Size is in fact a consideration of very practical importance. In the present instance everything must be done on a large scale—the excavation of the bones, their treatment on the spot, their transport to the coast and their freight to London. It is obvious that the work must be expensive, and I venture to hope that practical assistance will be given to the Museum, to enable it to continue and to make more complete the work already in progress. The excavation of the site can be carried on, until the end of the present year at least, by means of funds in the hands of the Trustees. It can only be done, however, on a very modest scale, by restricting the number of workers, and their remuneration, to a minimum. Even with this restricted programme it cannot be continued long enough to derive all the results obtainable from the bones which are lying on the surface, or close beneath it, in great profusion. What variety of life is represented by the fossils is at present uncertain, but the consignment just received from Mr. W. E. Cutler, who is in charge, indicates that the bones are in an excellent state of preservation and that they are by no means all of one kind. The extent of the Dinosaurian fauna of Africa has yet to be explored, and it must be remembered that this Continent has constantly yielded fresh surprises in animal life.

The study of African dinosaurs is almost at its commencement, but we know that the material is there, ready to be picked up by any one provided with a sufficiently long purse. Certain friends of the Museum have already sent generous contributions, by means of which a fund of some hundreds of pounds has been raised. It is a very welcome addition to our resources, and it will materially help us to carry out the work more satisfactorily than would otherwise have been possible. It falls far short, however, of our actual requirements, and I appeal for a material enlargement of the fund. Contributions, large or small, may be sent to me at the Natural History Museum, marked " Tanganyika Fund."

SIDNEY F. HARMER.

British Museum (Natural History),
Cromwell Road, S.W.5.

Method of Measuring Deep Sea Tides.

IN a letter to NATURE of April 4 under this heading Prof. R. W. Wood suggests the use of a subsurface buoy as an " artificial island " for supporting recording tidal gauges, in order to study the tidal rise and fall in the open sea. Many readers of NATURE are, of course, aware that a similar contrivance was worked out by Swedish oceanographers more than fifteen years ago, and has been repeatedly used with very satisfactory results, in order to take continuous records of the subsurface currents from points in the open sea off the coasts of Sweden.

A large buoy of half a cubic metre capacity with a net buoyancy of some 300 kgm. is kept submerged at a depth of from five to ten metres below the surface (the depth being fixed so as not to interfere with shipping) by double anchorage, the cables diverging by about 120°. From the buoy one or two recording current meters of the Pettersson type are suspended at the desired depth, taking observations of the direction and the velocity of the current every thirtieth minute for a fortnight without recharging. As many as three such " Ekman buoys " have been used simultaneously at different localities, while the research vessel was otherwise engaged. As the point of suspension, that is, the buoy, is practically without any proper motion, the observations thus obtained are perfectly free from the errors inherent in current observations taken from ships swinging at anchor, and thus the tidal currents as well as the residual current can be computed correctly. A large number of such current observations which have been taken in the course of the last few years are at present being worked up for publication.

For some time it has been the intention of the Swedish hydrographers to use the same arrangement for establishing a kind of submarine hydrographic station in the open sea, the water temperature being taken by thermographs, the horizontal movements by recording current metres, and the vertical movements by means of balanced submarine floats rising and falling with the boundary of the layer in which they float, and recording its vertical movements by means of pressure-gauges, such as have already been used at our coastal stations. By means of two such buoys marked with flag-staffs showing above the surface and anchored some distance apart in the open sea, a base-line can be obtained serving to define the movements of large subsurface drifters marked with small surface buoys, and thus one should be able to follow directly the movements of the water during a tidal period. The rise and fall of the water level should at the same time be studied by means of recording pressure-gauges, and the currents, as usual, by our registering current meters. By means of one or two such mid-sea tidal stations anchored at representative points, and supplemented by continuous observations from lightships, the intricate problems related to the tidal wave in the North Sea might be brought considerably nearer their solution. This scheme, which has been on the Swedish programme for some time, can obviously be carried out only by the co-ordinated efforts of the nations interested.

Regarding the use of the submerged buoy for observations over great depths, no experience has so far been gained, the greatest depths at which it has hitherto been used being about 100 metres. At depths much greater than a few hundred metres, the weight of the anchors and wire-rope required would probably be a serious obstacle. For particulars of the apparatus I may refer to *Svenska Hydrografisk-Biologiska Kommissionens Skrifter*, 5, and Quarterly Journal of the Royal Meteorological Society, June 1914.

HANS PETTERSSON.

Oceanografiska Institutionen,
Göteborgs Högskola.

An Amphoteric Substance in the Radula of the Whelk (*Buccinum undatum*).

THE experiments of J. Loeb ("Proteins and the Theory of Colloidal Behavior," New York, 1922) have shown that the iso-electric point of amphoteric substances is readily determined by staining them with basic or acidic ions or dyes at known hydrogen-ion concentrations. The method has since been applied for the determination of the iso-electric point of the mycelium of Rhizopus (Robbins, W. J., 1924, *Journ. Gen. Physiol.*, 6, 259) and of bacteria (Stearn, E. W., and Stearn, A. E., 1924, *Journ. Bacteriol.*, 9, 463) by staining with dyes.

The radula of Buccinum appears to consist of two zones, a young newly formed part (chitin A) and an older part (chitin B). Passing along the radula, the change from chitin A to chitin B is sudden, though a small portion of chitin A persists in the base of each tooth throughout. The reactions of A and B differ entirely and will be fully dealt with in a forthcoming paper by one of us (T. H. R.).

Radulæ were soaked in buffer solutions of known P_H to which had been added a few drops of a solution