ART. XXVII.—*A New Merycoidodon*; by MALCOLM RUTHERFORD THORPE.

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INTRODUCTION.

It is clearly apparent that the generic name *Merycoidodon* has priority over those of *Oreodon* and *Cotylops*, as previously pointed out by Gilmore and Hay. Yet Leidy preferred the name *Oreodon*, and this has been used by nearly all subsequent writers. When so great a group has been universally designated by a certain name for seventy years, and when this name is not a misnomer with regard to classification, it seems that its retention would be desirable, especially as both *Oreodon* and *Merycoidodon* were proposed by the same author.

Merycoidodon culbertsonii (1848), *Oreodon priscus* (1851), *O. robustus* (1851), and *Cotylops speciosa* (1851) are considered synonymous. The type of *Merycoidodon* possessed partly deciduous and partly permanent teeth; that of *Oreodon* had all permanent dentition; while the *Cotylops* type had all deciduous. *O. priscus* and *O. robustus* are the same.

This genus embraces five species and one subspecies, as now defined. They are all well marked and, with one exception, limited to the Middle Oligocene, the exception being *M. affinis* from the Lower Oligocene (Chadron). The majority of these forms have been well described and repetition will be avoided as much as possible in this paper. There are, however, a few factors which it is interesting to bring out.

Merycoidodon culbertsonii culbertsonii was exceedingly numerous, and must have roamed in droves. Of this one species alone, there are represented at least 400 individuals in the Marsh Collection in this Museum. This is, moreover, a very conservative estimate, as there are skulls and parts of skulls and jaws of some 340 individuals, together with a large quantity of skeletal parts belonging to these and many more of the same form.

This species was studied to some extent from a quantitative standpoint, and the determination of the relative age of the individuals at death is given below. The com-

putations were made on a decimal basis of 0 to 10, as in the species of the genus *Eporeodon* of the John Day basin, Oregon. The same method of procedure was followed: 0-3, deciduous dentition; 4-6, average medium age with 5 considered as mid-life and fully adult; 7-8, those with the tooth pattern of the triturating surface of M^1 obliterated and that of M^2 much worn; and 8-10, those having the tooth pattern of all the true molars very much worn or completely obliterated. Of 210 individuals, 44, or 20.9 per cent, died between 1 and 3; 138, or 65.7 per cent, between 4 and 6; 21 or 10 per cent, between 7 and 8; and 7, or 3.3 per cent, between 8 and 10. This summary for *M. culbertsonii* is typical, in the main, for the other species, although they are not represented by so many individuals, and therefore the data derived from them are not so reliable.

In comparison with the figures resulting from a similar study of the John Day *Eporeodons*, we find a remarkable agreement in the percentage of those that died between 4 and 6, both groups showing 65 per cent. In the other age classes, the figures would seem to indicate that the infant mortality in the White River area was greater than in the John Day basin where it was seen to be 13.2 per cent, and that more individuals reached an older age in that basin, the classes showing 12.2 per cent for post-mature and 8.8 per cent for extreme old age.

These two groups are widely separated in time and geographic locality, and undoubtedly their environmental conditions were considerably different.

DESCRIPTION OF SPECIES.

Merycoidodon culbertsonii culbertsonii (Leidy) 1848.

Specimens of this form were collected in Colorado, South Dakota, Wyoming, and Nebraska, fully 50 per cent or more being obtained in the latter state. Nearly all parts of the skeleton are fully represented in the Yale collection, as well as several very excellent endocranial and endofacial casts.

A few specimens show peculiarities worthy of note. Cat. No. 12477, Y. P. M., from Scott's Bluff, Nebraska, consists of both rami, showing each P_4 placed obliquely forward, and the premolar series are unusually short.

