# A NEW LEPORINE (LAGOMORPHA: LEPORIDAE) FROM WISCONSINAN DEPOSITS OF THE CHIHUAHUAN DESERT

Brett D. Russell and Arthur H. Harris

*Laboratory for Environmental Biology, University of Texas at El Paso, El Paso, TX 79968*

Abstract.—A new genus and species of rabbit is described from late Pleistocene (mid-Wisconsinan) deposits of Dry Cave, southeastern New Mexico. Additional specimens are known from Anthony Cave, south-central New Mexico and adjacent Texas; U-Bar Cave, extreme southwestern New Mexico; and Jiménez Cave, southern Chihuahua, México. This rabbit is characterized by its small size, nearing that of the dwarf rabbit, *Sylvilagus leonensis* Cushing; $P_3$ enamel pattern with similarities to that of *Nekrolagus progressus* (Hibbard); heavily crenulated reentrant folds on the lower dentition; long mandibular diastema with incisor terminating well anterior to $P_3$; and limb proportions that imply a cursorial habit similar to that of *Lepus californicus*. A close affinity with *N. progressus* is indicated by characters of $P_3$; however, other features in the lower dentition could imply affinity with Eurasian taxa.

The purpose of this paper is to describe a new genus and species of fossil rabbit from the Chihuahuan Desert of North America.

During a series of excavations conducted between 1965 and 1971, remains of a small rabbit were recovered from mid-Wisconsinan deposits of Dry Cave, 24 km W of Carlsbad, New Mexico, at an elevation of 1,280 m (see Harris, 1970, for description of Dry Cave and the local environment). Due to insufficient material, its affinities remained a mystery until January of 1982, when further excavations uncovered the first mandibles with dentition. These specimens, along with others obtained through a careful reexamination of uncatalogued material from the earlier work at Dry Cave, represent an undescribed genus and species and currently total 14 dentaries, 3 isolated lower cheekteeth, and 41 postcranial elements (the upper dentition is not surely separable from that of *Sylvilagus*). Radiocarbon dates on bone carbonates (Harris, 1980) indicated ages between about 25,000 BP and 34,000 BP for the Dry Cave deposits from which the remains were retrieved.

More recently, the same taxon was identified among the faunal assemblages of three more sites: Anthony Cave, located in the Franklin Mountains on the boundary of Dona Ana Co., New Mexico, and El Paso Co., Texas (T26S, R4E, SW¼ SW¼ Sec. 35, elevation 1,555 m); U-Bar Cave, in the Alamo Hueco Mountains of extreme southwestern New Mexico (elevation ca. 1,550 m); and Jiménez Cave, located in southern Chihuahua, México (14 km SE Jiménez, 27°7'N, 104°55'W, elevation 1,450 m). A late Pleistocene pluvial age is suggested by the fossil biota of Anthony Cave (Smartt, 1977), but faunal evidence also suggests some material predates full-glacial conditions. The U-Bar Cave fauna (Harris, 1985*b*) is mid-Wisconsinan, with dates of >31,150 and 35,890 BP associated with the material described as new herein. Dates are not available for Jiménez Cave, but the fauna (Messing, in press) suggests interstadial conditions or a version of full-stadial conditions warmer than those of more northern sites.

## Subfamily Leporinae

### *Aztlanolagus*, gen. nov.

*Genotype.—Aztlanolagus agilis* sp. nov.

*Distribution.*—Rancholabrean deposits of Anthony Cave, Dona Ana Co., New Mexico, and El Paso Co., Texas; Dry Cave, Eddy Co., New Mexico; Jiménez Cave, Chihuahua, México; U-Bar Cave, Hidalgo Co., New Mexico.

