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PLEISTOCENE MAMMALS FROM KANSAS

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Contents

Illustrations

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ABSTRACT

The following mammals are reported as new to the Borchers fauna from lower Pleistocene deposits of Meade county, Kansas: *Canis* sp., *Felis?* sp., *Perognathus gidleyi* Hibbard, *Parahodomys* sp., *Ondatra* sp., and *Equus* sp. Reported as new additions to the Jones fauna, from the upper Pleistocene of Meade county, are *Perognathus* sp., *Onychomys leucogaster* and *Platygonus*. *Cynomys vetus*, n. sp., is described from a Pleistocene deposit in Jewell county, Kansas.

INTRODUCTION

During the summer of 1941, vertebrate fossils were collected from Tertiary and Pleistocene deposits in western Kansas by the University of Kansas Museum field party. Members of the United States Geological Survey who are working on cooperative projects with the Kansas State Geological Survey reported deposits containing fossils and collected some fossils in areas under their study. This material reveals a number of forms that are new to some of the faunas previously reported from Kansas, and permits record of some new fossil-bearing localities and horizons.

Each additional species found associated with a known fauna aids in giving a clearer picture of conditions as they existed at the time the mammals lived. A fauna becomes more important as a unit for correlative purposes when it is completely known, or nearly so. A number of the mammals may be more or less local in distribution and confined to special environmental conditions, but the majority of forms are presumed to be rather wide-ranging species. It is only through the careful study of local faunas, and especially of assemblages that include nearly all species existent at a given time and place, that any progress can be made in horizontal correlation. It is impossible to know the vertical range of a species and its relation to other forms until we possess a better knowledge of the sequence of faunas, and such is accomplished only by intensive collecting and cooperation of those working in the field.

I wish to express thanks to the following members of the United States Geological Survey and Kansas Geological Survey for their cooperation—S. W. Lohman, Herbert Waite, Thad McLaughlin, Bruce Latta, John Frye and H. T. U. Smith; and to the members of the 1941 field party,—A. B. Leonard, George Rinker, Ralph Taylor, Jack Twente, Henry Setzer and Henry Hildebrand. I am greatly indebted to H. H. T. Jackson, of the United States Biological Surveys, C. D. Bunker, of the Museum of Birds and Mammals,

University of Kansas, and Colin C. Sanborn, of the Field Museum of Natural History, for permitting the study of the collections under their care. All drawings were made by Frances Watson. The specimens reported in this paper are in the University of Kansas Museum of Vertebrate Paleontology unless otherwise acknowledged.

PLIOCENE

No new records of mammals from the Rexroad member of the Ogallala formation were obtained, although teeth of *Procastoroides lanei* (Hibbard) and *Nannippus phlegon* (Hay were collected from an outcrop in sec. 4, T. 34 S., R. 29 W., which is a new locality for upper Pliocene vertebrates in Meade county.

PLEISTOCENE

Borchers Fauna

The Pleistocene deposits of the Meade formation at Loc. 9, containing the Borchers fauna, were intensively worked in an attempt to find a more complete assembly of mammals. A description of the fauna already obtained at this place and a discussion of the stratigraphic relationship of the beds has been given by Hibbard (1941), and Frye and Hibbard (1941). The following are additions.

ORDER CARNIVORA

Canis sp.

Plate 1, figure 6

A fragmentary left M^1 (no. 6471) of a young dog as large as *Canis latrans* was collected from Loc. 9. This tooth seems to be identical with the left M^1 (no. 3915) of an older individual taken from an upper Pliocene deposit at Loc. 2, Meade county, Kansas.

Felis? sp.

Plate 1, figure 7

A carnassial tooth, right M_3 (no. 6472), of a cat slightly smaller than a puma from Loc. 9 possesses a well developed heel and, in fact, resembles that tooth in *Pseudaelurus*. The tooth has an anteroposterior diameter of 16.9 mm.

ORDER RODENTIA

Perognathus gidleyi Hibbard (Gidley's pocket mouse)

Plate 1, figures 2, 5

Perognathus gidleyi HIBBARD, *1941,* Am. Midland Naturalist, vol. 26, no. 2, pp. 350, 351, fig. 9. Type locality, Meade county, Kansas, Loc. 3, upper Pliocene.