These rami were collected by H. B. Sargent, former Yale Corporation member, on the Yale College Scientific Expedition of 1870; another specimen, Cat. No. 12586, Y. P. M., collected by Sargent at Gerry's ranch, Colorado, is a very robust individual with an unusually great bizygomatic diameter. It would seem to represent the male, but sex dimorphism is almost impossible to determine in this genus. Cat. No. 12471/2, Y. P. M., from Nebraska, shows a quite large style developed from the cingulum between the protocone and hypocone of both M³; Cat. No. 12094, Y. P. M., is a skull with a well developed single-rooted accessory premolar between C and P¹ on both sides. The muzzle is elongated and both P² are set obliquely. This extra premolar is probably comparable to that found occasionally in the long-muzzled species of *Canis*. There is a certain degree of variation in the depth but not in the extent of the lacrymal fossa, which may be due to sex, those skulls having the more shallow fossa possibly being the females. The length of the superior molar-premolar series varies from 80 to 90 mm.; the molar series ranges from 45 to 50 mm., and the premolar from 37 to 42 mm.

Another specimen, Cat. No. 12101, Y. P. M., from the Middle Oligocene of White River, Nebraska, appears to be intermediate between *M. culbertsonii* and *Eporeodon hybridus* in its proportions. The cranium is broken away so that the presence or absence of the bullæ can not be determined. The muzzle is quite wide beneath the orbits and the infra-orbital foramen is above the middle of P³. The length of the molar series is 49 mm., that of the premolars 45 mm., while the width beneath the orbits is 101 mm.

The Yale Expedition of 1914 collected several bones, including the skull and jaws, of an individual of this species (Cat. No. 12238, Y. P. M.), on the Warbonnet ranch, 12 miles north of Harrison, Nebraska. The enveloping matrix as typical Middle Oligocene. The various elements are normal, except possibly the pes, which is very excellently preserved and articulated. On the ventral surface of this, close to metatarsal II, was found in the matrix a small elongate bone which apparently represents the hallux. This bone is 17.5 mm. long, although the proximal end is somewhat damaged. The

upper half of the inner side bears a distinct articular facet while the distal half of the bone is laterally compressed, ending in a blunt point. There is no indication of any phalanges accompanying this first metatarsal, if such it is, and the evidence certainly bears out the belief that it is the vestige of the hallux, present in the earliest forms of the *Merycoidodontidæ*, such as *Protoreodon*, but not previously noted as occurring in the Oligocene forms.

Specimen No. 12754, Y. P. M., consists of a skull and jaws from the upper nodular layer of the Middle Oligocene of South Dakota. It resembles *M. culbertsonii* in all essential respects, although it is considerably larger than the type. In fact, it probably represents a form intermediate, both structurally and stratigraphically, between *M. culbertsonii* and *Eporeodon major*. The bullæ are small and the lacrymal fossæ deep.

<i>Measurements</i> (Cat. No. 12754, Y. P. M.).	mm.
Total length, partly estimated	217
Postorbital constriction, diameter	29
Brain-case, maximum diameter.....	55
Superior molars, length	52
Superior premolars, length.....	46
Inferior molars, length.....	54.5
Inferior premolars, length.....	47.5

Merycoidodon culbertsonii periculorum (Cope) 1884.

This Middle Oligocene subspecies is represented by over fifty individuals in the collection, mainly from Colorado but a few from Nebraska and Wyoming. It differs but slightly from *M. culbertsonii* except in its smaller size. The length of the superior molar-premolar series varies from 72 to 77 mm.; the molar, from 40 to 42 mm.; and the premolar series has a length of 33 mm. The inferior molar-premolar length is 73 mm., with a molar length of 47 mm. The above measurements were derived from a considerable number of specimens. Cat. No. 12605, Y. P. M., has a bizygomatic diameter of 89 mm., a maximum brain-case diameter of 44 mm., and a postorbital constriction diameter of 30 mm.

The age classes, based on forty specimens, are as follows: 0-3, 6 individuals, or 15 per cent; 4-6, 26, or 65 per cent; 7-8, 6, or 15 per cent; and 8-10, 2, or 5 per cent.

Merycoidodon macrorhinus (Douglass) 1902.

M. macrorhinus is apparently not represented in this collection. It is a Middle Oligocene form from the nodular layer in Montana, collected near the Missouri River, southeast of Helena, and the holotype is Carnegie Museum Cat. No. 767. In nearly all respects it is close to *M. culbertsonii*, except that the face is one third higher above P^1 and the bone throughout is heavier. It may represent a male, showing an example of a considerable degree of dimorphism, but as I have not seen any comparable forms in the White River deposits, nor any examples of marked sex dimorphism in this group, it seems that the species is valid. The length of the superior molar series is 45 mm. and the length of the superior premolar series is the same.

