Art. VII.—*John Day Eporeodons, with Descriptions of New Genera and Species;* by Malcolm Rutherford Thorpe.

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Introduction.

In 1875 Marsh founded the genus *Eporeodon* on a skull collected about 1870 by Rev. Thomas Condon in the John Day basin, Oregon. By some students, this genus may be considered synonymous with *Eucrotaphus* Leidy; the present author, however, regards *Eucrotaphus* as a synonym of *Agriochœrus,* for reasons to be stated in a subsequent paper.

In determining the geologic horizon of the specimens, the same criterion has been employed as that used by the West Coast paleontologists, i. e. specimens showing any green coloration in the matrix should be considered as middle John Day, and those with light colored matrix, grey to buff, as belonging to the upper series. Using this datum, it is found that of 218 specimens in the Marsh Collection at Yale, 184 show unmistakable green coloration in the matrix, and 34, grey or buff colors. In other words, 84 per cent of the specimens of *Eporeodon* in the John Day basin are found in the middle John Day, and the remainder, 16 per cent, in the upper. The genus *Promerycochœrus* overlaps downward into the middle John Day in about the same proportion.

Geologically, the John Day formation is divided into lower, middle, and upper. Paleontologically, the lower

John Day has no designation, as it has so far yielded extremely scanty and ill-preserved vertebrate remains. The middle is termed the Diceratherium zone (Wortman), and the upper, the Promerycochœrus zone (formerly Merycochœrus). It is the writer's opinion that the term Diceratherium zone should be replaced by Eporeodon zone, for the following reasons:

(1) *Diceratherium* is known to occur in both the middle and upper series in considerable abundance; (2) it is quite difficult to identify *Diceratherium* in the field, owing to the general lack of skull and tooth material, and due to the fragmentary condition of the skeletal elements as usually found; (3) the *Eporeodon* material in the Marsh and other collections shows conclusively that representatives of this genus are the most common fossil vertebrates in the middle John Day. As a result of studies carried on at the University of California, the fact is brought out that

> "The middle John Day is characterized by abundant remains of *Eporeodon*, especially of the two smaller species *occidentalis* and *pacificus*, and by a great number of rodents, which have been obtained principally at two horizons, one at about the middle and the other at the top of the Diceratherium beds. Both horizons contain practically the same fauna. Next to *Eporeodon* in abundance the most common form is a *Hypertragulus*, fragmentary specimens of which occur at almost every exposure. Rhinoceros material is fairly abundant but usually fragmentary and possibly represents other genera in addition to *Diceratherium*." (Merriam and Sinclair 1907, p. 190.)

(4) The Oreodontidæ are such a wide-spread family and bear so great a similarity to each other in skeletal and tooth structure that their identification would be much easier to all field men, except expert paleontologists, than would that of *Diceratherium*, especially when only bone fragments of the latter are present. (5) There would be no confusion in distinction between *Eporeodon* of the middle and *Promerycochœrus* of the upper series, as the two genera have certain invariable distinctions clearly defined.

The study of specimens of this genus from the North Fork of the John Day River is unsatisfactory at best, due to inadequate geologic data concerning that area. It seems advisable at present to assume that these beds are of later origin than the typical John Day formation, and that assumption offers an explanation of why the forms from this area are different from those in the rest of the basin. One of the future problems, and one which is indeed critical, is a detailed geologic and paleontologic study of the North Fork area.

The number of skulls[1] of John Day Eporeodons represented in the Marsh Collection is approximately 300, while fragmentary materials indicate at least 50 more individuals. On a basis of 218 well preserved skulls, a quantitative study was made, some of the results of which are briefly stated below.

In determining the relative age of the individuals at death, the computations were made on a basis of 10, as follows: 0-3, milk dentition; 4-6, average medium age with 5 considered as mid-life, or fully adult; 7-8, those with the tooth pattern of M^1 obliterated and that of M^2 much worn; and 8-10, those having the tooth pattern of true molars very much worn or completely obliterated.

Of 204 individuals in which the age was determined, 27 or 13.2 per cent died between 1 and 3; 134 or 65.6 per cent between 4 and 6; 25 or 12.2 per cent between 7 and 8; and 18 or 8.8 per cent between 8 and 10. This summary for all species is typical for the individual species with but few exceptions. *Eporeodon occidentalis* shows 23.8 per cent that died having milk dentition and no individuals that reached an age between 8 and 10. *Eporeodon pacificus* shows 18 per cent reaching a very old age, 8 and above. In *E. leptacanthus,* 6.1 per cent died with deciduous dentition and only 1.5 per cent reached the age of 8, while the majority died in their prime, between 4 and 6. Half the specimens of *E. trigonocephalus* are 3 or below.

The majority of the specimens were collected at or near Turtle Cove. The other areas, named in order of their importance in yielding remains of this genus, are as follows: Bridge Creek, Haystack Valley, 5 or 6 miles below Cottonwood, Clarno Bottom, the North Fork, and Big Bottom.