*Diagnosis.—Aztlanolagus* may be distinguished from all other known leporids as follows. Lower incisor terminates under diastema and well anterior to $P_3$. Three reentrant folds present on trigonid of $P_3$: an anterior reentrant fold, an anterointernal reentrant fold (rarely cut off to form an enamel lake), and an anteroexternal reentrant fold. At all growth stages, a posteroexternal reentrant fold extends approximately
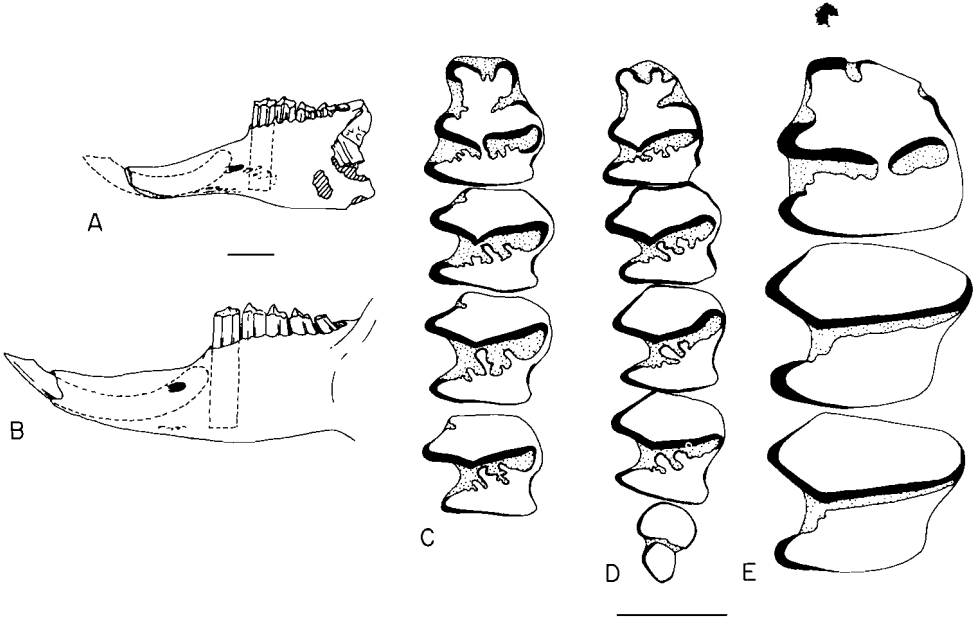
FIG. 1.—A, left mandible of *Aztlanolagus agilis*, holotype (UTEP 1-1202), showing proportions and relative positions of incisor and $P_3$; B, left mandible of *Sylvilagus floridanus* to show relative positions of incisor and $P_3$ in *Sylvilagus* and *Lepus*; C, occlusal pattern of lower cheek teeth, *A. agilis*, holotype (UTEP 1-1202); D, occlusal pattern, left cheek teeth, *A. agilis* (MNM 5689-6-29), with $P_3$ showing "*Lepus*" pattern; E, right $P_3$-$M_1$, *Nekrolagus progressus*, holotype, redrawn and reversed for comparison, after Hibbard (1939). Enamel, solid; cement, stippled; dentine, white. Length of bar for jaws (A, B), 5 mm; for occlusal patterns (C, D, E), 2 mm.

halfway across occlusal surface of $P_3$ to a narrow enamel lake lying next to lingual border; enamel lake rarely joined to external reentrant to form the *Lepus*-type pattern (Hibbard, 1963). On $P_4$ to $M_2$, external fold extends to enamel of lingual wall. Anterior border of talonid on $P_4$-$M_2$ deeply convoluted, often with alternating series of major and minor enamel loops (Fig. 1A, C, D).

*Comparisons.*—Comparison is required only with *Nekrolagus* (Hibbard) (Fig. 1E), other genera differing in number or major characters of the $P_3$ reentrant folds. Differs from *Nekrolagus* in constant presence of a well-developed anterointernal fold (or enamel lake), strongly developed crenulation of the posterior enamel of the external reentrant fold of $P_4$-$M_2$, extreme relative length and slenderness of the diastemal region, more anteriorly placed incisor base, and small size. Hibbard (1963) found an anterointernal fold in only 46% of a large sample of *Nekrolagus* $P_3$s; in *Aztlanolagus*, the fold or enamel lake derived from the fold is present in all specimens and generally much better developed than in *Nekrolagus*. The enamel of the "anterior wall of talonid on $P_4$-$M_2$ may be slightly folded, . . . or straight" in *Nekrolagus* (Dawson, 1958: 61), rather than the strongly crenulated condition found in *Aztlanolagus*. The diastema in *Nekrolagus* is "shorter relative to depth of jaw than in *Lepus californicus*" (Dawson, 1958:61). In *Aztlanolagus*, the anterior dentary and diastema is longer relative to size than in *L. californicus*. Dawson (1958:60) stated that in *Pratilepus* (the genus in which she treated *Nekrolagus*), the "posterior end of lower incisor terminates above mid-depth of jaw approximately in line with trigonid of $P_3$"; in *Aztlanolagus*, the termination is well anterior to $P_3$ in adults. Finally, the size of *Aztlanolagus* is near the minimum observed within the leporines, while Dawson (1958) reports the size of the monotypic *Nekrolagus* as near that of *L. californicus*.

