

Prof. Alex. Agassiz must have strangely misread that paragraph in my lecture in which I refer to the two deepest soundings of the *Tuscarora* if he supposes that I intended to cast any doubt upon their trustworthiness as indicating "depths considerably exceeding 4,000 fathoms." In the Official Report, now before me, these two soundings are thus recorded:—

"No. 15: 4,643 fathoms. No specimen (of bottom). Wire broke. Bottom not reached.

"No. 33: 4,655 fathoms. No specimen. Wire broke."

As there is no mention in the second case of the wire having broken in reeling-in (which is stated in several other cases), and as the length of wire run out corresponded almost exactly with that run out in the first, it was not unnatural that I should suppose that the wire broke by its own weight without reaching bottom. But I expressly cited these two soundings, incomplete though they were (no specimen of bottom having been brought up), as evidence in support of my case that those "gigantic pit-holes," in which extraordinary depths have been encountered, occur in regions of great Volcanic activity.

56, Regent's Park Road, WILLIAM B. CARPENTER
N.W., April 27

Seeing by Electricity

WITH respect to the letter of Messrs. Ayrton and Perry (*NATURE*, vol. xxi. p. 589), in which they propose to utilise for this purpose Dr. Kerr's discovery of the rotation of the plane of polarisation of light reflected from the pole of a magnet, will you allow me to give you some details of a repetition of Dr. Kerr's experiment which I made a year or two ago.

I used an electromagnet consisting of an iron bar 2 feet 4 inches long and 2½ inches diameter, surrounded by 70 lbs. of wire, and excited by ten Grove cells.

The total double rotation produced, not by slightly altering the resistance, but by reversing the current, was never more than 26' (twenty-six minutes of arc).

To see this at all with a very delicate Jellet analyser, it was necessary for the observer to increase the sensitiveness of his eye by sitting in total darkness for some ten minutes before each observation.

Your readers can judge what chance of obtaining visible changes of illumination there would be with "little" magnets and mere variations in a current not powerful enough to fuse a selenium resistance.

J. E. H. GORDON
32, Elvaston Place, Queen's Gate, S.W., April 22

Ophiolepis mirabilis

THE statement concerning Prof. Martin Duncan's *Ophiolepis mirabilis* contained in the review of Prof. Lyman's account of the *Challenger* Ophiurans was not intended to represent an expression of opinion of the Reviewer upon the matter, but simply the conclusions of Prof. Lyman as expressed in the memoir under review. The matter was not cited as a question of mistake, but of difference of opinion between two experts. Prof. Lyman enters, in the memoir referred to, at some length into his reasons for considering Prof. Duncan's species, as described, to be a true *Ophiopholis*. This latter genus Prof. Lyman thinks quite remote from *Ophiolepis*, in spite of the evidence adduced by Prof. Duncan. I am sorry that I did not make it clear that I was citing Prof. Lyman's opinion and not expressing any judgment of my own.

THE REVIEWER IN QUESTION

The Ōmori Shell-Heaps

DESIRING as much as possible to save space and avoid rhetoric, I shall be content to reply to the pith of Prof. Morse's amusing diatribe contained in *NATURE*, vol. xxi. p. 501, principally by citing extracts from a recent paper on Prehistoric Remains in Japan, read by Prof. Milne before the Asiatic Society of Japan, and printed, together with a report of the discussion it gave rise to, in their *Transactions*, published in February last, which I received about a fortnight ago.

The main object of my note in *NATURE*, vol. xxi. p. 350, was to show that the antiquity claimed by Prof. Morse for the Ōmori mounds was not warranted by the facts. In this view I am supported by Prof. Milne, Dr. Faulds, and Mr. Aston, whose united authority I venture to prefer to that of the Salem zoologist.