I am deeply appreciative of the privilege, afforded me by Messrs. Matthew and Granger, of measuring and studying the Cope types of this genus in the American

[1] The present study is based wholly on skulls and jaws; the Marsh Collection, however, contains an abundance of skeletal material as well.

Museum of Natural History. I wish also to express my thanks to Professors Schuchert and Lull for their helpful criticism and suggestions, as well as to Miss LeVene for her very careful and efficient aid in editing this and other papers. The illustrations have been made by Mr. Rudolf Weber.

Description of Species.

Eporeodon occidentalis (Marsh) 1873.

(Figs. 1-3.)

Holotype, Cat. No. 10142, Y. P. M. Upper Oligocene (middle John Day), Bridge Creek?, John Day River, Oregon. Plesiotype, Cat. No. 12345, Y. P. M., from Turtle Cove, John Day River, Oregon.

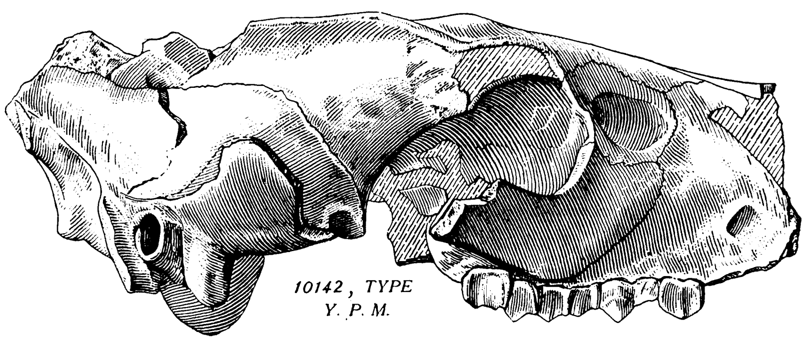
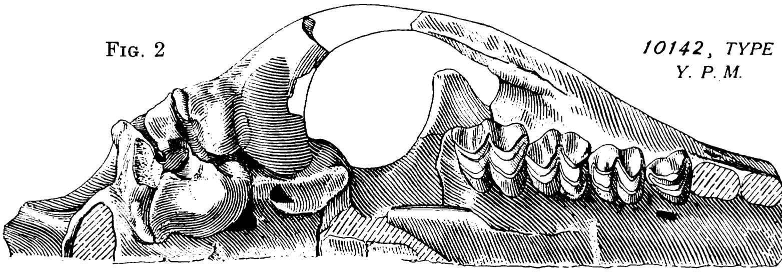


Fig. 1.—*Eporeodon occidentalis* (Marsh). Holotype. Right lateral view. × 3/5.

Specific characters.—Bullæ large and laterally compressed; skull mesocephalic and about the same length as that of *Merycoidodon* (*Oreodon*) *culbertsonii;* lacrymal fossa large and deep, but confined to lacrymal bone; postorbital constriction of medium diameter; bizygomatic diameter large; sagittal crest low and short; infraorbital foramen above middle of P^3; masseteric fossa deep and nearly horizontal; coronoid process thin and much higher than the condyle; paramastoids slender; posterior nares V-shaped; palate not produced beyond M^3.

Specimen No. 12316, Y. P. M., possesses natural casts of the bullæ which are divided into anterior and posterior hemispheres. In this collection there are about 50 individuals, chiefly from Turtle Cove, Haystack Valley, and Bridge Creek. The species is abundant in the middle John Day.

FIG. 2



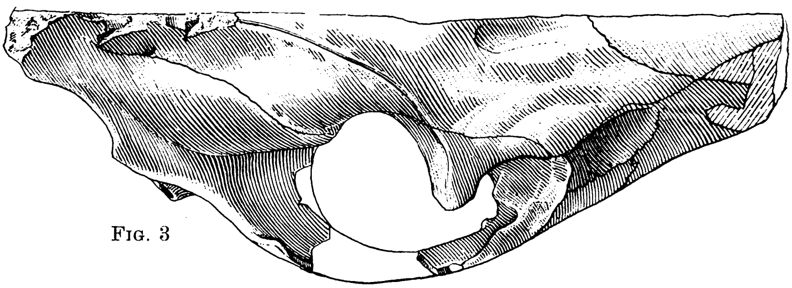


FIG. 3

FIG. 2.—*Eporeodon occidentalis* (Marsh). Holotype. Right half, palatal view. × 3/5.
FIG. 3.—*Eporeodon occidentalis* (Marsh). Holotype. Right half, superior view. × 3/5.

Measurements.

	Holotype mm.	Plesiotype mm.
Total skull length	188*	192
Bizygomatic diameter	127*	136
Superior molar series, length	43	44
Superior premolar series, length	39.5	39.5
Diameter, postorbital constriction	41	37

* Approximate.

Eporeodon leptacanthus leptacanthus (Cope) 1884.

Holotype, No. 7695, Cope Coll., A. M. N. H. Upper Oligocene (middle John Day), John Day River, Oregon.

