Plesiarctomys by *Paramys*; the European Lemurs, Bats, and Insectivora, for the most part have nearly related representative genera in North America, and for the Anoplotheridæ and Tragulidæ a substitute may be found in the altogether different Leptotragulidæ.

The development of the animals on both continents has evidently always followed different roads. The connection of the two continents appears, indeed, to have been still maintained, but the means of communication must have been difficult.

(*To be continued in our next Number.*)

NOTICES OF MEMOIRS.

I.—Western Australia. Report on the Murchison Goldfield. By Harry Page Woodward, F.G.S., etc., Government Geologist. 8vo. pp. 21. (Perth, 1893.)

THIS goldfield has a proclaimed area of 32,000 square miles. The principal auriferous belt is at its eastern side, about 200 miles from the coast, and has a general N. and S. direction. Other rich patches and belts occur further east (probably to a great distance), and a few nearer the coast. The metamorphic rocks constitute the base of this area, such as slates and schists, talcose, hornblendic, and micaceous, besides granite and highly altered ferruginous jaspery quartzites. These are traversed by large quartz-reefs, which are richest where intersecting the quartzite. There are also limestone beds, with veins of ferruginous calcite, bearing some gold. These rocks strike a little W. of N., dipping to the W., and in the northern part of the field turn N.E. and E., with granitic, dioritic, and other dykes.

On them lie remnants of an old table-land of the Mesozoic "Desert Sandstone" of Australia, consisting of horizontally bedded sandstones, clays, pipeclays, gypsum, and ferruginous layers. The alluvium in the water-courses, flats, and salt-marshes rarely exceeds 20 feet in thickness; there is also local travertine and other surface deposits. The alluvium has been derived largely from the Desert Sandstone, and partly from the metamorphic rocks; the latter *débris*, coarse and stony, sometimes overlies the former, because these older rocks were exposed to denudation after the Sandstones; hence the auriferous "wash" is not always on the true bottom; nor does it usually run in "leads," not having been shifted and sorted by running water. Definite "gutters," however, were found on the bed-rock at Lake-Austin Island and at Quin's.

The "reefs" have a high dip; and, where opened down to the water-level, often contain galena as well as iron-pyrites; in some cases copper-pyrites and antimony. For the most part they seem to be "fissure-veins," of variable size and extent. They have "shoots," or small parallel fissure-veins; and there are also "cross-courses," rich at their intersection of main north-and-south reefs, such as the "Star of the East," a true lode, but much broken.

The water-supply is good for the most part; excepting at the

Salt Lakes, Lake Austin, and elsewhere. The water-level in the mines is usually within 100 feet depth. Timber, however, is relatively scarce. The roads are bad at present.

Some large auriferous ironstone lodes are also met with, hematitic at top and pyritous below. In the Weld Range the exposed hematite is botryoidal, giving rise to the local opinion that it was a lava-flood. In some of the soft clayey bands of these lodes the Kangaroos scratch out caves; and the natives probably followed this plan in getting at the lode itself centuries ago, and here they still work (for the whites) with primitive wooden tools, cutting round a mass of the ore and then wedging it off. This ironstone was worked on a larger scale, and probably traded to great distances, before the white invasion of Western Australia. The red ochre of the lode has been mistaken for cinnabar.

The several mines and diggings are described in detail (pages 12–21); and, in conclusion, this Goldfield is regarded as exceedingly rich, and to have a brighter out-look than any other in the Colony; the distance to be traversed in getting to Kimberley, and the salt water of Yilgarn, being disadvantageous to them. Pilbarra and the Ashburton have not been proved to be large reefing districts.

T. R. J.

II.—On the Cranial Osteology of the Mesozoic Ganoid Fishes, *Lepidotus* and *Dapedius*. By A. Smith Woodward, F.G.S., F.Z.S.[1]

IN this paper the author describes the cranial osteology of *Lepidotus*, so far as decipherable from specimens discovered by Mr. Alfred N. Leeds in the Oxford Clay of Peterborough, and from Wealden specimens in the collection of the late Mr. S. H. Beckles. He then compares the skull with that of *Dapedius*, as shown by a fine specimen from the Lower Lias of Lyme Regis in the British Museum.

