DISCOVERY OF A SKELETON OF ELEPHAS ANTIQUUS *AT UPNOR, NEAR CHATHAM.*

THREE or four years ago a party of Royal Engineers was digging a trench on the banks of the Medway at Upnor, opposite Chatham Dockyard. In the course of their work they came across a number of large bones, some of which were destroyed together with a tusk of great size; at this point they suspended operations. Some time later Mr. S. Turner, of Luton, was collecting flint implements in the neighbourhood and picked up some pieces of bone, which he sent to the Natural History Museum for identification. One of these pieces was recognised as being a carpal bone of a large elephant, and in the autumn of 1913 it was decided to examine the spot in the hope that further remains would be found. From this examination it became clear that a considerable portion, at least, of the skeleton of a very large elephant still remained buried in the clay, and a few bones, including an enormous axis vertebra, were collected. The weather then becoming very wet, operations were discontinued and, for various reasons, not resumed till the past summer. Then, after arrangements had been made with the military authorities, the work of excavation was renewed, and was carried on until there was no hope of further discoveries.

FIG. 1.—Section at Upnor showing chalk below with Thanet sands above; the alluvium in which the bones occur was deposited against these. The actual spot where the skeleton was found is at the far end of the section.

The bones were in an extremely fragile condition, and in many cases were so near the surface that they were perforated by the roots of the vegetation growing above them and by worm-burrows. The method of extraction is shown in Fig. 2. The upper surface and edges were first exposed and then completely covered with a series of strips of coarse canvas dipped in plaster of Paris; next the specimens were undercut and turned over, when the encasing process was completed. This work was skilfully carried out by Mr. L. E. Parsons, jun., and thus a large part of the skeleton was safely removed.

The chief portions collected are a tusk about 8 ft. long, portions of the skull and mandible (very imperfect) with one lower and two upper molars in very good condition, numerous vertebræ, and sufficient limb bones of one side or the other to render it possible to restore the fore- and hind-legs almost completely. The teeth indicate that the animal is *Elephas antiquus*, and the discovery is of especial importance because this is the first instance, in this country, at least, in which teeth and a great part of the skeleton have been found in association. Hitherto there has always been uncertainty as to whether bones found were certainly those of *E. antiquus* or not; now it will be possible to give a nearly complete account of the osteological characters of that species.

FIG. 2.—Showing an os innominatum and a femur in process of extraction.

The limb bones indicate that the animal was of enormous size, comparison with bones of an

African elephant of known height showing that it probably stood 15 ft. at the highest part of the back. Thus the humerus is 4 ft. 4 in. in length, while the humerus of an African elephant said to have been 11 ft. 4 in. high is a foot less. The beds in which the bones were found consist of a series of sandy clays and tough clay with numerous flints, much race and ironstone. These were deposited against the side of a slope composed of chalk below and Thanet sands above (Fig. 1). Their exact age is doubtful, but probably they are nearly contemporary with the bone-bearing beds of Grays or perhaps earlier. The molar teeth seem to have belonged to an early form of *Elephas antiquus*, and closely similar to some discovered at Mosbach.

During the excavation the military authorities gave every possible assistance, and without their help the work would have been much more difficult, if not impossible. The specimen has been presented to the British Museum by the War Department. The bones are now being freed from their wrappings and hardened, but it will be some time before they will be ready for exhibition.

CHAS. W. ANDREWS.

BACTERISED PEAT AS A FERTILISER.[1]

THE horticultural world has been interested for some years in Prof. Bottomley's attempt to prepare a new fertiliser from peat. The reasons for that interest are manifest: farmyard manure is constantly increasing in price and decreasing in amount; and artificial fertilisers, excellent auxiliaries though they be, cannot impart to the soil those physical properties without which plants do not thrive.

