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RODENTS FROM THE PALEOGENE OF GUANAJUATO, MEXICO

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In 1952, Arellano published a brief note on the discovery of fossil mammals of early Cenozoic age in the red conglomerate of Guanajuato, Mexico. This was followed by a detailed account of the discovery and description of the vertebrate material by Fries *et al.* (1955). In 1962, one of us (JJS), accompanied by Dr. Richard Etheridge, visited the locality for one day. This work was supported by the National Science Foundation (Grant G-20875) and resulted in the finding of the rodent specimens described herein.

This new material was collected from the locality figured by Fries *et al.* (1955, plate 1), about 2000 meters south of Marfil, Guanajuato, Mexico. These authors have already given a complete description of the geologic occurrence of the fossil material (*op. cit.*, pp. 4-8). The new specimens add nothing to a determination of the age of the red conglomerate except that they reinforce previous suggestions of an early Cenozoic age. One specimen represents a new genus of rodent of uncertain affinities while the other specimen adds further information about *Floresomys guanajuatoensis* described by Fries, Hibbard and Dunkle.

We wish to thank Dr. Clayton Ray of the National Museum of Natural History (USNM) for the loan of a specimen of *Floresomys* and Dr. A. E. Wood for information on a hystricognathous rodent from the Eocene of Texas and for his comments on the manuscript. All measurements are in millimeters. The specimens are deposited in the Texas Tech University Museum (TTU-P) paleontological collections. This work was supported by grants from the National Science Foundation (GB-30840X to Black and G-20875 to Stephens) and by the Institute of Museum Research, Texas Tech University.

Systematic Description

Order Rodentia

Family indet.

Guanajuatomys, new genus

Type species.—*Guanajuatomys hibbardi*, a new species described beyond.

Diagnosis.—Mandible heavy, strongly curved under p4-m1 with incisor passing medial to angle; symphysis long, reaching to below m2, but quite shallow; masseteric crests weak; masseteric fossa ends below m2; p4-m3 cuspate; hypoconulids large on p4-m3 and elongate anteroposteriorly; trigonid basins small.

Guanajuatomys hibbardi, new species

Figs. 1-3

Holotype.—TTU-P 1140, left mandible with p4-m3.

Diagnosis.—As for genus.

Description.—The mandible is heavy and short with short diastema. The dorsal surface of the mandible is only shallowly depressed anterior to p4, and anteriorly it rises above the level of the cheek teeth alveoli. The ventral border of the mandible drops steeply from the anterior end of the incisor to below m2 where it bends sharply dorsally. This gives a broadly V-shaped appearance to the ventral border. The symphyseal scar is long, stretching back to below m2, and is compressed dorso-ventrally. Only the lower masseteric ridge is well developed. The masseteric fossa ends below m2. There is one large mental foramen just below the anterior root of p4 and a second much smaller foramen below the front of m1. The incisor passes internal to the ascending ramus and angle and appears to terminate below m2, although it may have passed somewhat farther, rising below m3. The angular process is displaced laterally and arises from the mandible lateral to the lower incisor rather than from the ventral margin of the incisor alveoli. The angle does not originate below the level of the incisor alveolus as it does in *Cavia*, nor is there any suggestion of the dorsal masseteric pit characteristic of later caviids. The angle rises well above the ventral border of the mandible and thus above and lateral to the incisor alveolus. At its point of origin the angle does not flare laterally as much as in some hystricognaths such as *Ctenomys*, but it does arise dorsolaterally as in that genus and not from the ventrolateral side of the mandible. The ascending margin of

TABLE 1.—*Dental measurements (in millimeters) of* Guanajuatomys hibbardi.