Specific characters.—Skull large and dolichocephalic; paroccipital process strongly compressed; nasal bones pointed posteriorly, and projecting to a point nearly above the prosthion; infra-orbital foramen above middle of P^3; lacrymal fossa large and deep; maximum bizygomatic diameter anterior to glenoid process; long high sagittal crest; bullæ large, laterally compressed; rami shallow below tooth-row; masseteric fossa shallow and much more vertical than in *E. occidentalis;* palate produced but slightly beyond M^3; posterior narial opening shaped like a shallow V.

In this collection, the species is represented by 60 or more specimens, collected at Turtle Cove, Bridge Creek, Haystack Valley, and at the fossil horse beds on Cottonwood Creek.

*Measurements of Holotype.**

	mm.
Total length of skull	247
Superior molar series, length	52.3
Superior premolar series, length	45.8

* This holotype is laterally crushed, and transverse measurements have been omitted, since, even at best, they would be only approximate.

No. 10145, Y. P. M., is considered a male on account of the longer dental series, much heavier and more robust canines, wider palate and frontals, larger cranium, square muzzle, and, in general, the more pronounced robustness of this skull in comparison with some others of the same species. The paramastoid processes are very heavy, but the postglenoid tubercles are abnormally small and the position of P^1 and P^2 is oblique. This specimen was collected by William Day in 1875 at Turtle Cove.

Skull No. 12408, Y. P. M., from the North Fork of John Day River, is referred to this species, but shows certain differences, as follows: length of molar-premolar series, 91 mm., the same as in *E. pacificus*, but the skull length is that of *E. leptacanthus;* total length of dentition less by 3 mm.; paroccipital processes turned obliquely outward; sagittal crest shorter; origin of zygoma heavier and face more prominently divided by the forward prolongation of the zygoma; nasals wedge-shaped, becoming progressively wider as they advance; postglenoid tubercles smaller; molar and premolar series of nearly equal length; lacrymal fossæ more shallow. Specimens numbered 12409, 12410, and 12414 exhibit the same characteristics as No. 12408.

Eporeodon leptacanthus pacificus (Cope) 1884.

Holotype, No. 7502, Cope Coll., A. M. N. H. Upper Oligocene (middle John Day), John Day and Crooked rivers, Oregon.

Specific characters.—Skull long and narrow; lacrymal fossa large and deep; infra-orbital foramen above posterior part of P^3; long sagittal crest; postorbital constriction moderately wide; palate moderately produced posteriorly; bulla large and laterally compressed, with a small forward prolongation not seen in any other species of this genus; bulla separated from postglenoid tubercles, which are oblong and small; paroccipital process slender and greater diameter transverse to sagittal plane; posterior nares shaped like a shallow open V; posterior part of nasal bones pointed and extending to anterior margin of orbit.

At least 50 individuals are present in this collection from Turtle Cove, Haystack Valley, Bridge Creek, Clarno Bottom, and from 5 or 6 miles below Cottonwood.

Measurements of Holotype.

	mm.
Total length of skull	241
Bizygomatic diameter	137
Superior molar series, length	47
Superior premolar series, length	44.7
Diameter, postorbital constriction	41

Cat. No. 10143, Y. P. M., is tentatively referred to *E. pacificus*. This specimen, collected at Turtle Cove in 1875 by L. S. Davis, is that of an old individual, probably a male. The major differences from the type of *E. pacificus* are: pterygoid process of the maxilla strongly developed, extending posteriorly and ending in a blunt point; posterior nares semicircular; glenoid articular surface wide and heavy; bullæ smaller; mastoid heavy and rugose and paramastoid thickened, with its greater diameter oblique to sagittal plane, instead of transverse; mesocephalic instead of dolichocephalic; length of molar series 44 mm., premolar, 49, but total length of dental series including canine is the same as that of *E. pacificus;* anterior zygomatic pedicle heavy, including malar.

It is probable that both old age and sex have produced these variations from the type. Just what proportion of influence each has had it is impossible to say, but the differences in the bone, i. e., maxilla, palate, glenoid, mastoid, and paramastoid, as well as zygoma, are probably due to sex; the others, such as length of molar and premolar series and mesocephaly, may well occur in old age. Skull No. 10147, Y. P. M., is that of an extremely old individual and exhibits some of the characters noted above.

Three specimens, Nos. 12402, 12403, and 12404, Y. P. M., collected by L. S. Davis in 1875 on the North Fork of the John Day River, 15 miles from its junction with the main stream, are apparently the forms of *E. pacificus* in that locality. Their horizon is, however, both middle and upper John Day. Specific characters are as follows: approximately same length as *E. pacificus;* total length of tooth row less by 5 mm.; molar series shorter, equalling or slightly less than length of premolar series; postglenoid tubercles less robust; paroccipital processes extending strongly outward and downward, and in contact with the bullæ only at base; palate much wider and less uparched; palate less produced posteriorly; incisive foramina wider and less ovate; face broader and width at zygoma greater; supra-orbital foramina closer together; nasals more slender and elongate; cranium about the same width but postorbital constriction less; orbits more nearly round, with much less vertical diameter; anterior prolongation of zygoma much more prominent, dividing the face more sharply; skull more robust; origin of zygoma heavier and more offset from alveolar parapet; basicranial axis less steep.

