

conclusions based upon them. That there is a radical divergence of testimony is evident from the fact that by one school of thought coastal drift is attributed entirely to wave action, and by another to current flow. By the author no doubt is entertained that, as a whole, waves are the more important agency, and in this view of joint action we are disposed to concur.

In dealing with shorelines, the author rejects the German system of numerical notation, and classifies them broadly as submergent, emergent, neutral, and compound, with a cycle of development passing from young to mature and old. Each of the four classes is dealt with at length, and there are apposite examples, illustrated by photographs, charts, maps, and diagrams, which will repay study. Fjords are not recognised as an indication of land subsidence, but are attributed to glacial action, and it is interesting to note the author's opinion that "any careful analysis of the process of marine erosion must lead to the conclusion that marine planation is possible without coastal subsidence."

The book covers a fairly wide area, and is written with the intention of assisting the engineer, the geologist, and the geographer. As affecting the first-named profession, the difficulty of reconciling the conflicting views of so many eminent authorities seems to us almost insuperable. There is scarcely any problem which causes the harbour engineer more perplexity and anxiety than that of forecasting the effect on the shoreline of a structure projecting into the sea, and in the present state of our knowledge—or ignorance—the evidence available is often capable of quite contradictory interpretations. No doubt further investigation will throw more light on this baffling question, but, for the present, it is beset with obscurity.

The volume is an excellent addition to the literature of physiography, and it fulfils a special function in classifying much fragmentary and detached information not readily accessible.

BRYSSON CUNNINGHAM.

MAMMALIAN PHYSIOLOGY.

Mammalian Physiology: A Course of Practical Exercises. By Prof. C. S. Sherrington. Pp. xi + 156 + ix plates. (Oxford: At the Clarendon Press, 1919.) Price 12s. 6d. net.

THE publication of Prof. Sherrington's practical course of mammalian physiology will surely be recognised as an event of first-rate importance for the teaching of physiology and for medical education.

Many teachers must long have felt the limitation imposed by the use of the frog for practically all class-work on living animal organs. The experiments possible to students were restricted to certain aspects of the subject; some were liable to be retained in the course which had mainly historical interest, and others were apt, in unpractised hands, to degenerate into exercises in fine dissection. Nor had the tech-

nical facility thus acquired much relation to the later requirements of the medical equipment.

The introduction into class teaching of the surviving carcass of the decerebrated or decapitated cat effects a great liberation. The student can observe for himself the main phenomena of mammalian function. The technique is in most cases relatively so simple that attention is concentrated on the observation of the result; at the same time, it has real value as an introduction to surgical manipulations.

The course opens with exercises on isolated mammalian plain muscle—intestine, spleen, and artery—and on the perfused heart of the rabbit. They involve no very new departure, but the methods given require simple apparatus only, and are admirably adapted to give successful results in the hands of students. Here, too, as throughout the book, each exercise is given the maximum educational value by the explanatory and historical comments.

From Exercise IV. onwards the decerebrated or decapitated carcass is used. Starting with relatively simple experiments on the arterial blood-pressure, the course leads to more elaborate demonstrations of the effect of nerve-stimulation on the vascular mechanism and the activity of the respiratory centre, of vascular and somatic reflexes, and ultimately, when the requisite dexterity has been acquired, to such relatively exacting experiments as that on the stimulation of pancreatic secretion by secretin. In each exercise the opportunities are fully used for incidental observation of important phenomena, not directly connected with the main object of the experiment.

The student who conscientiously follows this course must emerge with a wealth of experience in the methods of physiological observation, and a vivid apprehension of vital phenomena, which no amount of reading or even of witnessing prepared demonstrations could give. Prof. Sherrington himself points out that the method leaves to the individual teacher a wide choice of valuable exercises, beyond the representative series which he has been able to accommodate within the limits of his course. He opens, indeed, a new vista of possibilities to student and teacher alike.

The value of the book is greatly enhanced by the admirably clear drawings of dissections and apparatus. The records reproduced, nearly all taken from experiments made in the class, give convincing evidence that the exercises are well within the compass of the keen student. The last exercise of all, that on the determination of the opsonic index, seems to lie curiously outside the general scope of the course, and to have no clear connection with the opportunities offered by the brainless mammal. Doubtless experience has shown that its inclusion has some special advantage.

Not only students and teachers, but also those engaged in original investigation, have abundant cause for gratitude to Prof. Sherrington for the care and labour which he has expended on putting his methods and experience at their disposal.

H. H. D.