Eight fragmentary lower jaws, containing partial dentitions, and a right maxillary that are considered identical with the species found in the Rexroad fauna have been found. The right maxillary (no. 6154) possesses a complete dentition. The anteroposterior diameter of P^4-M^3 is 4.1 mm. The lower jaw (no. 5350) has only M_3 lacking. The anteroposterior diameter of P_4-M_2 is 2.8 mm. M_1 is larger than M_2. *Perognathus gidleyi* is distinguished from *P. pearlettensis* Hibbard by its larger size.

EXPLANATION OF PLATE 1

PLATE 1

Cynomys vetus, n. sp.

1—Maxillaries (no. 6187, holotype) occlusal view, x3.

Perognathus gidleyi Hibbard.

2—Right maxillary, P^4-M^3 (no. 6154) occlusal view, x10.

5—Right ramus, P_4-M_2 (no. 5350) occlusal view, x10.

Perognathus sp.

9—Right ramus, P_4 (no. 6042) lateral and occlusal views, x6.

Reithrodontomys pratincola Hibbard

3—Right maxillary, M^1-M^2 (no. 6467) occlusal view, x10.

11—Right ramus, M_1-M_3 (no. 6466) lateral and occlusal views, x10.

Ondatra sp.

4—Right M_2 (no. 6475) occlusal view, x6.

Canis sp.

6—Left M^1 (no. 6471) occlusal view, x2.

Felis? sp.

7—Right M_3 (no. 6472) lateral view, x2.

Onychomys gidleyi Hibbard.

8—Left ramus, M_1-M_3 (no. 4669, holotype) lateral and occlusal views, x6. Rexroad fauna, upper Pliocene, Meade county, Kansas.

Onychomys leucogaster (Wied)

10—Left ramus, M_1-M_2 (no. 6041) lateral and occlusal views, x6.

