

living phenomena in terms of matter and energy, and who try to regard experiment and observation with strict impartiality. The only difference between such misguided folk and Prof. Elliot Smith's declining band of faithful warriors lies in the belief that the rich harvest of classical morphology would provide more palatable food, for the young, if leavened by a knowledge of physiological facts.

It is depressing to think that a study of living organisms inevitably entails severe morpholophobia and that the only cure is a return to the dead. In spite of anxious and widespread inquiry, I have failed to discover any genuine case of this unfortunate disease; perhaps it only affects the very, very young.

J. GRAY.

King's College, Cambridge.

Ovoviviparity in Sea-Snakes.

MR. SMEDLEY'S note on viviparity in the sea-snake (*Laticauda colubrina*) in NATURE of Aug. 30, p. 312, needs some comment. My statement (which he quotes) that all sea-snakes are viviparous was not a reiteration of that of previous authors, but a confirmation, based upon personal knowledge of the group. In the light of fresh information, however, it requires some qualification.

The recent investigations of Miss Weekes have shown that true viviparity, with the formation of a placenta, first described in *Chalcides* by Giacomini in 1891, occurs in some Australian lizards (*Lygosoma* and *Tiliqua*) and snakes (*Denisonia*), and it would be well in future to restrict the term viviparous to those species in which some form of placentation can be shown to exist. Whether the sea-snakes are truly viviparous or not, is unknown, but that the majority of the species of the subfamily Hydrophiinae produce their young alive is a well-established fact. All the members of that group are strictly aquatic in their habits and never seek the land, and no other form of reproduction therefore seems possible for them. With the *Laticaudinae*, genera with broad ventral shields and partly terrestrial habits, it is different. I have recently examined a specimen of *Laticauda colubrina* with well-developed embryos enclosed in a thin semi-transparent covering, and also an example *Aipysurus eydouxi* with young less well developed and enclosed in a thicker capsule. From their position in the body of the mother it was evident that they were not yet ready for expulsion and that further development would have taken place before they were discharged. These species, therefore, appear to be ovoviviparous.

The eggs laid by Mr. Smedley's snake are no doubt similar to those deposited last month by the same species of snake in the Zoological Society's Gardens in London, and which are—in view of what has just been stated—eggs that have been prematurely laid in consequence of captivity. The fact that they were laid one by one at intervals of a few days, supports this conclusion.

MALCOLM SMITH.

London, Sept. 7.

Measurement of the Heaviside Layer Heights.

If the carrier wave of a wireless transmitter be increasing steadily in frequency, then a given receiving station will in general pick up two waves differing in frequency. One of these waves will have reached the receiver by the shortest path along the ground, while the other will arrive after having suffered reflection at the Heaviside layer. After rectification these two waves will give rise to a beat-note in the receiver. It is possible to arrange that this note shall have an audible pitch, and a determination of the latter may be used to obtain a measurement of the height of the

layer. The resulting method possesses some advantages, such as simplicity, and is besides adapted to the obtaining of continuous records.

In practice, it is not possible to continue increasing the carrier frequency indefinitely, but this difficulty is overcome by alternately increasing and decreasing the frequency many times a second, the rate of increase being constant and equal to the rate of decrease. It is evident that, corresponding to the change over from increasing to decreasing frequency at the transmitter, there will occur at the receiver a short period during which the frequency of the beat-note decreases rapidly to zero and rises again to its former value. The duration of this period must be made small compared with the time during which the beat-note remains steady. This condition is satisfied in practice by ensuring that the time during which the carrier frequency is increasing (or decreasing) shall be large compared with the time difference of the two ray paths.

Preliminary tests of the method have been made, and an audible beat-note has been detected at a distance of seven miles from the transmitter, on a wavelength of 250 metres. The experiments are being continued with improved apparatus. The details of the method, and the results obtained, will be published elsewhere in due course. The work is being carried out under the auspices of the Radio Research Board of Australia.

D. F. MARTYN.

Natural Philosophy Department,

University of Melbourne, Aug. 22.

The Spectrum of Trebly-Ionised Selenium.

THE spectrum of selenium has been investigated (in Prof. Fowler's Laboratory at the Imperial College, in collaboration with Mr. J. S. Badami) from $\lambda 7000$ to $\lambda 700$, using different intensities of discharge, through capillary tubes containing selenium metal or the oxide. Between $\lambda 1400$ and $\lambda 500$ photographs have also been taken in this institute of the spark spectrum of selenium with a vacuum spectrograph designed by Prof. Siegbahn, having a grating of radius 150 cm., at tangential incidence. With the aid of these, the doublet system of trebly-ionised selenium, due to the configurations $4s^2 4p$, $4s^2 4d$, etc., and $4s 4p^2$, has been identified. The characteristic separations are: $4p^2 P_1 - 4p^2 P_2 = 4378$; $5p^2 P_1 - 5p^2 P_2 = 1198$; $4d^2 D_2 - 4d^2 D_3 = 389$, etc. Details of the analysis will be published shortly.

K. R. RAO.

Physical Laboratory,

University of Uppsala, Sept. 18.

British Museum (Natural History): General and Departmental Libraries.

WITH reference to a review, appearing in the Supplement to NATURE for Oct. 4, of the list of place-numbers of societies issuing serial publications contained in the General Library of the British Museum (Natural History), I have been desired to point out that this List, being a General Library List, does not include the more special serials housed in the five Departmental Libraries of the Museum. This would account for the list's apparent weakness in specific branches of natural science, so justly commented upon by your reviewer.

A. COCKBURN TOWNSEND

(Assistant-Keeper in charge of the General Library).

British Museum (Natural History),

London, S.W.7, Oct. 3.

THE preface to the volume noticed does not contain any reference to the five Departmental Libraries; but I accept unreservedly Mr. Townsend's correction of my comments.

THE REVIEWER.