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ORIGINAL ARTICLES.

I.—NOTE ON A MOUNTED SKELETON OF A 'GAZELLE-CAMEL',
STENOMYLUS HITCHCOCKI, LOOMIS.

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(PLATE I.)

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THERE has recently been exhibited in the Gallery of Fossil Mammals at the Natural History Museum a restored skeleton of *Stenomylus hitchcocki*, Loomis, a 'gazelle-camel' from the Lower Miocene of Nebraska. This specimen (M 10969), which has been mounted in relief by Mr. L. E. Parsons, jun., includes portions of the skeletons of two individuals, but much of the dorsal region of the vertebral column and the ribs have been restored in plaster. The remains are from the Lower Harrison Beds (Lower Miocene) near Agate Springs, Co. Nebraska, where upwards of forty skeletons were collected in a small area. Many were complete and lay in such a position that they are believed to be the remains of a herd overtaken by floods and drowned.

Stenomylus was an extremely slender gazelle-like animal, differing widely from the usual conception of a camel. Its canines and first premolars are incisiform, the molars low-crowned. The neck and limbs are slender and much elongated, and the metapodials are not yet united to form cannon-bones. This type of camel seems to have been confined to the Lower Miocene of North America.

The history of the sub-order Tylopoda (Camels) is a remarkable one. At the present day it is represented by one family only, the Camelidæ, and of this there are only two genera, one, *Camelus*, confined to Central Asia, the other, *Auchenia*, to the westernmost and southernmost parts of South America. When a group is thus represented by a few widely separated forms it may usually be assumed that it is the remnant of a formerly much more extensive assemblage which attained its maximum development in some region from which the few surviving forms have been derived. In the case of the Tylopoda this region was North America, where in the Tertiary period the group attained a great variety of form and where it survived in considerable numbers even to the Middle Pleistocene. During the Pliocene representatives had migrated into Asia and South America, and it is curious that although camels and llamas coexisted in North America no true camels reached South America and no llamas passed into Asia. This may perhaps have been because the camels, being

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more tolerant of cold, were alone able to pass into North-Eastern Asia, while the llamas of the time were better fitted to pass through the Tropics to South America, where fossil forms have been found in Ecuador and Brazil. In the later Pleistocene the group became totally extinct in North America, hence its peculiar discontinuous distribution at the present day.

The earliest genus that can with certainty be referred to the Tylopoda is *Protylopus* from the Upper Eocene (Uinta). This genus includes animals about the size of a hare, in which the full dentition of 44 teeth was present, the bones of the fore-arm were separate, the fibula was complete, and there were four functional digits in each foot. In the White River Beds (Lower Oligocene) the genus *Poebrotherium* is represented by several species, some of which attained the size of a sheep. In this genus also the full dentition was present, but the selenodont molars were becoming high-crowned, the fibula was incomplete, and there were only two functional digits in each foot, although remnants of the others persisted. Up to this stage, according to Professor W. B. Scott, only one phylum is traceable, but in the Lower Miocene the group gives rise to two side branches, one, the gazelle-camels, of which *Stenomylus* is a representative, and the other, the curious giraffe-camels, which, as their name implies, possessed very long neck and limbs and probably browsed on trees like giraffes. The earlier (Lower Miocene) form *Oxydactylus* was much smaller than the later *Alticamelus*, and its neck and limbs were less elongated. The grazing camels, which may be regarded as the main stock of the group, possessed selenodont molars with increasingly high crowns, and in the later forms both in this group and in the giraffe-camels the metapodials fuse to form cannon-bones, the bones of the fore-arm unite, and the fibula is greatly reduced. *Procamelus* of the Upper Miocene of North America seems to represent approximately the common ancestor of camels and llamas. The earliest members of the sub-order yet found in the Old World are from the Lower Pliocene of the Siwalik Hills; other forms existed in the late Pleistocene and perhaps in Neolithic times in Northern Africa. In Europe remains of Pleistocene camels have been found in Southern Russia and Rumania.

II.—TRAIL AND UNDERPLIGHT.

By R. M. DEELEY, M. Inst. C. E., F.G.S.

THE peculiar features presented by the upper or land-surface portions of some deposits, or rather those portions of certain deposits which are now, or have been in times past, land-surfaces, have engaged the attention of many geologists. Most of those who have studied them are satisfied that some features which they often show are not now being produced in this country, and they are attributed by many observers to the action of different climatic conditions to those which at present exist.

The form of disturbed surface deposit to which I particularly refer

L. E. PARSONS, JUVEN., PHOTO.

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RESTORED SKELETON OF *STENOMYLUS HITCHCOCKI*. *TOONIS*.