several years used the following arrangement for this purpose.

A small weight is suspended by an iron wire constituting a torsion pendulum. Direct current is sent through this suspending wire and through a magnetising coil which surrounds it. This direct current is reversed in the magnetising coil (or in the suspending wire) in rhythm with the free oscillations of the pendulum. This causes the outside portions of the suspending wire to be magnetised successively along right and left helical lines, and the accompanying changes of length along the lines of magnetisation cause the wire to twist slightly to right and to left with the reversals of current. After several reversals of current the oscillations of the torsion pendulum become easily perceptible. W. S. Franklin.

Physical Laboratory, Lehigh University, South Bethlehem, Pa., April 6.

Wawo and Palolo Worms.

In your interesting note on the palolo worm of Samoa (Nature, March 31, p. 523) an error has crept in about the *wawo* of Rumphius, which is said to be doubtless the same as the Pacific palolo. Thanks to the kindness of Prof. Max Weber, the head of the Dutch Siboga Expedition, that explored the seas of the Malay Archipelago during the years 1899–1900, I had the opportunity of examining a cluster of these worms from Banda, where they are called *oelie* by the natives; especially in the months of March and April, the second and third nights after full moon they are swarming there in great numbers at the surface of the sea.

In the "Rumphius-gedenkboek," consecrated to the memory of the eminent naturalist of Amboyna, who died two hundred years before, which was edited by the Koloniaal Museum at Haarlem in 1902, I published a short description and some figures of this interesting worm. Though, like the Pacific palolo, a member of the family of Eunicidæ, the *wawo* or *oelie* belongs to the genus Lysidice, and is a rather small worm, measuring about 65 millimetres in length. Nearly all the specimens were in a state of sexual maturity, their bodies crammed with sperm or ova, but without showing any epitokal characters; the number of males and females appears to be nearly equal. In our preserved specimens nearly all the colour has vanished, but during lifetime males and females undoubtedly are differently coloured, probably green and red as stated by Mr. van Hasselt, the assistant-resident, who collected the worms. R. Horst.

Museum of Natural History, Leyden.

[The writer of the notice merely followed the original author, Mr. Woodworth, in identifying the "wawo" with the palolo. On referring again to Mr. Woodworth's article, he finds the mode of expression somewhat ambiguous, so that it might possibly bear another interpretation.—Editor.]

The Base of Napier's Logarithms.

In your issue of March 3 (p. 409) I read:—"The base of Bürgi's logarithms is nearly e, and that of Napier's nearly e^{-1}." In the "Encyklopädie der Elementaren Algebra und Analysis," by Heinrich Weber, Leipzig, 1903, p. 108, I read:—"Die Basis der Neperschen Logarithmen stimmt also sehr nahe mit der Zahl e überein."

Can your reviewer kindly explain on which side lies the truth? Adolfo Bossetti.

Turin, Italy.

What Napier actually gives in his table is a series of natural sines with a corresponding series of logarithms which diminish as the sines increase. If a Napierian logarithm is considered to be the logarithm of the sine opposite to which it stands, the base is approximately e^{-1}; but we may, if we like, regard the logarithms as logarithms of cosecants, and the base is then approximately e. Or again (as in "Encycl. Brit.," xvii., 179) we may take Napier's sines as actual integers, and use log Nap n for the logarithm placed opposite n in the table; then we have approximately

$$\log \text{Nap}\ n = 10^7 \log_e (10^7/n).$$

Thus opposite 5000000, which is entered as the sine of 30° to radius 10^7, we have a logarithm which, read as an integer, is approximately $10^7 \log_e 2$. Inspection of Napier's table gives more information than any brief description can do; as will be seen from what has been said, the definition of a Napierian logarithm and of its base depends to some extent upon how we translate his phraseology into modern notation. G. B. M.

BORINGS INTO A CORAL REEF.[1]

The work before us consists of a series of reports by different authors in connection with the three expeditions that were sent to Funafuti in 1896, 1897 and 1898. Their object was to obtain by boring a vertical core of at least 100 fathoms from the rock of a typical atoll, to settle, if possible, the vexed question of its formation. Naturally the different parts of the work are of unequal value. Indeed, all must be regarded as of quite subsidiary importance to that on the core, and are of interest mainly in so far as they throw light on its composition.

Little modern scientific work shows a better record of determination and thoroughness than this. The first expedition under Prof. Sollas was a failure, but the experience gained in its two borings of 105 and 72 feet made possible the subsequent success of the later expeditions, and the reports of its members threw a flood of light on the atoll itself, its fauna and flora. The most valuable direct result was the production of a chart giving a more thorough and detailed survey of an atoll than had ever before been attempted. The great care exercised by Captain Field and the officers of H.M.S. *Penguin* in this work has made feasible, by a re-survey of the atoll in a few decades, a comparison to show the changes that are at present in progress. To it we owe the possibility of the detailed geological survey of the atoll by Prof. David and Mr. Sweet (Section v.), which will be of material assistance for the same purpose. The magnetic survey, too, worked out by Captain Creak (Section iii.), by pointing out in the areas of greatest disturbance the probable positions where magnetic rocks might nearest approach the surface, suggested the idea of driving a boring down through the bottom of the lagoon, subsequently brilliantly carried out by Mr. Halligan with the aid of the captain and officers of H.M.S. *Porpoise* (Section vii.), Fig. 1.

The second expedition carried the bore to 698 feet, but was unsatisfactory in view of the small amount of core obtained. It, however, completed the geological survey of the islets. Finally, the third expedition drove the same boring beyond 1100 feet, the greater part of its core being almost continuous, and put down a second in the lagoon to a depth of 245 feet from the surface. Collections were also made from the outer slopes to 200 fathoms, and the biology of the atoll was studied by Mr. Finckh (Section vi.).

The latter section is, perhaps, the least satisfactory part of the whole report, mainly because the examination of the core suggests so many questions to which no answer is given. Its most interesting observations are those on the rates of growth of various organisms, a mass of Halimeda three inches in height and thickness in six weeks being quite remarkable. Attention is directed to the barrenness of the eastern or windward reef as compared with the western or leeward reef. No explanation beyond that of an "epidemic" is afforded, though whether any is necessary beyond the known effects of sediment on coralline life and the undercurrents on exposed reefs, both far more important to windward, is doubtful. The section gives

[1] "The Atoll of Funafuti." Being the Report of the Coral Reef Committee of the Royal Society. Pp. xiv+428; illustrated, and with 19 geological maps. (Published by the Royal Society.)