoped that the book will be widely read, as it is well designed to correct popular fallacies about science.

The author considers first the most abstract kind of science, taking geometry as his example, and then goes on to deal with more concrete types, taking first of all astronomy. The secret of the success of scientific method, and of its limitations, is found in the process of abstraction and defini-

tion; the distinction and separation of elements in experience, which can then be put together again. The method is often arbitrary and always involves unproved assumptions, but it is impersonal and cumulative; cumulative because impersonal. For this very reason science can never supply more than partial knowledge. "We are familiar with the fact that as a practical guide, theory is always dangerously incomplete. Its method is first to remove the life from any phenomenon before discussing it. Out of Nature's bounty of wild flowers it collects laboriously for its own reference a sort of *hortus siccus*."

One word of adverse criticism seems to be called for. The bibliography consists entirely of important and first-rate works, except for the first item. As that is the only work dealing primarily with the philosophy of science, it is a pity it should be an inferior one; when there are so many good books available on the subject, for example, those of Poincaré and Russell.

*Culture and Social Progress.* By Prof. Joseph Kirk Folsom. (Longmans' Social Science Series.) Pp. x + 558. (London, New York and Toronto: Longmans, Green and Co., Ltd., 1928.) 12s. 6d. net.

TEN years after the cessation of hostilities we are able to regard culture in as favourable an aspect as it deserves, being freed, as it now is, from the distasteful significance which it acquired with the advent, and during the continuance, of the War. This discursus by Prof. Folsom, dealing with "Culture and Social Progress," is one which presents the subject attractively; it is lucid in treatment, deft in arguments, dispassionate in conclusions, and for the most part convincing. The author submits that the true keynote of culture is personal liberty. He heads the chapter dealing with the elimination of waste with some words by Charles P. Steinmetz: "Work is a curse. The chief aim of Society should be to abolish work." His own arguments seem to support this unhealthy view: "Labour, by and large, is disagreeable, but its unpleasantness is mostly of that mild sort we call boredom," is merely one of the author's remarks in that direction. It is indisputable that waste is, in general, to be deprecated and avoided, but it may be confidently asserted that a world without work would be a world with no outlook. With the above as the main, and perhaps the sole, protest, it may be said that the book merits cordial approbation. P. L. M.

*Tychonis Brahe Dani Opera Omnia.* Edidit I. L. E. Dreyer. Tomus IX. Pp. viii + 352. Tomus XIV. Pp. iv + 327. (Hauniae: Libraria Gyldendaliana, 1927, 1928.)

THESE two volumes, which have seen the light after the editor's death, would appear to complete his great edition of the works of Tycho Brahe, apart from an *index rerum*, which it would seem is still awaiting publication. Of these two volumes, Tomus IX. has been edited almost entirely by the late Dr. Dreyer's colleague, Dr. Ræder. Tomus