Still another specimen, No. 12401, Y. P. M., consists of a skull only, certain characters of which refer it to *E. pacificus.* It was found by Davis in the North Fork area, but its matrix is light chocolate in color and the horizon probably upper John Day. This color is not shown in the matrix of any specimens in the collection outside of the North Fork area. The specific characters are: skull length a little less than that of *E. occidentalis,* or 182 mm. from occipital condyles to prosthion inclusive; markedly dolichocephalic; total length of dentition, 100.5 mm., length of molar series, 48 mm., and of premolars, 44 mm.; bullæ small; short sagittal crest; lacrymal fossæ small and very shallow; infra-orbital foramen above anterior portion of P^3; nasals extending approximately to a point above incisor border. The right P^4 has two accessory pillars on the external face of the cone; the left is normal.

It is possible that this may represent a new subspecies, but in view of the fact that the specimen has suffered marked lateral compression, it seems best for the present to leave it under *E. pacificus.*

Eporeodon trigonocephalus (Cope) 1884.

Holotype, No. 7505, Cope Coll., A. M. N. H. Upper Oligocene (upper John Day), North Fork of John Day River, Oregon.

Specific characters.—Palatonarial border produced posterior to maxillary bones; posterior nares shaped like a shallow V; small infra-orbital foramen above front of P^3; muzzle short; paroccipital process not separated from bulla by a groove; high, thin sagittal crest; bullæ small and ovoidal, with external ridge enclosing a groove continuous with stylohyoid fossa, the long diameter directed forward and inward; lacrymal fossa well marked, but shallow and confined to lacrymal bone; nasal bones blunt posteriorly; skull flat and broad.

The holotype is an old individual and nearly all of the teeth are broken away. The matrix is light grey. In the Marsh Collection, this species is represented by a comparatively small number of skulls, all from either Turtle Cove or Bridge Creek. These specimens, however, differ from the type to a certain degree, but not enough to invalidate the identification.

Measurements of Holotype.

	mm.
Total length of skull	201
Bizygomatic diameter	145.6
Superior molar series, length	36*
Superior premolar series, length	41*
Diameter, postorbital constriction	31.5

* Approximate.

Eporeodon trigonocephalus parvus, subsp. nov.

(FIGS. 4, 5.)

Holotype, Cat. No. 12425, Y. P. M. Upper Oligocene (middle John Day), Haystack Valley, John Day River, Oregon. Collected by L. S. Davis in 1875.

Specific characters.—In comparison with *E. trigonocephalus,* this subspecies shows the following differences:

skull smaller and about 20 mm. shorter in total length (this difference is not due to age, as the holotype is fully adult); very short sagittal crest; tooth-row shorter, individually and totally; muzzle more depressed and highest part of skull above postorbital bridge; postorbital constriction

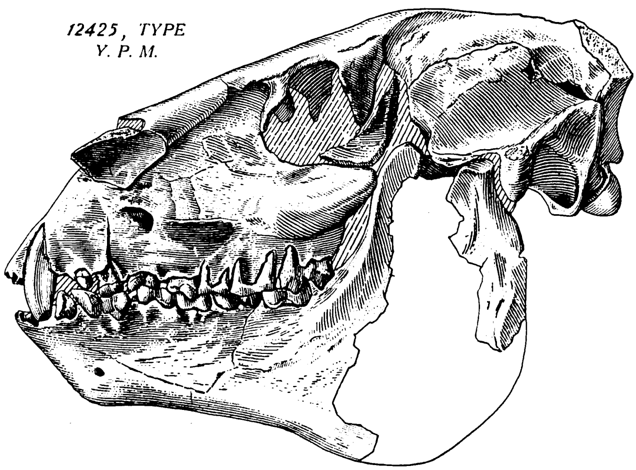


FIG. 4.—*Eporeodon trigonocephalus parvus*, subsp. nov. Holotype. Left lateral view. $\times$ 1/2.

of greater diameter; bullæ large and triangular; anterior portion of bullæ extends forward as far as middle of glenoid articulation; paroccipitals extend outward; M^2 is square instead of being wider than long.

The type locality of *E. trigonocephalus* is the North Fork of the John Day River, and the subspecies is probably the basin representative. However, the new form is middle John Day, and the other, upper.

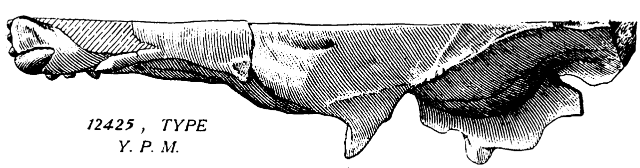


FIG. 5.—*Eporeodon trigonocephalus parvus*, subsp. nov. Holotype. Left half, superior view. $\times$ 1/2.

The paratype of the subspecies, found at Turtle Cove by William Day in 1876, is Cat. No. 12426, Y. P. M., and was enclosed in the typical green matrix of the middle John Day. The superior premolars in both holo- and paratype are crowded, and the nasals extend to a point above the incisor border.

