

that he 'cannot conceive of the antipodes' he uses the word differently from Huxley in the sentences he quotes, for Huxley only says that he believes that something will be accomplished, though he cannot conceive how. It happens that J. S. Mill uses Professor Brooks' example to explain the proper use of the word, writing (*Logic*, II., p. 321): "Antipodes were really, not fictitiously, inconceivable to our ancestors: they are, indeed, conceivable to us." Everyone will agree that conceivability in Professor Brooks' sense is not a necessary condition of truth, but this does not concern his subsequent argument.

Professor Brooks states in his last letter that Aristotle held "that our business in this world is to learn all we can of the *order* of nature, leaving to more lofty minds the attempt to find out what it is that 'produces anything and makes it what it is.'" Yet very curiously in his previous article to which he refers (*SCIENCE* N. S., Vol. I., p. 126) he wrote: "I should like to see hung on the walls of every laboratory * * * the older teaching of the Father of Zoölogy [Aristotle] that the essence of a living thing is not what it is made of, nor what it does, but why it does it." Professor Brooks seems to have proceeded from the *ignoramus* of his preceding paper to *ignorabimus* now, but he is not justified in taking Aristotle with him.

J. McKEEN CATTELL.

COLUMBIA UNIVERSITY.

SCIENTIFIC LITERATURE.

A Text-book of Gas Manufacture for Students:

By JOHN HORNBY, F. S. C. 12mo, pp. 261; 6 plates. London, 1896, Bell & Sons. New York, Macmillan & Co., 66 Fifth Ave. \$1.50.

A concise little book setting forth the chief points in gas manufacture in a manner that students can readily grasp has been a desideratum. The manufacture of coal gas, with its attendant by-products, is very extensively developed in England; hence to that country we look for excellent treatises on this subject, and this 'Text-book' meets the requirements.

After a short consideration of the properties and value of various coals for gas making, the author discusses carbonization; the construction

and setting of retorts and furnaces; the various appliances usually found in the retort house; the effect of temperature on the quantity and quality of the gas and on the by-products; condensation of tar; removal of ammonia and the elimination of other impurities; methods of testing purity and illuminating power; the various problems incidental to the distribution of gas to the consumers, and the construction of meters and burners. In Chap. XX., on the Composition of Coal Gas, is shown the effect of the various components of gas on its illuminating power.

The American reader will notice the slight attention given to water gas. Very little of this is used in England, it having been developed within the last fifteen years, while in most cases the English coal-gas works, with their plants for saving by-products, have been established much longer. A short description of the Lowe process, together with a plate, is given.

The author divides the water-gas process into 'continuous,' in which the reaction between carbon and steam takes place in an externally heated retort, and 'intermittent,' in which the carbon is raised to incandescence by an air blast, and then steam is blown into the hot mass. He adds that the continuous process has not proved a success. But in this country the term 'continuous' is applied to those processes in which a non-luminous water gas is made in a generator and stored in a gasometer, being afterwards carburetted in externally heated retorts. Processes of this character, notably that of Wilkinson, have proved very successful here for large works.

A short description of Peeble's gas-enriching process is followed by a chapter on sulphate of ammonia, which closes the book.

The print and plates are excellent and the illustrations are generally good, excepting two indistinct views of mechanical charging and drawing apparatus. FRANK H. THORP.

Repetitorium der Chemie: DR. CARL ARNOLD, Professor der Chemie an der Königl. Tierärztlichen Hochschule zu Hannover. Siebente Auflage, Verlag von Leopold Voss, Hamburg und Leipzig. 1896.