The market grower, accustomed to raise heavy crops on land treated with enormous dressings of manure—100 tons or more to the acre—is only too anxious to discover other and less costly means of enriching his soil; and even the general public—if we may judge from the attention which is being bestowed in the daily Press on Prof. Bottomley's discoveries—is alive to the importance of increasing the fertility of the land. Hence the spirit of the soil manifests itself opportunely in conjunction with the spirit of the times. It purports to reveal the mystery of the mode of action of bacterised peat—the fertiliser which Prof. Bottomley prepares from peat-moss litter and from certain kinds of raw peat.

Mr. Knox, the author of this volume, has done his work well. He tells his story graphically yet simply, although in chapter ix., entitled "Elementary Conceptions of Chemistry, etc.," he showers a rain of atomic bombs on the reader with such effect that that much-enduring person will doubtless seek cover in the next chapter.

Briefly, this is the story that Mr. Knox has to tell. Certain aerobic bacteria possess the power of liberating from peat large quantities of soluble humates. These soluble humates are in themselves of service to plants as sources of food. They serve, moreover, as a culture-medium in which nitrogen-fixing bacteria—azobacter chroococcum, etc.—multiply rapidly. Hence by adding cultures of nitrogen-fixers to sterilised humated peat, the amount of nitrogen in the latter is increased.

It was to this large nitrogen content that Prof. Bottomley originally attributed the fertilising powers of bacterised peat. Tests carried out at Kew on many different kinds of greenhouse plants—lilies (see Fig. 1), cyclamen, coleus (see Fig. 2), primulas, etc.—indicate in most striking manner that the addition of bacterised peat to a potting compost brings about a great increase of growth and vigour. The amount of bacterised peat (or humogen, as it is sometimes and somewhat inconsequently called) which produces these results is about 10 per cent. of the total compost.

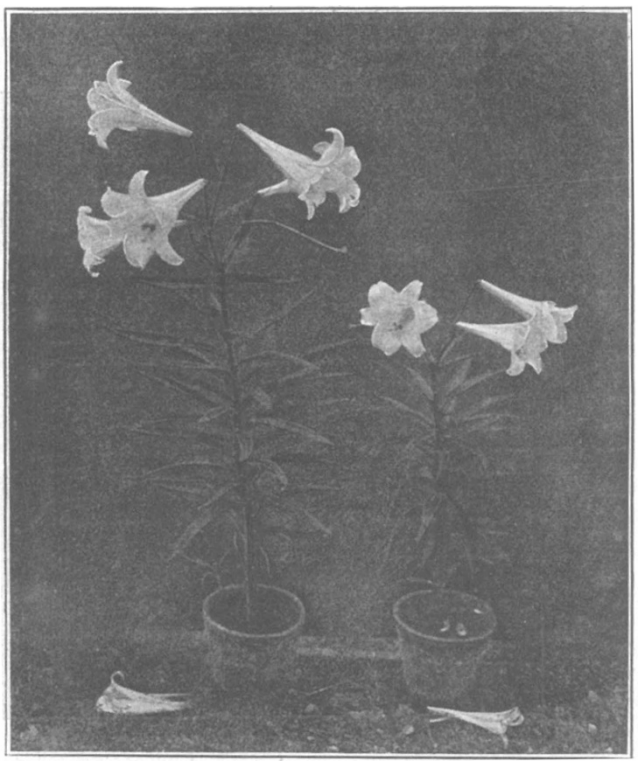

FIG. 1.—The left of the two lilies shown in the illustration was grown in humogen and ordinary soil, while that on the right was grown in a complete food compost. The average number of blooms on the batch (48 size pots) was six as against four, and it should be noted that this is the common effect of humogen treatment on bulbs. (The Royal Gardens, Kew). From "The Spirit of the Soil."

Anyone who takes the trouble to reckon what 10 per cent. means in tons per acre will recognise that, unless far smaller dressings of bacterised peat may be used, this fertiliser cannot be applied with success to field crops; and indeed, in certain field experiments which we have witnessed the addition of dressings of bacterised peat at the rate

[1] "The Spirit of the Soil." By G. D. Knox. Pp. xiii+242. (London: Constable and Co., Ltd., 1915.) Price 2s. 6d. net.