

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 tibias found in the heap. But platycnemic tibias, 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.)

this singular mixture, but with so bad a result that from that time (nearly four years ago) the mere recollection of the experiment produces again not only the indescribably nasty taste of the *chimú*, but sometimes even the vomiting, which was the end of my first and only attempt to use this luxury of the *Merideños*. And for this very same reason I hasten to put an end to this note.

A. ERNST

Caracas, March 18

Anchor-Ice

THE formation of anchor-ice has attracted a good deal of attention in Upper Canada, although I am not aware of any efforts having been made to describe theoretically the cause of its formation. Prof. H. V. Hind, some time of Toronto, alludes to it in a paper read before the Geological Society (*Proc. Geol. Soc.*, xxi. p. 128), and I believe the late Sir Wm. Logan, director of the Canadian Geological Survey, also brought the matter before the same Society, though I cannot trace up the paper, and Mr. Keefer, C.E., of Ottawa, read a paper on this subject before the Canadian Institute (*Canadian Journal* (new series), vii., p. 173, 1862).

The conditions under which anchor-ice forms appear to be those mentioned by Dr. Rae, as far as my own observation goes, and Prof. Hind remarks, in the paper alluded to, that it is not uncommon for the seat-nets off the Labrador coasts to be frozen, in water as deep as 60 feet, and that the andhows of these nets frequently bring up masses of frozen sand. The most interesting question in connection with this subject seems to me to be, Does the ice form, from the precipitation of the very minute ice-particles, in passing over the rapids, or does the intense cold of the ground favour the formation of *raze*, as it is locally called, independently of the floating ice-particles passing over the stones? I have never known it to form on clay or alluvial bottoms.

There is another form of anchor-ice to be found in the great northern lakes, which floats in large sheets at a considerable depth under the surface of the water. During the construction of a large breakwater on the Georgian Bay I had a great deal of trouble from large floes of this ice, which seemed to be floating in layers at various depths in water 14 feet deep. The local opinion was that this ice was formed on the extensive rocky shoals which abound on that coast, and more particularly in the neighbourhood of the work on which I was engaged, and that the floes became detached by storms and the hammering of the surface-ice upon them. Whatever may have been the cause of their formation, they were very destructive in their force upon the timber caissons which were being sunk.

Edinburgh, April 22

ALAN MACDOUGALL

THE SONGS OF BIRDS.—D. W., of Freiburg im Breisgau, writes that Mr. C. C. Starling (*NATURE*, vol. xxi. p. 590) will find an elaborate paper, "Ueber Vogelstimmen, &c." (especially on their musical properties, with many notes), by Prof. Oppel, of Frankfurt-on-Main, in the monthly journal *Der zoologische Garten*, February, 1871 (vol. xii. No. 2), published by the Zoologische Gesellschaft of that place.

GEOLOGICAL SURVEY OF THE UNITED STATES

IT is now about a year since the Congress of the United States took seriously in hand the question of the national scientific surveys and made a complete reorganisation of them, consolidating the geological work into one general Geological Survey of the United States, under Mr. Clarence King as director. Some time had necessarily to elapse before much fruit could be seen from the new tree. It was especially needful in the first place to justify the large expenditure of money required for the organisation, by showing that not merely pure science, but the industrial and commercial interests of the country were materially aided by the Survey. Consequently while ordinary geological surveying has not been neglected, the chief strength of the staff has been expended upon economic geology, and more especially on the deposits of iron, lead, silver, and gold. Some of the great mining districts of the West have been very carefully explored,

and the results will be embodied in the Annual Report. It is understood that Mr. King's general plan is to arrange his forces in two divisions, one charged with the investigation of the economic geology, the other with general geology or the geological map. The second division will no doubt be mainly engaged in the Western States and Territories, which will be parcelled out into large districts each under a special officer. Thus there will probably be a corps placed on the Pacific slope, another on the Great Basin, a third on the Plateau country, and a fourth in the eastern mountain ranges, or Rocky Mountains proper. But besides this general distribution of the staff there is an intention, we believe, to devote attention to special problems further east, and, in a most liberal and thoroughly scientific spirit, to employ for their study the best geologists who can be found in these regions to undertake the duty.

Rumours of this last branch of Mr. King's scheme have been rife for some months past in the Eastern States; and, like most rumours, they have doubtless exaggerated the true state of the case. In a recent number of *NATURE* (vol. xxi. p. 197) attention was directed to his alleged proposal to extend the operations of his staff not only over the Western Territories and other parts of the public domain, but also over the Eastern and long-settled States. In spite of the serious and emphatic protest made by Prof. Dana against this proposal, we spoke of the proposal itself as a kind of joke, meant chiefly to flutter the geologists of the East, but with no serious thought of claiming in any way jurisdiction in the Eastern States. It appears, however, that the Director, in answer to official inquiries, has written a letter, which has been laid before the Senate by the Chairman of the Committee on Appropriations, to be printed in connection with a joint resolution authorising the extension of the Survey. In this letter he states that the Survey as at present constituted, being understood to be limited in its application to the national domain or public lands, cannot possibly present a general exposition of the mineral resources of the whole country, and that in spite of its labours for their enlightenment, "the people of the United States must remain ignorant of the extent, nature, and broad practical relations of their mineral possessions." He therefore insists on receiving from Congress authority "to work over the whole United States and to study its whole economical geology," summing up his arguments by declaring that "briefly and finally, in my belief, the question of the passage or defeat of the resolution under consideration is the question whether it is or is not desirable and needful for the people of the United States to thoroughly know the nature, extent, and uses of their mineral possessions."

In Mr. King's view the work of his Survey should be to collect statistics of the annual output of minerals, to publish a yearly volume giving full information of the progress of the mineral industries, "to actually and directly aid in their development," "to promote the wise and guarded influx of foreign capital," and generally to study the mineral wealth of the country in its extent, in the relations of one kind of deposit to another, and in the relations of all the deposits to industrial and commercial progress.

Mr. King no doubt knows intimately the temper of Congress, and understands precisely the tactics to be pursued to get from that body an appropriation of \$340,000. He is aware that he will be much more likely to gain his end by showing that he can augment the number of dollars in the national exchequer than by trying to persuade the legislature to believe in the importance of discovering the southern limits of the Northern Drift. He must be allowed to be a better judge of how to get a large vote from Congress than any quiet on-looker here can pretend to be. Yet even from his own point of view there are some aspects of his letter to which, with all deference to his well-known tact and