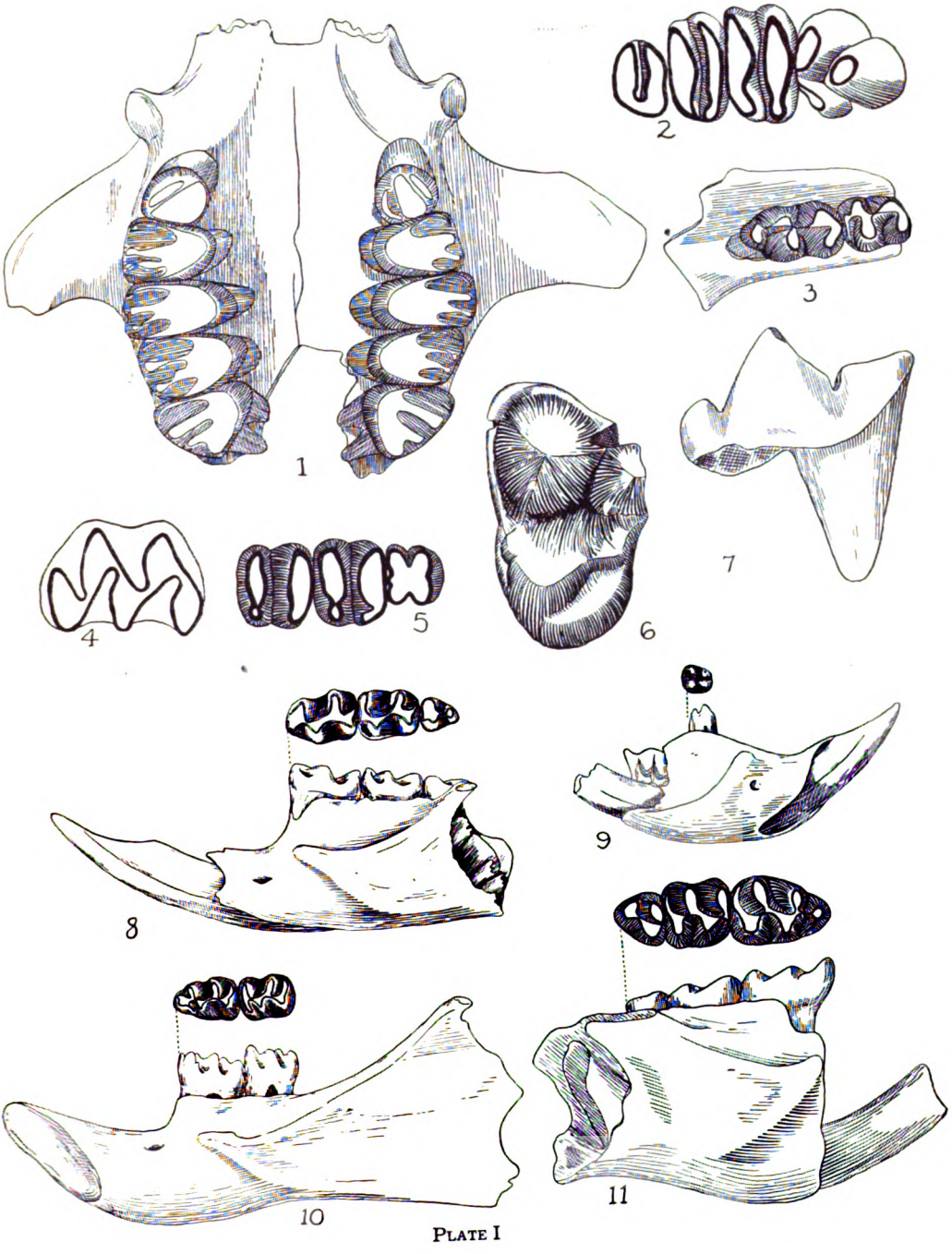

PLATE I

Reithrodontomys pratincola Hibbard

Plate 1, figures 3, 11

Reithrodontomys pratincola HIBBARD, *1941,* Kansas Geol. Survey, Bull. 38, pt. 7, pp. 209, 210, pl. 2, fig. 7. Type locality, Meade county, Kansas, Loc. 9, Pleistocene.

The type was based upon a portion of the right ramus bearing incisor and M_1. Three more specimens have been discovered. A fragmentary right ramus (no. 6465) bears M_1-M_3, the M_1 showing nearly the same amount of wear as the type. The anteroposterior diameter of M_1-M_3 is 2.8 mm. The massateric ridge is more pronounced in the fossil form than in *Reithrodontomys albescens griseus* (Bailey). No. 6466 is a fragmentary ramus bearing M_1 and M_2. The teeth are not as worn as in specimen no. 6465. The mental foramen is present and is slightly more anterior than the position of the foramen in the recent form *R. albescens griseus.* Anteroposterior diameter of M_1-M_2 is 2.2 mm. Part of a right maxillary (no. 6467) that contains M^1-M^2 was found. The anterior cusp of M^1 contains no anterior groove nor evidence of a groove. The anteroposterior diameter of M^1-M^2 is 2.4 mm.

Parahodomys sp.

Fifty-three isolated molars (no. 6474), both upper and lower, referable to the above genus have been collected. The teeth range in wear from that normally shown by young individuals to a well-worn stage representing adults. No rami or maxillaries have been recovered.

Ondatra sp.

Plate 1, figure 4

Only a single tooth, a right M_2 (no. 6475), has been found that belongs to this genus. It belongs to a young animal and is slightly smaller than the corresponding tooth in *Ondatra zibethica cinnamomina* (Hollister), which occurs in the Meade county area at the present time.

ORDER PERISSODACTYLA

Equus sp.

The astragalus (no. 6473) and fragmentary molar of a horse are

in the collection from Loc. 9. The astragalus is as large as those of *Equus niobrarensis* Hay, found at Loc. 8, Meade county, in the Jones "sink."

Jones Fauna

The following forms were collected at Loc. 13, Meade county, and are new to the Jones fauna. A more complete description of this fauna has already been published (Hibbard, 1940).

ORDER RODENTIA

Perognathus sp.

Plate 1, figure 9

A fragmentary ramus (no. 6042) bearing P_4, was found. Because of its fragmentary condition, the specimen can not be separated from either *Perognathus flavus* Baird or *P. flavescens* (Merriam), which now live in southwestern Kansas. It is distinct from the other fossil forms known from Meade county.