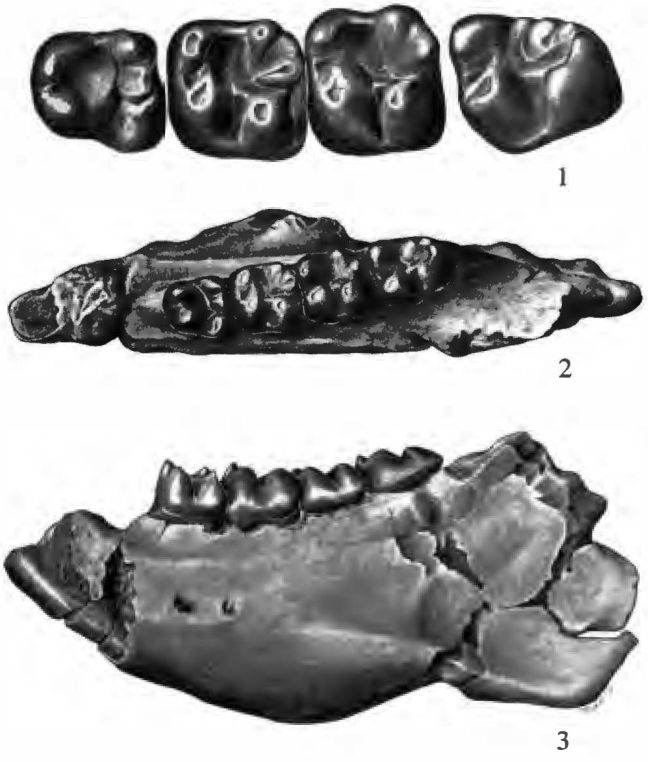
Tooth	Antero-posterior	Transverse
p4	2.25	1.75-2.05
m1	2.30	2.20-2.30
m2	2.30	2.40-2.40
m3	2.70	2.40-2.00

the ascending ramus rises just lateral to m3; and there is only a narrow shelf between m3 and the ascending ramus.

The dentition is in some respects that of a rather generalized ischyromyid. The first and second molars are square in occlusal outline whereas p4 and m3 are more elongate. There are four prominent, subequal cusps on p4-m3, with the protoconid and metaconid slightly higher than the hypoconid and entoconid. The protoconid and metaconid are closely appressed with only a shallow and narrow valley, rather than a true trigonid basin, separating them. On m1 there is a small trigonid basin enclosed both anteriorly and posteriorly whereas on m2 and m3 this basin is open posteriorly into the talonid. On p4-m3 there is a prominent hypoconulid that is only slightly smaller than the entoconid. The talonid basin is small and crowded on m1-m3. There is essentially no ectolophid and no metastylid. The incisor is somewhat compressed and is triangular in cross section. The enamel is quite thin. The enamel slightly overlaps the medial side of the incisor and covers about one-fifth of the lateral surface.

Discussion.—Wood (1972) has recently published on a rodent mandible from the late Eocene of Texas that is clearly hystricognathous in character. In this specimen, the angle spreads laterally and ventrally from the side of the mandible in quite a different manner from that in *Guanajuatomys.* The Texas specimen is the earliest record of this type of jaw structure for a New World rodent. In light of this discovery, it is not surprising to find a rodent with an hystricognathous mandibular structure in the early Tertiary of Mexico, although the hystricognathy is different in the two cases.

Wood did not figure the molars of his specimen but described their crown pattern (1972:1251) as being "closer to that in some members of the predominately North American Eocene family Sciuravidae than to any other rodent with which it has been compared." He has supplied me with drawings of the dentitions and the Texas specimens are clearly distinct from *Guanajuatomys.* As the dental morphology of *Guanajuatomys* is clearly not sciuravid in affinities but much closer to that of some of the ischyromyids, it appears that at least two rodent



FIGS. 1-3.—*Guanajuatomys hibbardi*, holotype, TTU-P 1140: 1, crown view p4-m3, × 8; 2, dorsal view of mandible, × 4; 3, lateral view of mandible, × 4.

lineages with an hystricognathous condition were present in southern North America during the early Tertiary.

This specimen has been compared with various ctenodactylids, which are hystricomorphous but sciurognathous. It differs from all members of this family in dental morphology as m1-m2 are essentially square in occlusal outline in *Guanajuatomys* whereas they are elongate in ctenodactylids and in *Advenimus* (Dawson, 1964), which, if not a ctenodactylid, is probably ancestral to them. Also, no ctenodactylids are known outside of Asia and Africa.