From the observations recorded it would be premature to make any very general deductions, the characters of the skull having yet to be discovered in the majority of the Mesozoic fishes. The new facts, however, are interesting as tending to confirm a conclusion that must have impressed everyone who has deeply studied these extinct fishes, namely, that it is impossible in Jurassic and Cretaceous formations to recognise any absolute sub division of the so-called ganoids into "Lepidosteoidei" and "Amioidei." The skulls of *Lepidosteus* and *Dapedius* differ from those of existing "ganoids" in exhibiting the backward extension of the basicranial canal; and the cartilaginous cranium of *Dapedius* is remarkably similar in every respect to that of the modern salmon (*Salmo*), except somewhat more ossified. Both *Lepidotus* and *Dapedius* agree with *Lepidosteus* and *Amia* in the fact that the membrane bones of the roof do not extend quite to the occipital border of the cranium; but *Dapedius* at least is distinguished from *Amia* and approximated to *Lepidosteus* by the course of the olfactory nerves across the orbital cavity, while *Lepidotus* is paralleled only by the last-named genus

[1] Abstract of paper read before the Zoological Society, June 20th, 1893.

in the absence of a gular plate. On the other hand, the superficial bones of the two extinct genera differ greatly from those of *Lepidosteus* and closely resemble those of *Amia*; the peculiar attachment of the premaxillæ in *Lepidotus*, for example, being reproduced almost in every detail in the last-named genus.

III.—On the Dentition of a Gigantic Extinct Species of *Myliobatis* from the Lower Tertiary Formation of Egypt.

By A. Smith Woodward, F.G.S., F.Z.S.[1]

THE Skates of the family of Myliobatidæ are well known to attain a great size, but few examples even of the dentition of the largest specimens are preserved in museums. It is, therefore, of much interest to record that the British Museum has lately received from Surgeon-Captain R. H. Penton a good example of the jaws of one of the most gigantic extinct species of *Myliobatis*, discovered in the Lower Tertiary Limestone of the Mokattam Hills, near Cairo, Egypt. So far as the present writer is aware, this is the largest specimen of the dentition of *Myliobatis* that has hitherto reached any museum.

The jaws were found in natural association, and the size of the teeth is indicated by the following table of measurements in fractions of a metre:—

	Upper Dentition.	Lower Dentition.
Width of median dental plate... ...	0·13 to 0·135	0·12 to 0·13
Length ,, ,, ...	0·18	0·014 to 0·016
Maximum width of three lateral series of plates...	0·02	0·02

From these measurements it is evident that the principal teeth in the lower jaw are about eight times, those of the upper jaw about seven and a half times as broad as long; while the maximum thickness of the same teeth in both jaws equals nearly one-quarter of their breadth. These characters, taken in conjunction with the form and proportions of the lateral teeth, suffice to distinguish the Makattam specimen from the dentition of all known species of *Myliobatis*; and it may therefore be named *M. Pentoni* in honour of its discoverer. In determining such specimens it is, of course, necessary to take into account the mode of growth of the teeth and their change in proportion with age; but it does not appear possible, in accordance with the ordinary laws of growth, for any known type of dentition to develop by increase of size into the one now described. The form of the lateral teeth and the transverse section of the median teeth seem to be nearly constant at all stages of growth in any one species.

Materials for comparison are unfortunately insufficient to form any certain estimate of the size of *Myliobatis Pentoni*; but if the few small examples of the recent *Myliobatis aquila* in the British Museum are at all similar in proportions, the maximum width of the disc of the extinct species cannot have been much less than five metres.

[1] Abstract of paper read before the Zoological Society, June 20th, 1893.