Onychomys leucogaster (Wied)

Plate 1, figure 10

A single left ramus (no. 6041) bearing M_1-M_2 can not be distinguished from the Recent species living in the area at the present time.

ORDER ARTIODACTYLA

Platygonus sp.

Two fragmentary molars (no. 6037) of a peccary were found associated with other mammal and *Ambystoma* remains.

Other Assemblages

Other vertebrate remains have been found recently at various places in Kansas. Chief in interest are the remains of a new species of prairie dog *(Cynomys)*, found by H. A. Waite, of the Geological Survey, in Jewell county, Kansas.

ORDER RODENTIA

Cynomys vetus, n. sp.

Plate 1, figure 1

Holotype.—University of Kansas Museum of Vertebrate Paleontology, no. 6187, maxillaries bearing P^3-M^3, upper incisors and skull fragments of an old adult; collected by Herbert A. Waite, September, 1941.

Horizon and type locality.—"Early phase of the Loveland loess" (brown zone, whitened by calcareous matter and containing large limestone concretions, occurring below the typical red phase), Pleistocene, sec. 3, T. 1 S., R. 10 W., Jewell county, Kansas.

Diagnosis.—A prairie dog belonging to the subgenus *Cynomys*, smaller than *C. mexicanus* Merriam, P^3 more circular in outline and not so oval, infraorbital foramina smaller, infraorbital process of the maxillary not as robust, supraorbital foramina notch better developed, maxillary teeth smaller and having narrower transverse diameter.

Description of type.—A shattered skull of an old adult prairie dog smaller than *Cynomys gunnisoni* (Baird). The maxillaries are present and bear P^3-M^3. Part of the left orbit and zygomatic arch and the anterior tip of the nasals are shown by the specimen. The posterior edge of the zygomatic process of the maxillary is located on a line with the middle of M^2.

Measurements (in millimeters) of the type of Cynomys vetus, *no. 6187 KUMVP, and Recent specimens of* Cynomys mexicanus *Merriam, in the U. S. National Museum, from La Ventura, Coahuila, Mexico.*

	TYPE 6187	USNM 79543 ♀	USNM 79550 ♂
Crown length of P^3-M^3	13.2	14.8	14.6
Alveoli length of P^3-M^3	14.0	16.1	16.1
Greatest diameter of P^3	2.9	2.9	3.0
Greatest anteroposterior diameter of P^4	3.0	3.2	3.1
Transverse diameter of P^4	4.45	4.6	4.5
Greatest anteroposterior diameter of M^1	2.6	2.8	3.0
Transverse diameter of M^1	4.5	5.4	5.2
Greatest anteroposterior diameter of M^2	2.6	3.0	3.2
Transverse diameter of M^2	4.5	5.1	5.3
Greatest anteroposterior diameter of M^3	3.2	4.5	4.0
Transverse diameter of M^3	4.3	4.5	5.1
Width of skull across infraorbital processes	15.3	19.0	20.7
Distance between LP^3 and RP^3	7.2	10.5	10.4
Distance between LM^3 and RM^3	4.0	5.2	5.5

In comparison with *Cynomys mexicanus*, P^3 is more circular in outline, the palate narrower, and the molar teeth possess a shorter transverse diameter. M^3 considerably smaller, also. *C. vetus* is distinguished from *C. niobrarius* Hay, from the Pleistocene near Grayson, Neb., by its much smaller size and the absence of a sharp, prominent ridge along the middle of the palate.

Cynomys ludovicianus Ord

The remains of fossil prairie dogs referable to this species, which is now living in Kansas, were collected from scattered localities.

A number of lower jaws, fragmentary skulls and other skeletal remains (no. 6286) were found by J. C. Frye in flood plain sediments of the intermediate trrace in sec. 27, T. 14 S., R. 11 W., Russell county, Kansas. The fossils were taken along a bluff from old burrows on the same level, 29 feet below the surface. These remains are indistinguishable from the Recent species.

Parts of another skeleton, including lower jaws and part of the skull (no. 517) were collected by H. T. U. Smith, August 30, 1941, in SE¼ sec. 18, T. 1, R. 38 W., Cheyenne county, Kansas, 11 feet from the base of a 25-foot terrace along the Republican river.