Measurements of Holotype.

	mm.
Length, occip. condyles to prosthion, inc.	169
Superior molar series, length	38
Superior premolar series, length	34.5
Max. diameter, postorbital constriction	35

Eporeodon longifrons (Cope) 1884.

Holotype, No. 7504, Cope Coll., A. M. N. H. Upper Oligocene (upper John Day), North Fork, John Day River, Oregon.

Specific characters.—Skull large and robust; lacrymal fossa moderately deep and well defined; short sagittal crest; cranium and postorbital constriction wide; infraorbital foramen above posterior part of P^3; greatest bizygomatic diameter anterior to glenoid process; posterior part of nasal bones pointed and extending to anterior margin of orbits; posterior nares round, and palate moderately produced beyond M^3.

This species was not common, if we may judge from the number in the Marsh Collection. Specimens were collected under the direction of Professor Marsh on the North Fork of John Day River (type locality), at Haystack Valley, 5 or 6 miles below Cottonwood, and at Turtle Cove.

Measurements of Holotype.

	mm.
Total length of skull	255
Superior molar series, length	47
Superior premolar series, length	47
Superior dental series, with canine, length	118
Diameter, postorbital constriction	47

Eporeodon major (Leidy) 1854.

A fragmentary muzzle with complete and well preserved molar series, together with P^4 and P^3, Cat. No. 12400, Y. P. M., is referred to *E. major*. It coincides with Leidy's description of the type in so far as it is possible to determine. The Yale specimen, the only one of this species in the Marsh Collection from the John Day basin, was found at Turtle Cove on the John Day River by William Day in 1875. It is of middle John Day age.

Eporeodon bullatus (Leidy) 1869.

Three skulls, Nos. 10146, 11056, and 12299, Y. P. M., the two former from Turtle Cove and the third from Bridge Creek, are tentatively referred to this species. In tooth measurements they correspond to the type, but the scarcity of other measurements of the type and the lack of drawings make it impossible to be sure of the identification.

Leidy compared the type with *Oreodon culbertsonii,* which he said it closely resembled, except for the presence of large auditory bullæ. These three skulls from the John Day basin are much more robust than the White River *O. culbertsonii,* and possess a much greater bizygomatic diameter. No. 11056 is more robust than No. 12299, and may be a male. It is also individually older.

These skulls tend toward brachycephaly, as in *E. occidentalis,* and, with the exception of the latter species and *E. trigonocephalus,* they exhibit this trend more distinctly than any other species from the basin. The lacrymal fossæ are relatively small and shallow, the nasal bones wide, the postorbital constriction narrow, the sagittal crest moderately long, the bulla about the size of that in *E. occidentalis,* the palate moderately produced posteriorly beyond M^3, the palate wide, the canines heavy and more robust than in the other species of this locality. In No. 10146 the premolars are crowded so that both P^2 are set obliquely; this is true also in No. 12299, but not to so great a degree.

Eporeodon condoni, sp. nov.

(FIGS. 6-8.)

Holotype, Cat. No. 11016, Y. P. M. Upper Oligocene (middle John Day), Bridge Creek, John Day Valley, Oregon. Collected by L. S. Davis in 1874. Paratypes, Cat. Nos. 11029 and 12294, Y. P. M., from Haystack Valley and Turtle Cove respectively.

Specific characters:—Somewhat smaller than *E. pacificus* and more brachycephalic; length of molar and premolar series approximately equal; bullæ small and less compressed, about the same size as in *E. occidentalis;*

lacrymal fossæ shallower and smaller; paroccipital processes compressed and turned obliquely outward, whereas in *E. pacificus* they are obliquely inward; palate moderately produced and much more round at the posterior nares than even in *E. leptacanthus;* canines less robust than in *E. pacificus;* postglenoids and bullæ in contact.

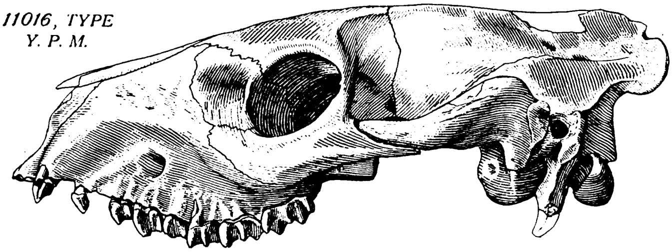


FIG. 6.—*Eporeodon condoni,* sp. nov. Holotype. Left lateral view. × 2/5.

This species is named in honor of Rev. Thomas Condon, to whom is due the distinction of first bringing to the attention of scientists knowledge of the great fossil deposits of the John Day basin. Specimens were collected at Clarno Bottom, Turtle Cove, Big Bottom, and Bridge Creek.

