In the lower jaw, owing to the difficulty of interpreting the conditions, it was not certain whether there were representatives of five or six teeth in front of the premolars. Presuming there were five, the large functional incisor of the adult was the fourth of the series. As in the upper jaw, there were four premolars and one molar, the second premolar not fully developing. There were evidences of vestigial predecessors to the large lower incisor and to pm. 4.

The following points of histological interest were noted:—

(1) The heaping up of the epithelium along the alveolar margins, a character often supposed to be peculiar to the Ungulates.
(2) The precocious development of the enamel.
(3) The compactness of the stellate reticulum of the enamel-organ.
(4) The abundant evidence of blood-vessels within the enamel-organ, thus confirming the observations of Poulton and Howes in the Rodents. The opposite opinion is usually held.
(5) Some slight evidence in support of the fusion of enamel-organs. Such fusion has been recorded in the fishes and reptiles, but not hitherto in mammals.

2. Professor J. P. Hill, D.Sc., communicated a paper by Dr. R. Broom, C.M.Z.S., "On the Structure of the Skull in Cynodont Reptiles." The author, after a study of all the available material contained in the British and South African Museums, gave a detailed comparative account, illustrated by a series of figures, of the morphology of the skull in the chief genera of the Cynodontia, including *Bauria*, *Nythosaurus*, *Cynognathus*, *Trirachodon*, *Gomphognathus*, *Diademodon*, *Sesamodon*, and *Melinodon*. He also discussed in some detail certain peculiarities of the Mammalian skull, apparently derived from a Cynodont ancestor.

3. Dr. C. W. Andrews, F.R.S., F.Z.S., read a paper "On a New Species of *Dinotherium* from British East Africa". The specimens described were sent to the British Museum by Mr. C. W. Hobley, Commissioner of Mines for British East Africa. They included portions of the mandible with teeth, a calcaneum, and a patella of a small species of *Dinotherium* nearly allied to *D. cuvieri*, from the Lower and perhaps Middle Miocene beds of France. The new species, which he proposed to call *Dinotherium hobleyi*, differed from *D. cuvieri* in several particulars—e.g., the inner anterior column of pm. 3 was more distinctly developed, and the talon of m_3 had a distinct tubercle on its inner side. Remains of Rhinoceros, a giant Tortoise, *Trionyx*, and Crocodiles also occurred. The bones were well preserved in a tough clay, and further collecting would no doubt yield important results.

CORRESPONDENCE.

LAND-ICE HYPOTHESIS.

Sir,—In the May number of the Geological Magazine, p. 238, the Rev. Osmond Fisher calls attention to the evidence he has seen of disturbances in the rocks below boulder-clays, and suggests that the

subject is one worth investigation. With this view most geologists will agree. Such disturbances not only affect the rocks upon which the boulder-clays rest, but are to be found in all kinds of glacial deposits as well. Roughly speaking they may be classified as follows:—

1. Disturbances caused by tree roots.
2. The creep of the soil down slopes.
3. Vertical arrangement of pebbles near surface of ground.
4. Creep of soil-cap caused by masses of consolidated snow on slopes.
5. Dragging along of all kinds of deposits by glaciers moving over them.
6. Ploughing up of deposits by the snouts of glaciers or by stranded icebergs.

Granting that the contortions so frequently seen may have been formed in the several ways enumerated above would it not be a great step in advance if means could be found whereby the different kinds could be distinguished?

1. Roots of any size seldom penetrate very deep, but they spread out from the tree trunks near the surface for great distances in many cases. Their effect is not to contort the surface beds, but rather to destroy all traces of bedding at or near the surface.

2. Soil creep may be the cause of crumpling the surface layers of the softer rocks. Such movements would form disturbances which may be likened to waves, the crests and hollows of which would have a trend at right angles to the slope of the surface of the ground. The growth of vegetation would tend to prevent such creep, whereas the presence of much snow and frost would tend to make it more marked.

In the case of the binding of the harder sandstones and shales at the surface the only agent competent to produce the effect is either névé or glacier ice.

3. Dr. Strahan has called attention to the remarkable manner in which all kinds of objects on the surface tend to assume a vertical position in Spitzbergen. I have noticed that in the case of a large number of gravels which there is reason to suppose are of Interglacial age, the pebbles near the surface stand on end. It would be interesting to know if the peculiarity to which Dr. Strahan refers is something more than skin deep.

4. In the case of valleys containing snow banks on their sheltered sides, the creep might be of the same nature as 'soil creep' but more pronounced in character.

5. In many of our river valleys there are river gravels which show signs of great disturbance. Such disturbances are never found in the more low-lying deposits. Those disturbances are very marked on large flat areas and could not possibly be the result of 'soil creep'. They consist of plots and undulations the trend of which generally points to motion down the valley and not down the slope into the valley. Very frequently they extend to depths of from 8 to 10 feet, and I have seen them so marked that the gravel has been folded into the Keuper Marl and the marl into the gravel. To my mind the disturbances could not possibly be the result of soil creep or tree roots. Glacial conditions of short duration seem the most likely explanation.

Similar contortions may often be seen in glacial gravels and sands and beneath boulder-clays. Near Spendon, Derbyshire, a mass of Boulder-clay was contorted into the Keuper Marl and masses of marl were enclosed in the Boulder-clay; there were also striated boulders of Mountain Limestone deeply embedded in the red marl.

6. Many of the disturbances in the Chalky Clay seem to have been formed by the direct pressure of the ice front, others as at Cromer by the overriding of the Boulder-clay by the ice.

I agree with the Rev. O. Fisher that the subject is worth investigation, and feel sure that the question of how the disturbances and folds were produced can be ascertained by studying the details of the phenomena. One generally finds the subject dismissed with the remark 'surface creep'.

R. M. Deeley.

Inglewood, Lingcroft Avenue,
Harpenden.
May 23, 1911.

GEOLOGY OF PADSTOW AND CAMELFORD.

Sir,—Referring to the letter signed "Reviewer" which appeared in the April number of the Geological Magazine concerning the memoir on the Geology of Padstow and Camelford, I should be obliged if you would allow me to say that I entirely agree with the statements contained therein as to Mr. Ussher's priority in representing on a map the three main divisions of the Devonian Rocks in the area in question, and also to express my regret that no reference was made to this fact in the memoir.

J. J. H. Teall.

Geological Survey Office,
28 Jermyn Street, S.W.
May 26, 1911.

DREIKANTER.

Sir,—With reference to the discussion in your columns on the use of the word Dreikante, I should like to point out, as I have already done elsewhere, that the term is more appropriately employed for the comparatively common form with three long, nearly parallel edges, than for the rarer type which is roughly tetrahedral and has typically six instead of three edges.

If a stone lies on a sandy tract, the wind may, by means of the sand that it carries with it, bevel the upper portion of the side turned towards it, and at the same time gradually remove the sand beneath till the stone falls, turning over towards the wind on to its abraded surface. A new plane of abrasion will then be formed on the stone, making an angle of about 60° (a crystallographer would call it 120°) with the first, and, under favourable circumstances, by the repetition of the same movement a trigonal prismatic form with three parallel sides and edges will be more and more distinctly developed.

The tetrahedral or 'tripyramidal' form and other more irregular shapes would appear to be due to the stone falling over obliquely