The skull, lower jaws and other skeletal remains of the prairie dog, *Cynomys ludovicianus*, were collected in sec. 35, T. 34 S., R. 29 W., Meade county, Kansas, from outcrops measured by Smith (1940, p. 101). At the point where these bones were collected there is a change in facies, so that the beds do not correspond with Smith's measured section, although they were taken 17 inches above Smith's zone 7, and 13 feet below the soil zone, from a resistant bench composed of interbedded light reddish-brown to buff silt and clay.

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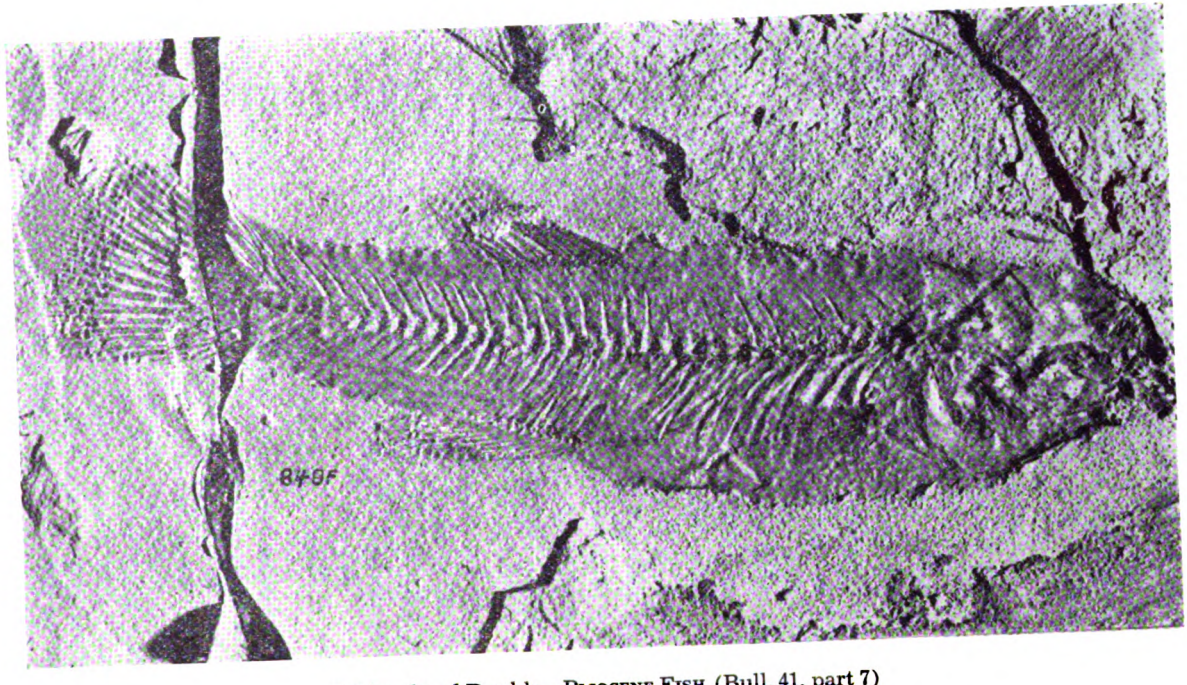

Plate 1. *Fundulus detillae*, n. sp. University of Kansas Museum Vertebrate Paleontology, holotype (no. 848F); middle Pliocene, Logan county, Kansas. Total body length 50.6 mm.

STATE GEOLOGICAL SURVEY OF KANSAS, BULLETIN 41
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A NEW SPECIES OF CYPRINIDONTID FISH FROM THE MIDDLE PLIOCENE OF KANSAS

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ILLUSTRATIONS

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ABSTRACT

A new species of cyprinidontid fish, *Fundulus detillae*, is described from the middle Pliocene, Ogallala formation, of Logan county, Kansas.