Guanajuatomys could have descended from the North American *Leptotomus* complex. The dental pattern of the cheek teeth is sufficiently generalized to make such a derivation feasible through the addition of a strong hypoconulid and change in the length to width proportions of m1-m2. However, no specimen of *Leptotomus* is

known that shows any tendency towards development of a hystricognath angle.

At present we leave *Guanajuatomys* without familial assignment. *Guanajuatomys*, on dental morphology, could not have been ancestral to the South American caviomorphs.

Etymology.—G. hibbardi is named in honor of Dr. Claude W. Hibbard.

Family ?Sciuravidae

Floresomys Fries, Hibbard, and Dunkle, 1955

Type species.—Floresomys guanajuatoensis.

Emended diagnosis.—Protrogomorphous; P3 reduced; P4 reduced, metacone and hypocone much smaller than protocone and paracone; M1-M3 with cusps isolated; M1-M2 four-cusped with small metaconule; anterior cingulum strong; mesostyle absent on M1, small on M2; distinct transverse valley; p4 reduced with protoconid and metaconid distinct only at their apices; m1-m3 with four main cusps and a strong hypoconulid; no anterior cingulum or trigonid basin; transverse valley deep.

Floresomys guanajuatoensis
Figs. 4-10

Holotype.—No. 52-137, Instituto de Geologia de la Universidad Nacional Autonoma de Mexico, right and left rami with p4-m3 and left maxillary with P3-M3.

Hypodigm.—Type and USNM 20139, partial left ramus with p4-m3 and TTU-P 1141, associated right and left rami with m1-m3 and skull fragment with RP3-M2 and LM1-M3.

Description.—There is only a small portion of the skull preserved and this has been broken and laterally compressed. The incisors and parts of the cheek teeth of both sides are present as is the anterior zygomatic root and a short portion of the zygomatic arch on the right side.

The rostrum is narrow and probably tapered. The upper incisors are sharply curved. The anterior face of the zygomatic root is nearly vertical and lies just anterior to P3. Only the ventral border of the infraorbital foramen is preserved and it lies immediately anterior to and above P3. There is no knob of bone on the ventromedial surface of the zygomatic root as in *Sciuravus* (Dawson, 1961:3) and *Paradjidaumo* (Wilson, 1949*b*:37). There is a faint ridge from the base of P3 along the anterior and then the lateral margin of the zygomatic

TABLE 2.—*Dental measurements (in millimeters) of* Floresomys guanajuatoensis.

Tooth	Antero-posterior	Transverse
p4	1.05	-0.9
	1.45	1.10-1.40
m1	1.40	1.10-1.40
	1.45	1.40-1.50
m2	1.45	1.40-1.50
	1.35	1.30-1.30
m3	1.30	1.30-1.30
P4	1.00	1.30-
	1.40	1.60-
M1	1.40	1.60-
	1.30	1.50-
M2	1.35	1.60-
M3	1.20	1.40-

arch. This ridge delimits the area of attachment of the *masseter lateralis*, which was completely limited to the ventral border of the zygoma. The zygomatic arch itself parallels the tooth row as it passes posteriorly.

The portion of the mandible preserved closely resembles the specimen figured previously (Fries *et al.*, 1955, fig. 6d). The mandible is slender and deep. The masseteric fossa extends to a position below the anterior end of m2. The masseteric ridges are not prominent. Anterior to the V-shaped termination of the masserteric fossa there is a shallow excavation under the posterior portion of m1, from which a slip of the *masseter lateralis* probably arose. The diastemal portion of the mandible is completely missing. There is no shelf or pit between the ascending ramus and m3 for insertion of part of the pterygoid musculature.

