Short Reviews

The Origin of Living Matter. By Dr. H. A. Gray and N. M. Bligh. Pp. vi+27. (Cambridge: W. Heffer and Sons, Ltd.; London: Simpkin Marshall, Ltd., 1933.) 1*s.* 6*d.* net.

ARGUING from the fact that the moon's mass bears a higher ratio to that of the earth than does the mass of any other satellite in the solar system to that of its planet, Dr. Gray and Mr. Bligh contend that the earth-moon binary system is due to an encounter with some third body, that a great quantity of energy was made available at the time of the encounter, and that this energy was converted into sub-atomic energy, the energised atom being vital. Vital atoms have the power of vitalising other atoms. A detailed structure is proposed; the vital atoms are a binary system of two or more protons, surrounded by appropriate electron shells. The chemistry of these vital atoms is extremely complex—more so than that of the non-vital atoms. The authors attempt to disarm criticism by printing on the cover the statement that "a proof of that degree and kind that the scientific world rightly demands of all theories, it is maintained, applies only to materialistic phenomena, and insistence on such proof when dealing with animate matter cannot be sustained". We imagine that this point of view will not find much favour with biochemists, and we had imagined that the identification of animate with non-animate chemistry was as old as the synthesis of urea.

It is clear that these authors must suppose that only a very small amount of the matter in any living organism is vital. They postulate, of course, that the atoms become devitalised at death; if not, we should detect some remarkable spectroscopic phenomena in freshly killed tissue. But on their theory, should not death itself be a luminous phenomenon, giving rise to a remarkable spectrum, the quanta, perhaps, being in the ultra-violet or X-ray region? If the number of vital atoms is very small, it should be possible to detect some tiny photoelectric effect. Many other objections will, no doubt, occur to our readers. These authors —and all others—should be warned against basing theories on current astronomical descriptions of the origin of the solar system, or of the galaxy, which are usually tentative and have a habit of changing completely within a decade.

Symmetrical Components: as Applied to the Analysis of Unbalanced Electrical Circuits. By C. F. Wagner and R. D. Evans. Pp. xvi+437. (New York: McGraw-Hill Book Co., Inc.; London: McGraw-Hill Publishing Co., Ltd., 1933.) 30*s.* net.

IT was in 1918 that Prof. C. L. Fortescue published his now classic paper on "The Method of Symmetrical Coordinates Applied to the Solution of Polyphase Networks". A considerable literature dealing with the solution of unbalanced polyphase circuits by his method has resulted; and indeed the present authors claim that it is the only practicable method of solving unbalanced electric circuits. The method has also been applied to all manner of problems in power distribution, particularly to the investigation of unsymmetrical transient disturbances. The present volume claims to be the first which gathers together the fundamental theory on which the method is based and discusses the principal applications.

It is fitting that an introduction is written by Prof. Fortescue, the originator of the method, who still prefers the term 'symmetrical coordinates' to the more commonly used expression 'symmetrical components'. The introduction is interesting in its explanation of the mathematical history of complex numbers, the usefulness of which was a comparatively late discovery.

The earlier chapters cover the more essential phases of the fundamental theory and the principal application of the method: the determination of voltages and currents under unbalanced faults. Separate chapters are given for the calculation of the constants of synchronous machines, transformers, short lines with and without earth wires, long lines and cables. The second half is devoted to more specialised problems and to measurements. An appendix contains many useful data.

The book can be thoroughly recommended. It will be a boon to those seeking a textbook on symmetrical components, and a revelation to those hitherto unaware of the extent to which this powerful method can be applied.

Elements of Engineering Thermodynamics. By James A. Moyer, Prof. James P. Calderwood and Andrey A. Potter. Fifth edition, rewritten and reset. Pp. xiv+192. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1933.) 15*s.* 6*d.* net.

IN their preface to the new edition of this book, the authors indicate that it is intended for use in those technical colleges where special courses are held in the subjects of advanced thermodynamics as well as in steam turbines, internal combustion engines, refrigeration, and other applications of thermodynamics. To this end they claim to have stressed the fundamental principles of engineering thermodynamics as a foundation for the more advanced and practical applications of the theory.

While there can be little complaint over the general arrangement of the subject-matter, it is felt that the amount of information offered in some of the branches is scarcely adequate to enable the student to proceed directly to the more advanced applications. In the chapter dealing with internal combustion engines, no mention is made of the Atkinson cycle, or of the dual combustion or mixed pressure cycle. Comparatively simple accounts of vapour reheating and regenerative cycles take about six pages, but the more difficult case of the combined reheating and