INTRODUCTION

During the summer of 1924 the late H. T. Martin, then Curator of Paleontology, at the University of Kansas Museum of Vertebrate Paleontology, while working the "Rhino Hill" quarry in Wallace county, incidentally discovered fish scales and leaf impressions in diatomaceous marl deposits in the vicinity. Later, M. K. Elias, of the Kansas State Geological Survey, studied the geology of Wallace county, incorporating his findings in a Survey report (Elias, 1931). In the course of his studies Elias discovered other outcrops of the marl, including one just east of Wallace county in sec. 7, T. 11 S., R. 37 W., Logan county. In this deposit he found a few fragmentary leaves and fish remains. On August 30, 1931, William K. McNown and Claude W. Hibbard, while engaged in reconnaissance work in western Kansas, met Doctor Elias and his son Max at the "Rhino Hill" quarry. With him were three residents of the area, C. M. DeTilla and West Grover of Wallace, Kan., and Emil Schroeder of Brewster, Kan., all of whom had assisted Martin in the past. Mr. DeTilla succeeded in locating the fossiliferous horizon in the Logan county marl deposit, and a number of fish skeletons were found at this time. The locality was not visited again until David and Helena Dunkle, in August, 1935, spent four days at the quarry collecting fossil leaves and fishes. A Kansas Museum field party, composed of C. W. Hibbard, Faye Ganfield Hibbard, Joe Tihen, Francis Parks and Otto Tiemeier, spent the period from July 6 to July 18, 1936, collecting fossil fish and plants from the marl. Finally, David and Helena Dunkle spent one day in August, 1940, collecting at the locality.

The collection made in 1931 formed the basis of the report upon the flora by Chaney and Elias (1936) as well as the fishes reported by Hibbard (1936). Most of the material included in this report is also a part of the collection made in 1931.

We wish to express our gratitude to the many individuals mentioned, and to George Vincent, owner of the ranch upon which the deposit is located, for their assistance in making this collection.

The new species of fossil fish here described is represented in the collection of the University of Kansas Museum of Paleontology by

numerous specimens, all from the diatomaceous marl deposit of Logan county described above. The series includes skeletal assemblages of all degrees of completeness. Preservation of the fossils is generally poor, inasmuch as many are distorted. Also, unavoidable damage from mechanical cleavage of the marl adds to the difficulty of obtaining good specimens.

It has been possible to determine that the new species of fish possessed cycloid scales that extended anteriorly over the dorsal and lateral regions of the head; well developed eyes; the margin of the upper jaw formed only by the premaxillaries; fixed conical teeth in more than one series; aspinous fins; a single dorsal fin, posteriorly inserted slightly in advance of the anal fin; no modification of any of the anal fin rays into intromittent organs; a normal vent; the caudal fin not forked; abdominal pelvic fins; and no lateral line. These observable characters place the fish, without doubt, in the order Cyprinodontes, and in the subfamily Fundulinae of the family Cyprinodontidae.

Description of Species

Fundulus detillae, n. sp.

Plate 1 (page 270)

Holotype.—University of Kansas Museum of Vertebrate Paleontology, no. 848F, a complete but imperfectly impressed fish in counterpart; collected by C. M. DeTilla, August 30, 1931. Paratypes, nos. 852F, 856F, 861F, 865F, 872F, 878F, 878aF, 880F, 881F, 1137F and 1143F, are nearly complete impressed fish.

Horizon and type locality.—Middle Pliocene beds of the Ogallala formation; sec. 7, T. 11 S., R. 37 W., Logan county, Kansas.

Diagnosis.—A *Fundulus* which differs from all of its closest allies in the following combination of structural details: head length and maximum body depth more than one third of total body length; conical teeth in more than one series, firmly attached to the premaxillaries and dentaries. Four branchiostegal rays; vertebrae approximately twice as long as deep; dorsal fin having 13 rays inserted in advance of the anal fin, which is composed of 11 rays; caudal having 29 rays.