Prof. Milne examined a number of shell-mounds in various parts of Japan, both in Yezo, where the Aino race still flourishes,

and in the main island, including the Ōmori heaps, but he does not mention having met with any human remains in any of them. Adverting to Prof. Morse's conclusions from his examination of the Ōmori shells, which may be briefly presented thus:—

That changes have taken place in the relative abundance, size, and proportions of certain species and in the extinction of certain species,

Prof. Milne quotes from the Memoir: "The modification in the relative size, &c., is profound, and seems to indicate" either a shorter period of species-variation than is commonly admitted, "or else that the deposits presenting these peculiarities have a much higher antiquity than had before been accorded them." Prof. Milne (but then he is merely a "Briton in Japan," and *quâ* such disposed, doubtless, in the eyes of Prof. Morse, to sneer at everything Japanese, shell-mounds included) is inclined to think these modifications "in great measure due to the great changes which have been taking place in Yedo Bay during recent times." The italics are Prof. Milne's. "... The bay is rapidly silting up. . . during the last 800 years large cities have sprung up round its shores, all of which have added something to destroy the purity of its shallower waters. All these causes combined are and have been making changes in physical conditions, and with them we should naturally expect a rapid change in the faunæ which are dependent on them." Further on a map is given showing the ancient coast lines at and near Yedo, and proving the magnitude and rapidity of the various successive encroachments of the shores upon the waters of the bay.

Again, "The conclusion to which I am led with regard to the shell-heaps is that they are of Aino origin . . . the positions which these shell-heaps occupy are on spots which we know . . . were once tenanted by Ainos, and even down to the end of the twelfth century Ainos were living in Nipon." By Nipon is meant, I presume, the main island. I may add that I have often heard from Japanese of Aino colonies still existing in the north-eastern districts of the main island, but not distinguishable by language, or customs, or otherwise than physically from their Japanese neighbours. The average advancement of the land at and near Yedo, Prof. Milne states as varying from 38 feet to 2 feet per annum, which would account for the present distance of the Ōmori heap from the shore being attained in from something under 100 to something over 1,000 years. Mr. Aston, in the course of the discussion which followed the reading of Prof. Milne's paper—I quote from the report in the *Transactions*—"was glad to observe a tendency to diminish the antiquity which had been earlier assigned to these remains (from Ōmori) by some of the writers on the subject. Civilisation in Japan is a product of much more recent growth than in Europe, and we do not require to go so far back in order to meet with tokens of a primitive degree of advancement." Mr. Aston then showed that in the middle of the eighth century a large portion of the main island was exclusively Aino. Dr. Faulds assigned "600 years as the probable antiquity of the Ōmori heap," and Prof. Milne in reply said that the rise of land variously evidenced round Yedo Bay, "taken in conjunction with the vast deposits of silt which are brought down by the various large rivers which flow into the bay, would make the changes in coast-line exceedingly rapid."

With regard to the pottery of the Ōmori heaps, Prof. Milne says: "The designs are in very many instances similar to the designs which are carved by the Ainos of the present day." On this point Dr. Faulds's testimony is more emphatic. "The 'mat' impressions figured by Prof. Morse in Plate V. Fig. 1, are to be found repeated in the most recent pottery;" the types of pottery in the shell-heaps did not seem "to be separated by any one well-marked character from contemporary pottery of a low grade. The shell-heaps scattered along the old and recent coasts of Yedo Bay presented in their fragments of pottery a series of modifications leading up to recent times, and some of the heaps may be seen in actual process of accumulation." Further, Mr. Ninagawa of the Tokio Museum, the principal authority on the subject of Japanese pottery, decides that the "remains . . . cannot be older than 1,000 years." Dr. Faulds showed some coarse pottery of the day not dissimilar to that of the shell-heaps, and was not even prepared "to accept finally the belief that the Ainos were the founders of these heaps."

From personal investigation of many remains of shell-heaps on the coast-line and inland between Yedo and Yokosuka, I can corroborate Dr. Faulds's statement. I do, however, believe that the heaps at Ōmori were the handiwork of Ainos, very

possibly after they had come into contact with the Japanese, though some of the other heaps I have seen were undoubtedly raised by the Japanese themselves; in a few cases they appeared of quite recent accumulation.