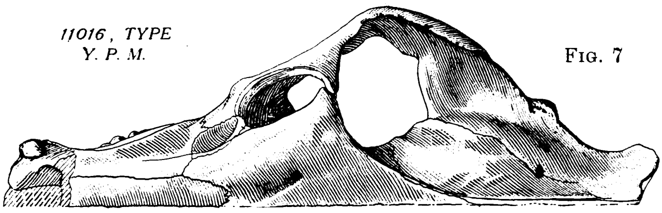


FIG. 7

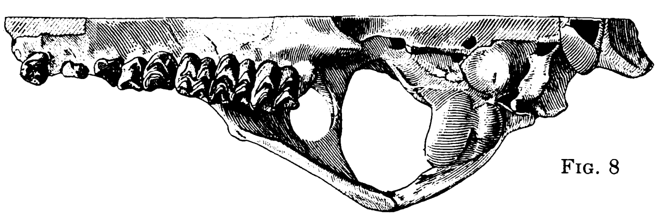


FIG. 8

FIG. 7.—*Eporeodon condoni,* sp. nov. Holotype. Right half, superior view. × 2/5.
FIG. 8.—*Eporeodon condoni,* sp. nov. Holotype. Right half, palatal view. × 2/5.

Measurements of Holotype.

	mm.
Total length of skull	208
Bizygomatic diameter	121.6
Superior molar series, length	42.3
Superior premolar series, length	40
Diameter, postorbital constriction	36.5

Eporeodon perbullatus, sp. nov.

(Figs. 9, 10.)

Holotype, Cat. No. 11011, Y. P. M. Upper Oligocene (upper John Day), Bridge Creek, John Day River, Oregon. Collected by S. H. Snook in 1874. Paratypes, Cat. Nos. 12319 and 12320, Y. P. M., Upper Oligocene (middle John Day), also from Bridge Creek. Collected by L. S. Davis in 1874.

Specific characters.—Bullæ relatively enormous, full and ovate and nearly twice the size of those in *E. leptacanthus*, which is the largest species of this genus in the John Day basin; lacrymal fossæ deep and large; para-

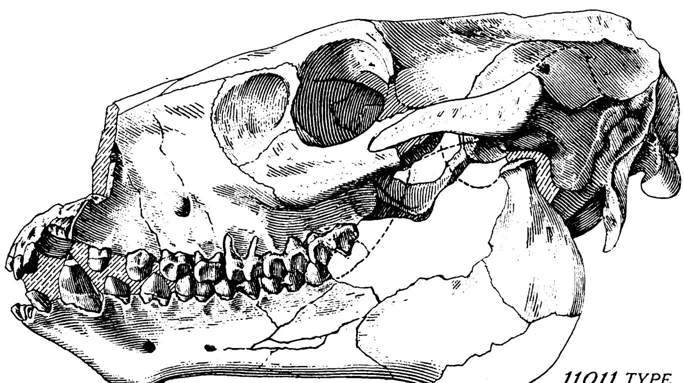


Fig. 9.—*Eporeodon perbullatus*, sp. nov. Holotype. Left lateral view. × 2/5.

mastoids transversely compressed, ending inferiorly in a thin tip and they extend downward and well outward from the median line of the bullæ; postglenoid tubercles relatively small; length of superior dental series intermediate between *E. pacificus* and *E. leptacanthus;* nasal bones wide; cranium wider than in *E. leptacanthus;* palate produced but a very short distance beyond last molar; masseteric fossa relatively deep.

Nos. 11011 and 12320 are probably males, while No. 12319 is more delicately proportioned and may be a female. In the latter, the nasal bones are much more narrow, the orbits smaller, and the whole skull and jaws less robust, than in the other two.

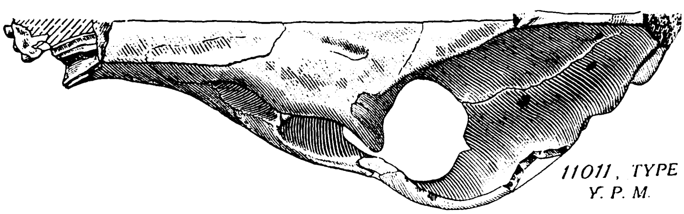


FIG. 10.—*Eporeodon perbullatus*, sp. nov. Holotype. Left half, superior view. × 2/5.

Measurements of Holotype.

	mm.
Total length of skull	227
Bizygomatic diameter	138
Superior molar-premolar series, length	95
Superior premolar series, length	47
Diameter, postorbital constriction	37.5
Ramus, max. length	186
Inferior molar series, length	52
Inferior dental series, with P_1, length	102
Bulla, ant.-post. diameter	31.3
Transverse diameter	25
Vertical diameter	27

Oreodontoides oregonensis, subgen. et sp. nov.

(FIGS. 11-13.)

Holotype, Cat. No. 12329, Y. P. M. Upper Oligocene (upper John Day), Turtle Cove, John Day River, Oregon. Collected by William Day in 1875.

Distinctive characters.—Size small, length less than that of *E. trigonocephalus;* muzzle pointed; face narrow; orbits nearly round, looking chiefly outward, but somewhat upward and forward; cranium very full; no sagittal crest, as frontal ridges do not unite; postorbital constriction very wide; skull depressed at each extremity; lacrymal fossæ well marked, but small; mesocephalic. The sides of the meso- and metastyle of M^3 are straight, giving the metacone a square outline, instead of rounding at the base as in other species. This may or may not be a specific character.

