

lowest avian brains, with their large projecting olfactory lobes and uncovered optic lobes, and the highest avian brains, with their small, inconspicuous olfactory lobes and covered optic lobes. The difference between these two extremes is almost as great as that between the brain of a lizard and the brain of the lowest type of birds. Yet there is no impassable gulf between these two extremes. All the intervening stages are supplied by the brains of the various avian groups. In reviewing this remarkable sequence, we are almost forced to believe that this tendency towards a progressive compactness of the brain existed long before the first bird was evolved. If this be true, then this tendency towards a progressive compactness of the brain, combined with a tendency to develop all parts appertaining to vision and to atrophy all parts appertaining to smell, will account for all the major differences between the avian and the reptilian brain.

Furthermore, within this class of animals, this "progressive compactness" of the brain is a factor of taxonomic importance. So far at least as major groups are concerned, a classification based upon it alone is, for the most part, in harmony with those classifications that are based upon other structural elements of birds.

Histologically considered, the bird brain is composed of nerve fibres, nerve cells, and neuroglia. Excepting the fornix and hippocampal commissures, all the principal commissures of the mammalian brain, corpus callosum included, are found in the avian brain. Poverty of space causes the omission, in this abstract, of the various other tracts of the bird brain.

Although in the bird brain the nerve cells present a great diversity of forms, yet they may all be grouped in the following classes: ganglionic cells, Deiter's corpuscles, fusiform or flask cells, pyramidal cells, and multipolar cells. The ganglionic cells are large bi-polar cells, which are never found outside of the root ganglia. Each extremity of the cell is prolonged into a nerve fibre. One fibre passes into the brain, the other into a nerve. In addition to the ordinary cell wall, each of these ganglionic cells is surrounded by a special nuclei-bearing sheath. Deiter's corpuscles are small cells, which are supplied with so small an amount of protoplasm that ordinary preparation reveals nothing but their nuclei. These minute cells are universally distributed. In the cerebellum, however, they are densely aggregated in a single lamina; while in the optic lobes they are densely aggregated in several concentric laminae. The remaining three types are encountered throughout the brain; but in any single nidulus some type always predominates, often to the exclusion of the other two. The flask cells resemble a flask in shape, and when stained each cell presents a faintly stained nucleus, within which is a densely stained nucleolus. Such cells are supposed to function as sensory cells. The pyramidal cells are sub-pyramidal in outline. These cells stain densely, when each one presents a densely stained nucleus, within which is a densely stained nucleolus. Such cells are probably motor in function. The multipolar cells resemble distorted, many-branched, pyramidal cells. Such cells probably act as switch stations for nervous energy.

University of Cincinnati, Dec. 31, 1891.

C. H. TURNER.

A NEW SABRE-TOOTHED TIGER FROM THE LOUP FORK TERTIARY OF KANSAS.

In a collection of Loup Fork Tertiary fossils obtained by the writer from northern Kansas, is a right upper canine of *Machærodus*, apparently different from that of any of the known species of that genus.

The remains of several feline animals have been described from the Loup Fork, one of them (*Felis maxima*, Scott) being the largest of all known *Felidae*; but none referred to the genus *Machærodus* has been announced. It may, however, yet appear that the *F. maxima* itself, which Professor Scott has but provisionally referred to the genus *Felis*, is a machærodont.

The Loup Fork canine includes the entire root and neck and the basal portion of the crown. As nearly as it is possible to judge, it represents an animal about as large as the puma, but it must be borne in mind that the size of an animal cannot be very positively and closely estimated from a part so highly specialized and so subject to variation in the ratio of its size to that of the body as is the canine in this genus. In any event, the tooth indicates an animal smaller than any of the known American Pleistocene species, unless it be *M. gracilis*, Cope, and considerably larger than the European Miocene *M. palmidens*, de Blainville.

As compared with the larger American species of *Machærodus* (*M. necator*, etc.), *M. gracilis* is characterized by the more compressed form of the basal portion of the upper canine; and this compression is said to be a marked feature. In the Loup Fork species, on the contrary, that tooth has greater relative thickness than in *M. necator*, the thickness of the tooth, at base of crown, being related to its breadth as 1 to 1.65, while the corresponding ratio in *M. necator* (taken from Cope's illustrations) is 1 to 2.2. In *M. neogæus* the ratio, derived from the measurements given by Burmeister, is 1 to 2.33.

The Loup Fork species may be known as *Machærodus crassidens*.

The canine of *M. crassidens* presents a gentle curvature and has its posterior cutting edge compressed and denticulated. Whether the anterior border was of similar character is uncertain. The form of a point-like downward prolongation of the surface of fracture on the anterior border of the crown may have been determined, when the tooth was broken, by the presence of a compressed border, but, if so, the contour of the preserved part of the crown does not indicate it. It is, at least, certain that a denticulate carina did not extend so far from the apex on the anterior as on the posterior border.

DIMENSIONS.

	Inches.
Breadth of crown of canine at base.....	1.14
Thickness of same.....	.69
Breadth of crown 1.5 inches above base (about).....	.83
Thickness of crown at same (about).....	.46
Length of root of canine (to origin of denticulated keel).....	2.44
Length of canine, as restored (approximate).....	5.45

Should new material prove that only the posterior margin of the canine is denticulated, the species would, in this respect, resemble the *Machærodus nestianus* of the upper Pliocene of Italy.

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NOTES AND NEWS.

THE Pennsylvania State Board of Health, at the instance of the Governor of Pennsylvania, has issued an invitation to the other State and the more important city boards of health, and to the American Public Health Association, to join in a conference with the officers of the World's Columbian Exposition at the city of Chicago, with the view to making an exhibit of the objects, methods, and results of the work of sanitary officials in this country.

— Mr. Charles S. Peirce has tendered his resignation as Assistant in the United States Coast and Geodetic Survey, to take effect Dec. 31. Mr. Peirce was first attached to the Survey about thirty