proceedings of its faithful servants and children. For the patriarchal parent-cell is the habitation of the Ego, the I, of the organism, while the child-cells are inhabited by subordinated egos. The protoplasm of a cell is a machine, and the inhabiting Ego its engineer. Reflex action is not merely reflex, but chiefly determined by the purposive action of the cell-ego, and so forth. We need not follow Mr. Bell further. Enough has been said to show the nature of his speculations, and to enable the biological or psychological reader in some measure to decide whether it will repay him to read Mr. Bell's pages for himself. C. LL. M.

Elementary Botany. By J. W. Oliver. (London: Blackie and Son, 1891.)

IN these days, when the pursuit of a "pass" is more keen than that of knowledge, the confession that an elementary text-book has been written for the use of students who are studying in classes under the Science and Art Department, and has been prepared on the lines of the syllabus of the first stage or elementary course, is apt to awake criticism, especially when, as in the present case, ten years' examination papers are printed at the end of it. But this book, though not an ideal elementary text-book, is tolerably free from the vices of cram: its merits are, in short, chiefly negative. What is urgently required at present is an elementary book of positive excellence, written (not compiled, as the present work appears to be) by an author who walks himself near the limits of our present knowledge; under these circumstances, the beginner would receive, from the very first, side lights, whether from terminology or from positive statement, which would prepare him for his more extended study. Such side lights are singularly absent from this work: take, for instance, the andræcium and gynæcium; in connection with these the word sporangium is not mentioned, nor is the word spore, except in the statement (p. 163) that the Cryptogamia "reproduce themselves by spores which contain no embryo": thus the attempt is not made to pave the way for subsequent progress to the study of the homologies in the lower forms. Again, in describing various types of corolla, the old terms such as papilionaceous, hypocrateriform are trolled out (p. 126) with only the minimum of explanation of the romance of insect agency (p. 147); and though function is put in relation to form in treating of the stem, the chapter on leaves is singularly dry, owing to its dealing simply with form and terminology. As regards terms, *fibro*-vascular should not be applied generally to bundles (p. 63), and the term *oospore* may well give place to zygote; while "acropetalous" is, we believe, a new enormity. Many of the figures are old friends: some of the new ones are bad; for instance, Fig. 54, of the wood of pine, which is full of inaccuracies; Fig. 73 (C), in which the cambium in a two-year old shoot is as thick as the phloem; and Fig. 75, in which the bordered pits are entirely omitted; while the difference between spring and autumn wood depends mainly upon filling up the lumen of the tracheids with printer's ink. It must not be concluded from these remarks that the book is worse than others of its class: in some respects, it is above the average, but none the less the field is yet open for a book suitable for beginners, and written by a master hand, which shall deal with the elements of the science, in its modern development, in such a way as to lay a secure foundation for the future progress of the beginner, and leave him with nothing to unlearn. F. O. B.

Household Hygiene. By Mary Taylor Bissell, M.D. (New York: N. D. C. Hodges, 1890.)

THIS little volume consists of a series of papers which originally appeared as contributions to the Art Interchange Company. They deal with the sanitary regulation of the home. Every chapter is written in excellent style, and considering that much of the matter with which the author is concerned is technical, the manner in which it is presented is exceedingly clear. Dealing as it does with every requirement of the home from a sanitary and scientific point of view, the book contains much information of the utmost value to women of the household. It would be well if the essential conditions for a healthy home, so well laid down by Dr. Mary Bissell, were more carefully remembered, for they would be the means of saving life, now often sacrificed by ignorance of the ordinary laws of health. We recommend the book most cordially to the class of readers for whom it has been written, and we feel sure that everyone upon whom the care of a home devolves would be the better for bearing in mind the lessons which it teaches. H. BROCK.

Lessons in Applied Mechanics. By J. H. Cotterill, F.R.S., and J. H. Slade, R.N. (London: Macmillan and Co., 1891.)

THIS is one of the best little books on the subject that have come under our notice for some time. It is of a thoroughly practical character. Although most of the matter has been selected from the larger work by the first-named author, it is presented here in a more elementary manner, having been for the most part rewritten, with considerable additional illustration.

The work is divided into three parts. In the first part the principle of work is dealt with, and among the more important chapters in it we may mention that on pulleys, belts, and wheel-gears, and that on the direct-acting engine, the latter being thoroughly well examined in detail, with explanatory diagrams. In the second part, which treats of the strength of materials and structures, we have some well-prepared chapters on the bending moments and shearing forces under distributed loads, open beams, lattice girders, and frame-work structures, &c., together with some experimental facts relating to elasticity, strength, and resistance to impact of various materials. The last part consists of the fundamental laws relating to hydraulics, and although rather short, contains a sufficient amount of information for an elementary work.

Altogether, the book is an excellent treatise for students of engineering, and others taking up the subject. The examples, all of which are practical and original, are numerous, and add greatly to its utility.

LETTERS TO THE EDITOR.

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The Flying to Pieces of a Whirling Ring.

IN order not to mislead students, it may be well to point out that the words "parallel to the equator" in my letter on p. 439 (March 12) are emphatic, and that a less paradoxical statement is simply that the tension needed to lay a weightless cable precisely along a parallel of latitude is more than it can stand.

It will be noticed that a horizontal rope must sag either downwards or upwards, according as it is in a liquid lighter or heavier than itself; and that to stretch a thread, even a floating thread, till it is curved no more than the earth, needs too much tension for anything but a quartz fibre to stand; unless the liquid is so delicately adjusted as to buoy the body's apparent weight, without buoying its true weight. The termination of my former letter erred in seeming to suggest (as Prof. Karl Pearson puts it) that the principle of Archimedes fails for centripetal acceleration. OLIVER J. LODGE.

WE may imagine how anxious the practical man would be to test the extraordinary numerical results given by Dr. Lodge for the tension in a steel telegraph cable, due to the whirling effect of the earth's rotation, amounting, according to the formula, to a tension of 30 tons per square inch in latitude 60°, and 120 at the equator.