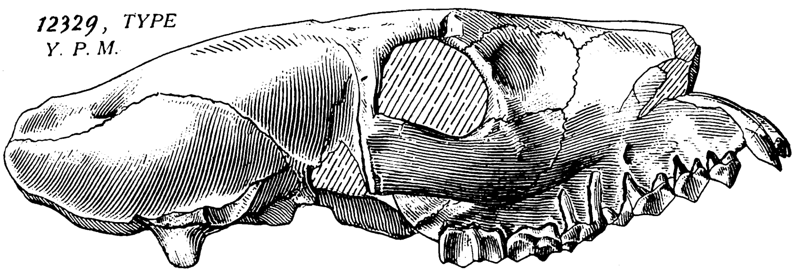
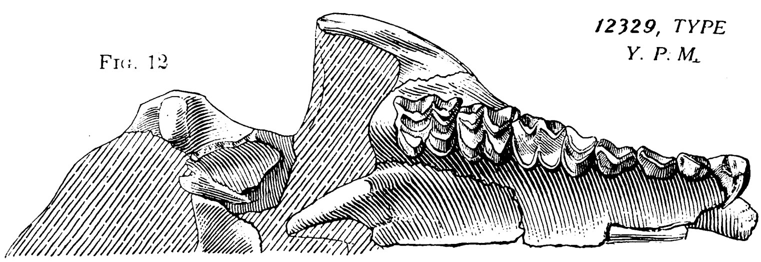


FIG. 11.—*Oreodontoides oregonensis,* subgen. et sp. nov. Holotype. Right lateral view. × 2/3.

Great size of brain chamber, lack of any sagittal crest, unusual diameter of postorbital constriction, and a marked tendency toward brachycephaly are the most marked characteristics of this form.

FIG. 12



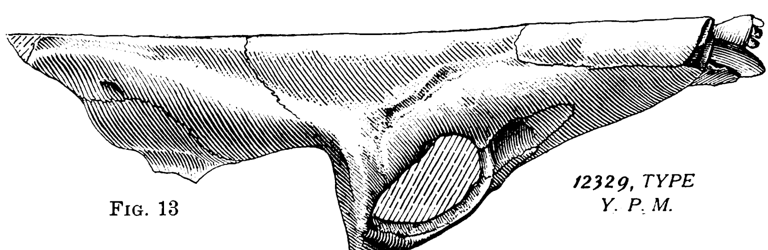


FIG. 13

FIG. 12.—*Oreodontoides oregonensis,* subgen. et sp. nov. Holotype. Right half, palatal view. × 2/3.
FIG. 13.—*Oreodontoides oregonensis,* subgen. et sp. nov. Holotype. Right half, superior view. × 2/3.

Measurements of Holotype.

	mm.
Total length of skull	160*
Superior molar series, length	31.7
Superior premolar series, length....................	30
Cranium, max. width	52.5
Diameter, postorbital constriction..................	42

* Approximate.

Paroreodon marshi, gen. et sp. nov.

(FIGS. 14-16.)

Holotype, Cat. No. 12415, Y. P. M. Upper Oligocene (middle John Day), Haystack Valley-Turtle Cove area, John Day River, Oregon. Collected by L. S. Davis in 1875.

Distinctive characters.—Size small; brachycephalic; facial vacuities in advance of orbits, bounded by lacrymal, frontal, and maxillary bones; enormous brain chamber; extremely short sagittal crest; face short and muzzle narrow; steep basicranial axis; bulla very large and robust, ending inferiorly in a sharp ridge; paroccipital process triangular, with greatest diameter transverse, abutting against bulla for two-thirds its length, and descending outward, forward, and downward; very small diastema between C and P^1; palate produced posterior to M^3; palatal vault uparched; three very small incisors crowded against each other and the canine; lacrymal fossa shallow and open, maximum diameter vertical;

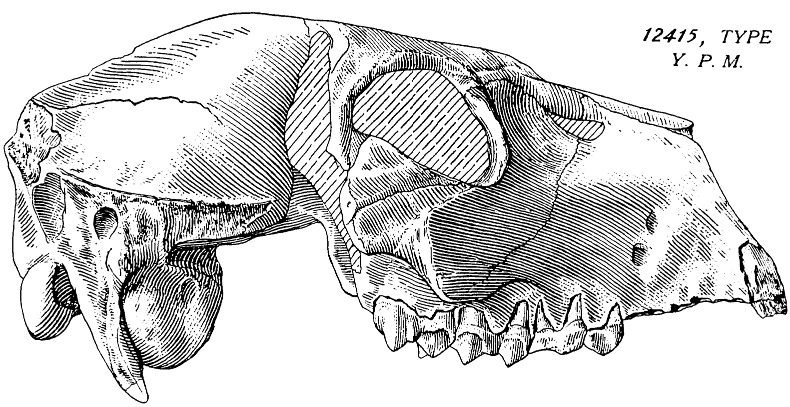


FIG. 14.—*Paroreodon marshi*, gen. et sp. nov. Holotype. Right lateral view. × 2/3.

infraorbital foramen above posterior portion of P^3, this foramen double, with a smaller one above and in advance of the larger. Both sides possess this double foramen, but it is possibly due to individual variation.