*Etymology.*—From the Uto-Aztecan, *Aztlán,* the mythical homeland of the Aztec—in Chicano literature, Aztlán refers to the border area of the southwestern United States and northern México, which encompasses the current known range of the genus; and *lagus,* from the Greek, *lagos,* hare.

**Aztlanolagus agilis**, sp. nov.

*Holotype.*—No. 1-1202, Laboratory for Environmental Biology, University of Texas at El Paso (UTEP), incomplete left dentary with $P_3$, $P_4$, $M_1$, and $M_2$; lacking incisor, $M_3$, and region posterior to $M_3$ (Fig. 1A, C).

TABLE 1.—*Dimensions (mm) and descriptive statistics of dentary and lower dentition of* A. agilis.

| Measurement | $\bar{X} \pm SD$ | Range | $n$ |
|---|---|---|---|
| Alveolar length toothrow | $10.907 \pm 0.206$ | $10.69–11.10$ | 3 |
| Diastema length dentary | $14.857 \pm 0.644$ | $14.07–15.91$ | 10 |
| Dentary depth at P4 | $9.716 \pm 0.313$ | $9.00–10.14$ | 13 |
| Length P3 | $2.28 \pm 0.165$ | $2.0–2.7$ | 24 |
| Width P3 | $2.07 \pm 0.169$ | $1.8–2.3$ | 24 |
| Length P4 | $1.88 \pm 0.098$ | $1.7–2.0$ | 6 |
| Width P4 | $2.125 \pm 0.088$ | $2.0–2.2$ | 6 |
| Length M1 | $1.99 \pm 0.111$ | $1.8–2.1$ | 7 |
| Width M1 | $2.17 \pm 0.057$ | $2.1–2.25$ | 7 |
| Length M2 | $1.99 \pm 0.025$ | $1.95–2.0$ | 4 |
| Width M2 | $2.10 \pm 0.082$ | $2.0–2.2$ | 4 |
| Length M3 | $1.5$ | | 1 |
| Width M3 | $1.15$ | | 1 |

*Horizon and type locality.*—Late Pleistocene, mid-Wisconsinan, Rancholabrean, radiocarbon date on bone carbonates of $29,290 \pm 1,060$ BP (TX-1774); UTEP Locality No. 1, Dry Cave, 1,280 m. Eddy Co., New Mexico (32°22′25″N, 104°28′55″W, T22S, R24E, SE¼ Sec. 22).

*Diagnosis.*—As for genus.

*Etymology.*—From the Latin, *agilis*, meaning light, swift, and nimble; alluding to the presumed cursorial habits of *A. agilis*.

*Hypodigm.*—Fifty-nine postcranial elements, 27 partial mandibles, 3 partial palates, 1 premaxilla, and 58 isolated cheek teeth referable to *A. agilis* (see Tables 1 and 2 for measurements). A complete listing with locality data is given in the appendix.

*Description and comparisons.*—The holotype (Fig. 1A, C) is a partial left ramus of a small rabbit, slightly larger than the dwarf rabbit, *Sylvilagus leonensis* Cushing; $P_3$–$M_2$ are present, with the incisor and region posterior to the $M_3$ alveolus missing. The jaw is that of an adult. The occlusal surface of $P_3$ shows a complex pattern of four well-developed reentrant folds and a narrow posterointernal enamel lake. Three cement-filled reentrant folds are present on the trigonid of $P_3$. A broad, crenulated, anteroexternal fold lies opposite a smaller, but well developed, anterointernal fold, with a simple anterior reentrant valley located midway between these two folds. A posteroexternal reentrant fold extends approximately half way across $P_3$, nearly to the labial margin of the enamel lake. The lake itself is anteroposteriorly compressed and continues across $P_3$ to the lingual border. Enamel forming the lake and posteroexternal reentrant fold is broad and even on the anterior margin, but irregularly crenulated along the posterior margin.