Great stress is laid by Prof. Morse upon the platycnemic tibiae found in the heap. But platycnemic tibiae, as Prof. Milne well points out, are characteristic of the Aino race, and, I believe, though I cannot put my hand upon my authority, of other low-type existing peoples.

The "extraordinary blunder" the usual "Japanese gentleman" has with patriotic promptness reproved me for making I cannot notice, for I have not hitherto seen any statement or correction of it. But in saying that the eastern portion of the main island was probably peopled by an Aino race up to the fourteenth or fifteenth centuries, and in asserting that Yedo was not founded until the close of the sixteenth century, I was not strictly accurate. The most valuable information to be extracted from native works is to be got at by reading between the lines, and, following this system, I have for my own part arrived at the conclusion that, up to the thirteenth or fourteenth centuries at all events, the country east of the Rokugo River was peopled by a mixed Aino and Japanese race, whom I believe to have been the builders of the mounds. Ōta Dōkuwan erected a stronghold upon the site of the present castle of Yedo about the middle of the fifteenth century, but the *Yedo Meisho* (cited by Mr. McClatchie, in his paper on the Castle of Yedo, *Tr. Asiatic Soc. Japan*, vol. vi. part 1) tells us that up to the end of the sixteenth century it "was merely a small fortification" overlooking, doubtless, an inconsiderable town consisting of a mere aggregation of villages. Iyeyasu made it his capital about 1590, and gave to the city the apt name of Yedo, or Door of the Rivers. What Prof. Morse means by charging me and "so many of" my "countrymen" with "the wilful blunder of calling the principal city of the empire by its wrong name" I cannot imagine. Does he find in the practice some covert "sneer" at things Japanese on the part of the "ordinary Briton"? Then is the "extraordinary American," who sheds upon Salem its due supply of zoological light, guilty of the same offence, for in his memoir he talks of "the bay of Yedo," "maps of Yedo," &c. The fact is the expression "Tōkiō," invented by the successful party after the Revolution of 1868, would have been unrecognisable by many readers of NATURE. Again, Yedo is a Japanese word, and is the name of the city; Tōkiō is a mispronounced Chinese compound, meaning "eastern capital," and is, properly, a mere official designation. So under the Shōguns Yedo was often called by various Chinese styles, but never lost its name of Yedo.

My belief that the mounds were swept away was founded upon a statement to that effect I saw in a Japanese newspaper since leaving Japan, after many years continuous residence, in January, 1879. But whether my belief was right or wrong, I fail to understand how its expression could raise such ire in Salem. I sincerely trust that my inadvertence in not recognising the last plate of the memoir as a copper one will be forgiven.

Lastly, Prof. Morse complains of my review, as he terms my brief note on his memoir, being written in some "spirit" which he does not "now heed." This is deplorable, for it was written simply in the "spirit" of truth.

The question of cannibalism is discussed in Prof. Milne's paper in a most interesting manner. I would gladly give a *résumé* of his remarks on this portion of the subject, and answer some points I have left unnoticed both in the memoir and Prof. Morse's letter, but I fear that I have already trespassed terribly upon your space.

F. V. DICKINS

Arts Club, April, 1880

The Destruction of Insect Pests by Application of Yeast

THE article on the destruction of insect pests, &c., in NATURE, vol. xxi. p. 447, by Mr. E. R. Lankester, contains statements upon which I beg to make some remarks:—

"Prof. Hagen has called attention to the old practice of destroying greenhouse pests by the application of yeast."

It is very interesting to me to hear that this is an old practice. I had never known it, and would be glad to receive any notice where it is published. In the many letters which I received since the publication of my pamphlet, nobody has mentioned that the use of yeast against greenhouse pests is a well-known remedy. Mr. Hovey, for fifty years the editor of the *Magazine of Horticulture*, assured me that he never heard of it. After it was suggested by me last year, the application of yeast has proved to be successful against Aphides.