Merycoidodon gracilis (Leidy) 1851.

This Middle Oligocene form has more than sixty representatives in the Marsh Collection from Colorado, Nebraska, Wyoming, and South Dakota. There seems to be such close resemblance between this species and *M. coloradoensis* (Cope) that they should be considered synonymous. The main distinctions of the latter were stated to be a little larger size, about 5 mm. longer in total length, and a different geographic locality, Colorado, to which Cope considered the species confined.

Another species is mentioned by Cope, and defined as follows (1888, p. 1094): "During the White River epoch droves of *Oreodon culbertsonii* inhabited the swamps, and the small *O. minor* was abundant. Several forms, perhaps species, coexisted with these two." Since this form is defined only to the extent of being smaller than *M. culbertsonii*, it is my opinion that *O. minor* should be considered a nomen nudum.

The amount of variation within this species seems not to be sufficient for subdivision into varieties. The young forms with deciduous dentition are usually more dolichocephalic and the posterior nasal bones are somewhat more acute than in the adult. There are likewise variations in the adult forms, but after a careful study of the specimens in this Museum, I am led to the conclusion that these differences are not greater than we should expect to find,

due to sexual, individual, and local variations of minor importance.

Using a considerable series of specimens, it was found that the length of the superior dental series ranged from 57 to 60 mm.; that of the molars, from 33 to 37 mm.; and of the premolars, from 27 to 30 mm.

On a basis of thirty-four individuals, the age classes show: 1-3, 10 individuals, or 29 per cent; 4-6, 17, or 50 per cent; 7-8, 4, or 11.7 per cent; and 8-10, 3, or 8.8 per cent. This series does not represent as great a number of individuals as might be desired, but it shows a variation in the first two classes, while the latter two are more nearly normal.

Merycoidodon affinis (Leidy) 1869.

The genus *Merycoidodon* is characterized mainly by dolichocephalic forms, but *M. affinis* is mesaticephalic. The muzzle is short and the diameter across the frontals at the orbits is as great as in *M. culbertsonii*. The total length is but slightly greater than that of a robust *M. gracilis*. The length of the superior dental series averages 67.5 mm.; that of the molars, 38 mm.; and of the premolars, 32 mm.

There are some twenty or more skulls and parts of skulls here, together with much skeletal material, collected in Colorado and Nebraska. *M. affinis* differs from the other species of the genus in that it is Lower Oligocene (Chadron) in age.

Merycoidodon platycephalus, sp. nov.

(Figs. 1, 2.)

Holotype, Cat. No. 12752, Y. P. M. Middle Oligocene (lower Brule), near Scott's Bluff, Nebraska. Skull and some skeletal parts.

Distinctive characters.—Very low, wide cranium; long sagittal crest; nuchal crests wide apart and having less overhang than in other species of this genus; posterior part of nasal bones obtuse; infra-orbital foramen above interval between P^3 and P^4 ; lacrymal fossa small and shallow; orbits look forward and outward only, and their outline is quite different from that of any other species in the genus (see fig. 1); orbital opening smaller than in *M. gracilis*; supra-orbital groove a well defined depression

leading forward from the supra-orbital foramen, and extending ventro-laterally to the infra-orbital foramen (this is probably a variable character); malar below orbit as robust as in *M. culbertsonii*; sagittal crest and postorbital processes of frontals very rugose.

FIG. 1.—*Merycoidodon platycephalus*, sp. nov. Holotype. Lateral view of skull. $\times 2/3$. Drawings by Rudolf Weber.

FIG. 2.—*Merycoidodon platycephalus*, sp. nov. Holotype. One half superior view of skull. $\times 2/3$.

The skull is fully adult and not crushed, although the teeth are damaged. The distal end of the radius shows that the facets for the scaphoid and lunar bones were separated by a space of a little over 1 mm., which is an unusually large interval in this genus.

Measurements of Holotype.

	mm.
Total length	155
Maximum diameter of brain-case	46
Diameter of postorbital constriction	30.3
Bizygomatic diameter	89.5
Superior dental series, with C, length	75.2
Superior molar series	36
Superior premolar series	33.7

1. Posterior part of nasal bones acute.

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