P3 is shown as an extremely minute peglike tooth by Fries *et al.* (1955, fig. 6a). In TTU-P 1141, the crown of P3 was lost during preparation but not before Fig. 5 had been prepared. P3 in this specimen was considerably larger than in the type and displayed a central cone with anterior and posterior cingula. P4 is reduced in size with the protocone by far the largest of the major cusps. Both the hypocone and metacone are quite small. The paracone is intermediate in size between the protocone and metacone. The anterior cingulum is short and narrow, passing from about midface of the paracone to midface of the protocone, and it lies well below the tops of these cusps. There is a thin, very short loph between the protocone and paracone but no loph between the protocone and metacone. The hypocone and metacone

FIGS. 4-5.—*Floresomys guanajuatoensis*, TTU-P 1141: 4, ventral view of skull fragment × 6.5; 5, crown view of P3-M2, × 12.5.

are joined through the anterior and posterior crests that isolate a small pit between them. The hypocone is separated from the protocone by a rather deep valley. P4 appears to be undergoing reduction through a diminution in size of the posterior half of the tooth.

M1 and M2 are of approximately equal size and display four subequal cusps, the paracone, protocone, metacone, and hypocone. There is a short anterior cingulum from midprotocone into the base of the paracone. There are small metaconules on M1-M2 but these do not connect with the metacones. There is a protoloph but no metaloph.

The lower premolar, although broken, also appears to be greatly reduced in size. The metacone is missing but both protocone and metacone appear to have been closely appressed into a single transverse loph. The talonid basin is minute. Both hypoconid and entoconid lie well below the level of the protoconid and at the base of the protoconid-metaconid slope.

The lower molars, m1-m3, are rectangular in occlusal outline and display four subequal cusps on their crown surface. There is a faint indication of an anterior cingulum along the anterior face of the pro-

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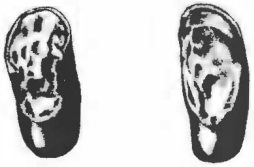

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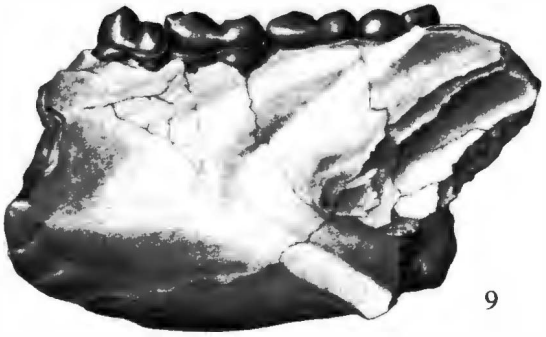

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FIGS. 6-10.—*Floresomys guanajuatoensis*, TTU-P 1141: 6, crown view of p4-m3, × 8.5; 7-8, cross section of lower incisors, × 11; 9, lateral view of left mandible, × 8.5; 10, crown view of pm1-m3, × 8.5.

toconid. There is no suggestion of either a mesostylid or ectolophid. The protoconid and metaconid on the molars are set together with little indication of a trigonid basin. The anterior two cusps on m1-m3 are considerably higher than are the hypoconid and entoconid. These latter cusps are separated from the trigonid by a shallow and narrow

valley. There is a small hypoconulid set behind and internal to the hypoconid.

Discussion.—It is extremely difficult to place *Floresomys* in any family of early Tertiary rodents. Fries *et al.* (1955) originally assigned the genus to the subfamily Sciuravinae of the family lschyromyidae. This assignment is followed here but with the sciuravids given family rank.

Floresomys is placed in this family primarily on the pattern of the upper dentition. The upper molars have large separate hypocones and no conules, characters which Wilson (1949*a*:96) considered of prime importance in distinguishing sciuravids from other early Tertiary rodents. The lower dentition is not typically sciuravid as the molars lack any indication of a hypolophid or entoconid crest and the entoconid joins the short posterolophid rather than being separate from it.

There is some suggestion of geomyoid affinities in *Floresomys*, particularly in the lower dentition, the laterally compressed incisor, and the long, narrow rostrum. The reduction to four nearly isolated cusps on the lower molars and the small p4 give a first impression of heteromyid relationship. However, the masseteric structure, presence of P3 and the upper P4-M3 morphology are not heteromyidlike in any way. Eomyid relationships are ruled out by the structure of P4, the absence of cingula and mesolophids on the lower molars, and the dominance of cusps rather than lophs on all cheek teeth.

In sum *Floresomys* appears to be a sciuravid which has evolved somewhat towards geomyids. It is a divergent member of the family and at present is isolated within the group.

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