the ilium; the fact that the posterior sacral is larger than the anterior, showing the enormous power exerted by the tail; the coossification of the 17th and 18th caudal vertebræ, indicating that this was a fixed point when the animal stood upon its hind feet and partly supported itself upon the tail in the tripodal condition; the excessively small neural canal throughout, the probable presence of a pair of clavicles, not hitherto observed in the Sauropoda; the hollow character of the large limb bones.

These skeletons are referred to a new species, *D. carnegiei*, in honor of the founder of the Pittsburgh Museum.

As regards the habits of these animals Mr. Hatcher speaks as follows:

From the above consideration I am inclined toward the opinion that *Diplodocus* was essentially an aquatic animal, but quite capable of locomotion on land. Though living for the most part in the more important rivers and fresh-water lakes, it may not infrequently have left the water and taken temporarily to the land, either in quest of food or in migration from one to another of adjacent bodies of water.

It is not improbable that during the period when these huge dinosaurs lived and flourished over what is now New Mexico, Colorado, Wyoming, Montana and the Dakotas, there prevailed throughout this region physical conditions somewhat similar to those which exist to-day in tropical America and more especially over the costal plain of the lower Amazon with its numerous bayous and islands, or the more elevated valleys of the anterior in the Brazilian provinces of Amazonas and Matto Grosso with their numerous lakes and large rivers surrounded by a dense tropical vegetation with broad, level valleys subject to periodical inundations.

With the beginning of the Cretaceous there began a subsidence over this region, and a great inland sea was formed which gradually encroached upon the habitat of these animals, more and more restricting the area adapted to them, so that at about the commencement of the Upper Cretaceous the entire region formerly occupied by them had become a shallow sea save only certain islands of limited extent, and perhaps otherwise poorly adapted as the homes of such animals as were the *Sauropoda*.

A few years more of such efficient exploration as this and of such remarkably careful field and preparation work promises to give us a knowledge of the osteology of these great Sauropods almost as complete as our knowledge of the skeleton of the recent horse, for example. The author of the present work and Dr. J. L. Wortman, who found the type skeleton, have led the way in these methods of field work.

Henry F. Osborn.

An Introduction to Physiology. By William Townsend Porter, M.D., Associate Professor of Physiology in the Harvard Medical School. Cambridge, Mass., The University Press. Pp. 314.

This small volume contains in a convenient form what is apparently the course of practical physiology given for the past two or three years at the Harvard Medical School. To those who are not conversant with the difficulties that beset the practical teaching of the subject to large classes it may appear surprising that in this matter the large American medical schools should have lagged behind the smaller, in some of which courses of a considerably wider scope than that under review have not only, for the best part of a decade, been available for the advanced student of medicine, but have taken their place among the compulsory subjects of the ordinary curriculum. He, however, who knows how much wise planning and laborious organization —what material, intellectual and even moral resources—are required for the successful conduct of a practical class for a couple of hundred students will be much more ready to congratulate Dr. Porter and the Harvard Medical School on the satisfactory results of their efforts than to criticise them as belated laborers in the vineyard of practical physiology. Nor will the experienced teacher whose circumstances enable him to make free use of mammals as well as frogs seriously blame, however much he may regret, the entire omission of mammalian experiments, except those performed on the students themselves. He will nevertheless note that the lack of this element, so valuable, under proper conditions, in the training of the medical students, renders the book less suited to the requirements of schools of moderate size than would otherwise be the case. On the other hand, for those who are so situated that they can only use frogs, the work may be recommended as a sound guide to the performance of the fundamental experiments in the general physiology

of muscle and nerve. The mechanical phenomena of the circulation are also adequately treated in a series of exercises on an ingeniously constructed artificial scheme.

It would have been better, we think, to omit much of the elementary physics which bulks so largely in some of the chapters. The simple experiments on magnetic induction, lines of force and electromagnetic induction, given in Chapter II., would be in their proper place in a manual of practical physics. We doubt the wisdom of encouraging the medical student to neglect his physics, as he so often does at the period of his preliminary scientific studies, in the sure and certain hope that 'all he really requires,' the titbits of that severe and repellant science—will be served up to him later on in semi-digested form in the course of physiology.

The proofs have been read with commendable care, and few actual errors have escaped detection. On page 188, however, it is wrongly stated that 'in muscle the electrotonic currents are much stronger than in nerve.' The assertion, on page 189, that 'the electrotonic currents are absent in nerves which lack a myelin sheath' seems a little too absolute, although everybody admits that they are weaker than in medullated nerves. On page 250 one is rather staggered by the argument that 'were the slow passage of the blood in the capillaries due simply to friction, the blood would move still more slowly in the veins because the retarding influence of the friction in the viens would be added to that of the capillaries.' This would hold true if the blood possessed only kinetic energy. But since the blood in the capillaries is under a higher pressure than in the veins, there is a surplus of potential energy which is capable of being converted into kinetic.

It is a good idea to encourage the learner to discuss his results by setting him here and there a definite question for consideration. A critical comparison of the isotonic and isometric causes of contraction (pp. 221, 229) affords a valuable mental gymnastic to the student who has just been exercising his manual dexterity in obtaining them. And if Swift could extract an elegant meditation (according to the style and manner of the Hon. Robert Boyle) from so dry a piece of timber as a broomstick, the ingenuous reader will waste no sympathy on the twentieth-century medical student, even when he is requested to tackle a somewhat unpromising theme, to write, for example (according to his own style and manner) 'a critical account of the muscle-lever in his laboratory note-book.'

G. N. I. S.

Theory of Functions of a Complex Variable. By A. R. FORSYTH, Sc.D., F.R.S., Fellow of Trinity College, Cambridge, Sadlerian Professor of Pure Mathematics. Second Edition. Cambridge, at the University Press. 1900. 8vo. Pp. xxiv + 782.

The publication of a second edition of Professor Forsyth's very valuable and comprehensive work on the theory of functions is a matter of no little interest and importance to the mathematical world. The first edition, which appeared in the spring of 1893, was the first extended systematic presentation in English of a field of modern mathematics now generally recognized as the most useful as well as the most fascinating. Furthermore it was the most comprehensive treatise on the subject in any language, treating a greater number of departments, exhibiting a greater variety of methods, and giving more references to important original contributions than any previous work. Its position in all these respects has been modified since only by a single work, the elaborate historical and bibliographical report of Professors Brill and Noether published in the third volume of the 'Jahresbericht der deutschen Mathematiker-Vereinigung.'

The new edition has been enlarged by about one hundred pages. By means of these additional pages and also by omitting about twenty pages devoted in the earlier edition to binomial differential equations, the author has been enabled to introduce an elementary discussion of the birational transformations and to give some account of Abel's theorem and its applications.

In the work of revision many improvements in the details of presentation have been introduced. The author has altered the wording of a considerable number of theorems and demonstrations which before contained slips of one sort or another. The work has thereby gained