"He imagines that the yeast-fungus enters the body of the insect on which it is sprinkled, and there produces a growth which is fatal to the insect-life."

For the experiment with potato-bugs, published in my paper, 100 beetles collected the same day and in the same place were divided into two parcels, and both kept in the same room. One parcel was sprinkled on three or four successive days, and most of those beetles died on the eighth day, the last one on the twelfth day. Of the other parcel all but three were alive and bright six weeks later, and more than 50 per cent. lived through the whole winter. I found in the dead ones, which had been sprinkled with diluted yeast, in the large sinus of the wings, spores of a fungus in quantity. The spores resembled those figured by Dr. M. Reess,¹ Plate I., Fig. 15, *ed.*, and were so numerous and so distinct that I could not have been deceived, the more as I am familiar with the anatomy of insects and with the blood-fluid and its contents. Not having studied, myself, fungi, I can only state that, after the beetles having died in a manner which showed manifestly an infection, I discovered cells in the blood-fluid which certainly are not to be found in the blood-fluid of unpoisoned insects, and which are similar to the figured ones.

It is a fact corroborated lately by Mr. A. Giard that a few spores of a poisonous fungus in a comparatively large quantity of water are sufficient to be propagated in caterpillars, which are sprinkled with such water. There is no doubt that a mash-tub into which a diseased insect has once fallen will keep up a sufficient supply. Nevertheless when such spores are so common in mash that Dr. Bail, in using brewers' yeast, succeeded in numerous experiments, and that here the use of dry top-yeast, as well as the use of compressed bottom-yeast, gave the same successful results, I believe that it is of no particular avail to cultivate artificially *Isaria* spores in beer-mash. The recommendation to use simply yeast would be sufficient, and so it was given by myself: "The general result of the most accurate investigations of the beer-yeast fungus is entirely opposed to the notion that it can enter an insect's body and produce a disease." I am perfectly unable to find the publications alluded to, which, of course, would settle the question at once. Nothing in the size and the form of the spores would prevent them from entering the body.

The ingenious suggestion of a collection and cultivation of an insect's disease-producing fungus was made and published in 1874 by Dr. John L. Leconte, from Philadelphia.

Cambridge, Mass.

H. A. HAGEN

Recall of Sights and Tastes

I THINK the following two facts, from my own personal experience, may be of some interest to Mr. Francis Galton.

1. In 1875 I was appointed by the Venezuelan Government to organise the library of the University in this city. The collection contained then about 8,000 different works, which I arranged and numbered on their backs, having no assistant but a servant for the rough part of the labour. Since that time I have been head librarian, it being my duty to be at the library on all mornings, Sundays excepted. It is natural that I should therefore know the place of every book on the shelves; but in the case of the more important works, as soon as the title is mentioned I am able to recall to my mind the exact appearance of the books, with their corresponding numbers, the lettering being however much less distinct. It is no case of memory; for I cannot say what book is to be found under a certain number; I must first have the image of the book, and afterwards I read its number, as if it were actually before my eyes. A considerable part of later additions to our library was numbered by the assistant librarian, as amongst these books there are but few which I can recall to my mind in the manner described.

2. In Mérida (a western state of Venezuela) the people use a substance called *chimo* (pronounce *cheemó*). It is made with the juice of tobacco, inspissated to the consistency of syrup, and mixed with powdered *urao*, or sesquicarbonate of soda, from a small lagoon near the village of Lagunilla, not far from the town of Mérida. The *chimo* is black, and kept in small boxes made from the horns of cattle. When used a small quantity is put into the mouth outside the gums, where it is slowly dissolved by the saliva, and then swallowed down. Being myself pretty well accustomed to smoking cigars, I once felt desirous to try

¹ "Botanische Untersuchungen über die Alcoholgährungspilze," von Dr. Max Reess. (Leipzig, 1870.)