FIG. 15

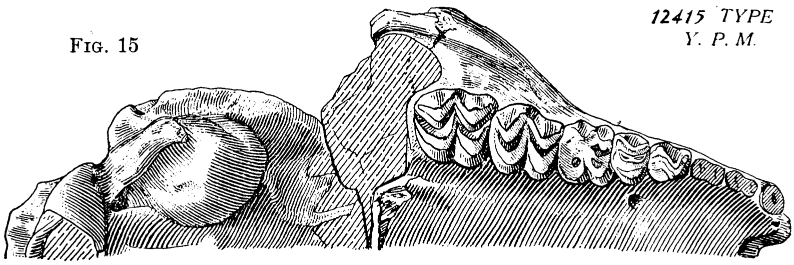


FIG. 16

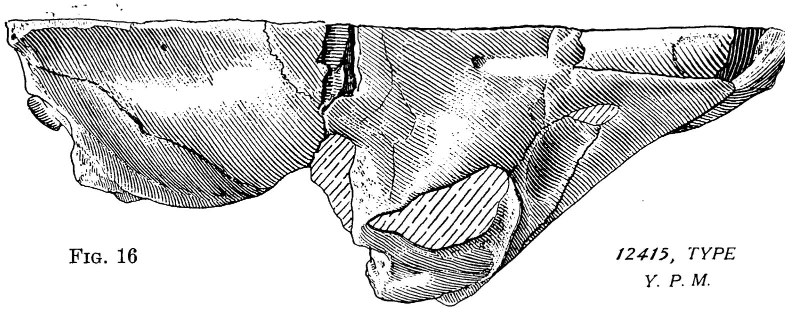


FIG. 15.—*Paroreodon marshi,* gen. et sp. nov. Holotype. Right half, palatal view. × 2/3.
FIG. 16.—*Paroreodon marshi,* gen. et sp. nov. Holotype. Right half, superior view. × 2/3.

Measurements of Holotype.

	mm.
Axial length, basion to prosthion	141.2
Superior molar series, length	38
Superior premolar series, length	33
Cranium, max. width	57.3
Diameter, postorbital constriction	43
Bulla, ant.-post. diameter	23.3
Transverse diameter	21
Vertical diameter	24

REFERENCES.

Cope, E. D.—1880.—Observations on the faunæ of the marine Tertiaries of Oregon. Bull. U. S. Geol. and Geog. Surv. Terr., vol. **5**, 55-69.

— 1884.—A. Synopsis of the species of the Oreodontidæ. Proc. Amer. Philos. Soc., **21**, 503-572.

Cope, E. D.—1884.—B. On the structure of the feet in the extinct Artiodactyla of North America. Pal. Bull. 39.
— 1884.—C. The history of the Oreodontidæ. Amer. Nat., **18**, 280-282.
— 1888-1889.—The Artiodactyla. Ibid., **22**, 1079-1095; **23**, 111-136.
Leidy, J.—1856.—Notice of some remains of extinct vertebrated animals. Proc. Acad. Nat. Sci., Phila., **8**, **163-165.**
— 1873.—Contributions to the extinct vertebrate fauna of the western Territories. Rept. U. S. Geol. Surv. Terr., **1**, 14-358.
Loomis, F. B.—1920.—On *Ticholeptus rusticus* and the genera of Oreodontidæ. This Journal (4), **50**, 281-292.
Marsh, O. C.—1873.—Notice of new Tertiary mammals. Ibid. (3), **5**, 407-410.
— 1875.—Notice of new Tertiary mammals. Ibid. (3), **9**, 239-250.
— 1884.—Dinocerata. U. S. Geol. Surv., Mon. **10.**
Matthew, W. D.—1899.—A provisional classification of the fresh-water Tertiary of the West. Bull. Amer. Mus. Nat. Hist., vol. **12**, 19-75.
— 1909.—Faunal lists of the Tertiary Mammalia of the West. In Bull. **361**, U. S. Geol. Surv., 91-120.
Merriam, J. C., and Sinclair, W. J.—1907.—Tertiary faunas of the John Day region. Bull. Univ. California, vol. 5, 171-205.
Scott, W. B.—1890.—Beiträge zur Kenntniss der Oreodontidæ. Morpholog. Jahrb., **16**, 319-395.

Art. VIII.—*Two New Forms of Agriochœrus;* by Malcolm Rutherford Thorpe.

[Contributions from the Othniel Charles Marsh Publication Fund, Peabody Museum, Yale University, New Haven, Conn.]

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Synoptic table of species.
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Introduction.

The genus *Agriochœrus* has approximately as many synonyms as have the Chalicotheres. In 1850, Leidy described the first form as *A. antiquus* from the badlands of Nebraska. Other genera proposed since that time and now regarded as synonymous are: *Eucrotaphus* Leidy 1852, *Coloreodon* Cope 1879, *Merycopater* Cope 1879, *Artionyx* Osborn and Wortman 1893, and *Agriomeryx* Marsh 1894.