On $P_4$–$M_2$, the trigonid and talonid are separated by an external reentrant fold. The posterior enamel of

TABLE 2.—*Postcranial descriptive statistics (mm) for* Aztlanolagus agilis.

| Element | Measurement | $\bar{X} \pm SD$ | Range | $n$ |
|---|---|---|---|---|
| Femur | Maximum length | 59.6 | 59.4–59.9 | 2 |
| | Breadth trochanter tertius | $9.5 \pm 0.16$ | $9.3–9.7$ | 6 |
| | Proximal breadth | $10.8 \pm 0.54$ | $10.3–11.5$ | 4 |
| | Distal breadth | $8.8 \pm 0.23$ | $8.4–9.0$ | 5 |
| Humerus | Maximum length | 47.3 | | 1 |
| | Proximal breadth | $7.8 \pm 0.12$ | $7.7–7.9$ | 3 |
| | Proximal depth | $8.0 \pm 0.29$ | $7.8–8.4$ | 4 |
| | Distal breadth | $5.9 \pm 0.22$ | $5.6–6.3$ | 14 |
| | Distal depth | $4.1 \pm 0.17$ | $3.7–4.3$ | 14 |
| Tibiofibula | Maximum length | 71.3 | | 1 |
| | Proximal breadth | $8.9 \pm 0.11$ | $8.8–9.0$ | 3 |
| | Proximal depth | 9.1 | $8.9–9.5$ | 2 |
| | Distal breadth | $7.3 \pm 0.43$ | $6.7–8.2$ | 14 |
| | Distal depth | $4.1 \pm 0.24$ | $3.8–4.6$ | 14 |
| Metatarsal II | Maximum length | 24.2 | | 1 |
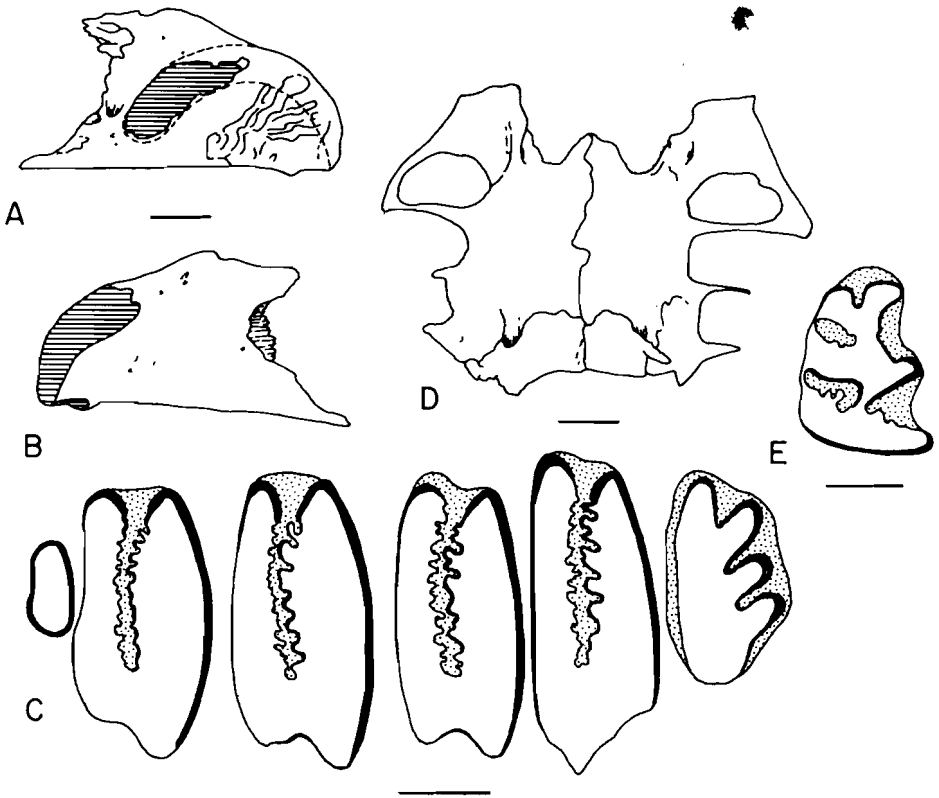
FIG. 2.—A, B, medial and lateral views, left premaxilla, *Aztlanolagus agilis*, referred (MNM 5689-123-2); bar, 2 mm. C, occlusal pattern left upper cheek teeth, *A. agilis*, referred (MNM 5689-1-181); bar, 1 mm. D, palate, *A. agilis*, referred, (MNM 5689-1-45); bar, 2 mm. E, right $P_3$, *A. agilis* (MNM 5689-98-1); bar, 1 mm.

this fold is crenulated, with a series of major and minor enamel loops. A small anteroexternal fold is present on the trigonid.

