adapted. Prof. Thompson has chosen to classify dynamos according to the nature of the field of force and the manner in which the armature moves in the field of force. It is doubtless difficult to find any very satisfactory mode of classification of these machines: but the reason for the particular classification adopted here is certainly not apparent in the descriptive chapters, in which the nature and effect of the field in the various machines is perhaps the point on which a great deal mo nformation would be desirable. The diagrams and figures in these chapters are all that could be wished for. They are admirably chosen and are well executed.

The mathematical theory of the dynamo machine has of late received considerable accessions; though much yet remains to be done in working out a satisfactory theory by mathematics and experiment combined. The fundamental principles are well known. The experiments of Faraday and Joule, and the mathematical investigations of Helmholtz, Sir William Thomson, and Clerk-Maxwell have formed a good foundation; and considerable advances have recently been made by the labours of Joubert, Mascart, Hopkinson, and Marcel Deprez. The invention by Hopkinson of the "characteristic curve" is a most important step; and the study of these curves is at the present time doing for the dynamo machine the same thing that the study of Watt's indicator diagram does for the steam-engine.

Prof. Thompson devotes a considerable number of chapters to the mathematical theory of the dynamo, and his treatment of the subject is on the whole satisfactory. There are, however, a few points on which in our opinion it requires revision. One of these is the notation; and it would be a great satisfaction if mathematicians and electricians could by some means—for instance, by appointing a committee for the purpose—agree upon some standard notation which would be convenient, and which would harmonise with notations commonly employed in dynamics and in general physics. In several points we could wish to see Prof. Thompson's notation different. It seems, to say the least, a very great pity to use the letter H in mathematical writing connected with magnetism for any purpose besides Earth's Horizontal Force, while the use of the letter i for strength of the current is only a perpetuation of French want of logic.

Prof. Thompson's formulas on the subject of efficiency of a motor are not satisfactory; and it is most unfortunate that he has allowed himself to be misled by his friend, Mr. W. M. Moorsom, into fancying an error in the fundamental equation of Joubert for an alternate-current dynamo. The investigation of Appendix IV. and the physical assumption that the coefficient of self-induction for the armature and the coefficient of mutual induction for the armature and electromagnets are approximately equal in *all* dynamos will not bear examination. It is more than doubtful whether there is *any* dynamo in which this is approximately true. Certainly it would not be true for the Siemens alternate-current machine, with which M. Joubert concerned himself. M. Joubert did not leave the matter as a question of supposition; but showed *by experiment* that the term which is concerned with mutual induction is unimportant, and that on this account the differential equation in question becomes manageable.

One other blemish we cannot pass over. It is the introduction of two or three new words which have been adopted without due weighing of the consequences. That mathematicians have been too slow to form words for new ideas we quite admit; and of the advantage of good words to express clear ideas there can be no question. Witness the comfort of having such words as "radian" for the unit angle, of "volt," "ampere," "watt." But word-making may be carried too far unless caution and judgment be used; and that words so grotesque as "torque" and as "gausses" should be adopted into the English language would be, to say the least, a very great misfortune.

The faults which we have found are, however, few, and not of vital importance, and in conclusion we must once more express our gratitude to Prof. Thompson for a very valuable work. We feel confident that it will find a very wide circle of usefulness and of appreciation.

OUR BOOK SHELF

An Elementary Treatise on Conic Sections and Algebraic Geometry, with Numerous Examples and Hints for their Solution, especially designed for the Use of Beginners. By G. Hale Puckle, M.A. (London: Macmillan & Co., 1884.)

WE are not often called upon to notice the *fifth* edition of a school text-book, but now that we have examined this one and compared it with our familiar third edition copy (issued in 1868) we are glad to be able to say that, though new editions have not appeared with the sensational rapidity of some similar works of late, yet with the steady advance in public favour there has been an evident desire on Mr. Puckle's part to bring up his work to the level of other treatises on the subject. Contrasting the two editions, we find there has been an increase from 343 to 379 pages, and not only has there been careful revision, but also an addition of very many articles of interest. It is to be borne in mind that no attempt is made to bring out a work which shall satisfy the requirements of a University man who is "reading high," but the writer's aim has throughout been to write a purely *elementary* treatise on the lines of Dr. Salmon's "Conics." Mr. Puckle rightly acknowledges his great indebtedness to this now classic work, and on the other hand it should be borne in mind that the first edition came out at a time when Salmon was not openly used as a *College* text-book at Cambridge. We are very glad to notice that Mr. Puckle has, in this last edition, adopted the notation of the general equation of the second order, according to Salmon. It is quite time that this notation should be adopted in all our text-books, for it is a needless burden upon the memory to get up the several conic formulæ under different forms. A useful addition has been made to the number of worked-out exercises. A result of the book's having reached a fifth edition is that we have not noted any errata in the text.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

The Cretaceous Flora of North America

IN the abstract of a paper on the above subject by Mr. J. Starkie Gardner in NATURE of September 25 (p. 528), it is stated that "the lowest beds (of the American Cretaceous) are