of Abiogenesis has recently been discussed, the reticence shown in avoiding allusion to the subject is perhaps the most remarkable among the many remarkable characters of this great work. P. H. PYE-SMITH

OUR BOOK SHELF

Elementary Natural Philosophy. Being a course of nine lectures by J. Clifton Ward, F.G.S., Associate of the School of Mines. (London: Trübner and Co.)

THE attempt to crowd the Elements of Natural Philosophy into nine lectures cannot be otherwise than a failure. This is signally the case with the little book before us. We need hardly go farther than the table of contents to justify the statement. A single lecture is devoted respectively to Magnetism, Voltaic Electricity, Light, and Heat; Pneumatics and Hydrostatics together occupy one lecture, whereas to Frictional Electricity and Sound are given two lectures apiece. Nor does the author confine himself to a simple summary of the leading facts in each of these subjects, he tries to rush over all the field occupied by larger text-books. Hence, important facts are often lightly passed over and comparatively trivial matters made unduly prominent. In Voltaic Electricity, for example, two pages are occupied with a description of the effects of electro-chemical decomposition, when seen on the screen by the aid of the solar microscope. We recognise here, and indeed on every page of the book, those lecture-experiments with which Dr. Tyndall has made the students of the School of Mines so familiar. Mr. Ward has not only drawn largely upon his notes of those lectures, but he imitates Dr. Tyndall's language and style.

Notwithstanding this, we are quite sure Mr. Ward has only himself to blame for the errors which even a cursory glance has revealed to us. On p. 85 we read "Magnetism may be produced by *friction* (of *soft iron* with loadstone or other magnet) by magnetic induction and electricity." Magnetism is *not* produced by friction of soft iron. On pp. 36 and 37 Mr. Ward has fallen into a vulgar and serious error in explaining the electric wind. Speaking of the so-called electric fish, here is what he says:—"If the interior of the Leyden jar be charged positively, negative electricity will be attracted to the head of the fish, from the somewhat blunt point of which it will stream and cause a movement from the knob; while the gliding off of the repelled positive from the finer pointed tail, will counterbalance this movement, and keep the body in equilibrium." The author also speaks of a lighted candle extinguished by the *draft of electricity* streaming from a point. This, of course, is grossly incorrect; it is the movement of contiguous air particles charged similarly by contact and then repelled, that extinguishes the candle, or supports the gold leaf fish.

Though there are some good points in this little book, we regret our inability to recommend it either to schools or students. We venture to think the author betrays his want of experience in teaching science by the over-crowding of his facts; the first lecture, for instance, is accompanied by thirty-three distinct experiments. Teaching—especially science teaching—requires "precept upon precept, line upon line, here a little and there a little:" otherwise there is an almost certain danger of the learner obtaining loose and superficial knowledge, the end of which is not sound instruction, but disastrous conceit.

W. F. B.

Essays on Darwinism. By J. R. R. Stebbing. (Longmans and Co., 1871.)

MR. DARWIN, in his recent work, very truly observes that "false facts are highly injurious to the progress of science, for they often long endure; but that false theories are comparatively innocuous." Mr. Stebbing's work can then do little harm, as it supplies us with no new "facts" whatever, whether true or false. The author is an advocate who serves Mr. Darwin with more zeal than discretion, and who seems but little, if at all, able to appreciate the arguments and objections adduced on the other side. Some who are already convinced of the truth of Darwinism will read with pleasure a series of eloquent and interesting essays in its favour; but, though calculated to confirm a disciple, they are singularly ill-calculated to convert an opponent. Before Mr. Stebbing again writes upon this subject we strongly recommend him to peruse carefully Mr. Grote's "Examination of the Utilitarian Philosophy."

Das Wesen und die Ziele der Chemischen Forschung und des Chemischen Studiums. Akademische Antrittsrede gehalten von Dr. Rudolph Fittig. (Leipzig: Quandt and Händel, 1870. London: Williams and Norgate).

So busy are the majority of German chemists in research, that it is seldom we are privileged to have their opinions on the object of the science, and the position it should occupy as a study. Dr. Fittig has availed himself of his appointment as Professor of Chemistry in the University of Tubingen to deliver an inaugural address, in which these points are discussed with great clearness and ability. Starting with the assumption that the majority of men estimate the value of a science only by its power to satisfy want and contribute to the comfort of life, Dr. Fittig goes on to claim for chemistry from this point of view the first place among the sciences. "Where," he asks, "is there another science which, in the application of its results to man, almost from his first breath to his last, is so true a companion as chemistry?" and he proceeds to show that it is useful, not so much in explaining what the nourishing constituents of food are, as in disclosing the laws of agriculture, and thus teaching us how to produce means of nourishment. Further, he points out that there is not an article of clothing for the preparation of which chemical knowledge has not been employed, and the same knowledge is necessary to show how the spread of disease may be prevented, and cured when it has taken hold. While these practical results are obtained by the study of chemistry, Dr. Fittig is careful to show that it is a total misunderstanding to suppose that its chief purpose is to discover brilliant colours or new medicines. Thus, without undervaluing the practical importance of the discovery of the aniline colours, it is nevertheless true that the splendid results obtained by Hofmann would have had the same interest for the chemist, had these compounds been colourless and without any technical use. So we are told, "The task of chemistry is to explain the composition of bodies and all phenomena resulting from change of this composition *in order to derive the regular connection and cause of these phenomena, and therefore also of the natural laws which regulate the building up and decomposing of substances.* . . . . We are compelled to multiply the number of substances already existing in nature, not for the sake of producing new bodies and benefiting the world, *but to discover the eternal laws of nature.* He is no true chemist who only prepares new compounds without any definite aim (although, perhaps, he has prepared a large number of compounds hitherto unknown and possibly very beautiful in appearance), and his work has no direct value for science, and can only become valuable when employed by others in its true scientific sense. . . . . True scientific researches must never be given over to chance, they must be systematically planned, begun with a clear consciousness of what is to be attained, and finished in the same spirit." Dr. Fittig has done well to point out so clearly the true aim of the science of chemistry, and to disparage the false estimation of its value, which would make it simply a means of discovering bodies with some technical or useful application. And even in this direction, which must