Description of the holotype.—A small moderately elongated fish. Head scaled dorsally and laterally, relatively large, depressed, its

length with the opercular apparatus, which approximates the maximum body depth, contained 3.25 times in the body length, and its greatest depth contained 4.1 times in this length. Bones of the head not observable. Orbit ovate, centrally placed, and small, its length equalling one fifth the length of the head and operculum. Suspensorium inclined far forward. Mouth terminal, uptilted by the projection of the lower jaws, and gape small. Maxillaries restricted from the edge of the mouth by large premaxillaries, which exhibit concave dentigerous margins. Dentary bones weakly united at the symphysis. Teeth styliform and curved, firmly attached to the premaxillaries and dentaries, and in more than one row, the external series much enlarged. Opercular bones normal. Four saber-like branchiostegal rays on either side. Vertebrae 37, their length twice their depth, strongly constricted; strengthened by pairs of dorso-laterally and ventro-laterally disposed longitudinal ridges. Neural and haemal structures all about equally developed, expanded and firmly attached to the centra proximally, right and left halves fused distally, and provided with short spinous processes. Ribs robust, very slightly arched, and reaching only two thirds the distance to the ventral body margin. Dorsal fin posteriorly placed, beginning of insertion located opposite the 18th trunk vertebra; 13 rays, the anterior 4 shorter than the rest and not deeply bifurcated, slightly acuminate behind, longest ray approximately as long as the length of the insertion of the fin. Caudal fin deep, not emarginated but roundly truncated, 16 bifurcated rays preceded dorsally by 9(?) and ventrally by 4 short, unbifurcated rays. Anal fin shorter at the base but deeper than the dorsal, having 11 unmodified bifurcated rays, the first of which is inserted below the 19th vertebra, and the longest of which exceeds by one third the length of the fin base. Proximal radial supports of both dorsal and anal fins short, transversely compressed and longitudinally expanded. Pelvic plate inserted opposite the 13th abdominal vertebra. Pelvic fins abdominal and originating slightly nearer the anal than the pectoral; number of their rays not determined. Pectoral fins elevated, large and distally overlapping the pelvic plates.

Scales large, cycloid, and widely overlapping. Those from the dorsal trunk region, 1.6 mm in length, round in outline, nuclei centrally placed, exhibiting 8 to 11 complete basal radii; circuli on exposed portions of scales not densely concentrated. No evidences of lateral line observable.

Measurements of the holotype.—Length from snout to base of caudal fin, 52 mm; length of head and opercular apparatus, 15.7 mm; maximum depth of head, 12.5 mm; maximum body depth at anterior insertion of pelvic fins, 15.3 mm; depth of caudal pedicle, 7.6 mm.

Variations.—The series of referred specimens reveal only a few structural details that have not been indicated already in the description of the holotype. One feature is the characteristic structure of the premaxillary, which is indicative of the extreme protractility of the mouth in this family of fishes. Also, the basal pharyngeals are separate and covered by an irregular series of conical teeth. In addition, several specimens show the complete paired fins, the pectorals composed of 16 bifurcated rays and the pelvic of 6 to 7.

These specimens show the following extreme range of measurements: total length from snout to base of caudal fin, 25.9 to 69.5 mm; length of head with opercular apparatus, 7.1 to 19.5 mm; maximum depth of head, 3.0 to 14.0 mm; maximum body depth at anterior insertion of pelvic fins, 4.5 to 19.4 mm; depth at caudal pedicle, 1.9 to 9.7 mm.

Variations in the number of vertebrae and fin rays noted are: vertebrae, 31 to 37; dorsal fin rays, 12 to 13; total caudal rays, 29 to 36; anal rays, 10 to 13. Certain of these variations, such as the differences in the number of caudal rays and vertebrae, which seem excessive, may be inaccurate owing to distortion in preservation and damage in collecting.

Remarks.—On the basis of skeletal evidence alone, it is not possible to assign the described species to any genus other than *Fundulus,* in spite of the differences listed in the diagnosis. *F. detillae* differs from *Parafundulus nevadensis* Eastman in that the latter possesses a dorsal fin more anteriorly placed in relation to the anal. It is distinguished from *P. erdisi* Jordan by characters of the vertebrae, which are deeper than long in *P. erdisi.*

Fundulus detillae was found associated with *Chaenobryttus kansasensis* Hibbard, *Pomoxis lanei* Hibbard and the fossil frog *Scaphiopus studeri* Taylor.

This species is named in honor of Mr. C. M. DeTilla of Wallace, Kan., who discovered the occurrence of these fishes and to whom we are indebted for assistance.

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