The other dentaries and $P_3$s referred to *A. agilis* agree closely with the type specimen in most observable characters. However, Museum of New Mexico (MNM) specimen no. 5689-6-29 from U-Bar Cave has the enamel lake merged with the posteroexternal reentrant fold to form the typical *Lepus* pattern (Fig. 1D); the jaw, tooth, and associated cheek teeth otherwise clearly display the characters of this taxon. A different specimen (MNM 5689-98-1) from the same site has an enamel lake in place of an anterointernal reentrant fold (Fig. 2E). The only other notable exceptions are individual variations with respect to the degree of crenulation of reentrant folds and the absence of an anteroexternal reentrant fold on $P_4$–$M_2$ in most examples. Mandibles with two or more $P_4$–$M_2$ cheek teeth in place have the anteroexternal fold present in either all or in none of these teeth. Age does not appear to have a significant effect on enamel patterns of the lower cheek teeth. Juveniles with teeth just emerging have an enamel pattern consistent with that of adult dentition. There is some evidence that tooth wear in maturing individuals slightly reduces the degree of crenulation, but this appears to have no significant effect on the overall pattern.

Only specimen MNM 5689-6-29 preserves the $M_3$. It appears to be a typical leporine $M_3$ (Fig. 1D).

In adult individuals, the posterior end of the lower incisor, marked by a small swelling on the lingual surface of the dentary, terminates under the diastema and anterior to $P_3$, forming a large gap between it and the $P_3$ (Fig. 1A). Juveniles lack this gap, instead having the lower incisor base lying next to and in front of $P_3$. When mature, dentary depth at the diastema is shallow and, in general, follows the "U-shaped" curvature of the lower incisor. This entire region angles downward. Together, these features form an unusually long, slender, distinctive diastemal region which is enhanced by a slight concave depression along the ventral border of the dentary just anterior to $P_3$.

Four skull fragments are referred to *A. agilis,* three with considerable confidence and the other somewhat hesitantly. MNM 5689-1-181 is a left maxilla with all teeth, a small portion of the left palatine, and a fragment of the right palatal maxilla. MNM 5689-1-45 is a palate without teeth; the anterior alveolar portions of both maxillae are present, but the lateral walls of the alveoli for $P^3$–$P^4$ are missing, as are the entire post-$P^4$ portions (Fig. 2D). MNM 5689-1-183, somewhat less certainly assigned to *A. agilis,* consists of most of the zygomatic process of the left maxilla with the adjacent alveolar wall.

The upper cheek teeth are similar to those of *Sylvilagus auduboni* (Baird), though of somewhat lesser size than in adults of that species (Fig. 2C). $P^2$ has three deep reentrant folds, two anterior and one anteromedial. All are filled and covered with thick cement. The central fold is deepest, extending about two-fifths of the way across the tooth. The lateral fold is slightly less deep, placed close to the central fold, and almost parallel with it. The anteromedial fold is V-shaped. $P^3$–$M^2$ have the internal reentrant fold displaying moderately coarse crenulations on both anterior and posterior enamel walls. $M^3$ is a small even oval.

The most notable feature by which 5689-1-181 and 5689-1-45 differ from *Sylvilagus auduboni* is in palate proportions. As seen in the latter specimen, the palate is very long in relation to its width (ratio of length to width, 1.00), whereas in *S. auduboni* the palate is relatively short (generally less than 0.75). *S. leonensis,* however, closely approaches *A. agilis,* with four examples ranging from 0.73 to 0.98 ($\bar{X}$ = 0.87); possibly this ratio is to some degree a function of skull size. The relatively great length in *A. agilis* is due primarily to the maxillary portion of the palate. Specimen 5689-1-181 lacks most of the palatine, but the distance from the anterior palatal notch to the palatine foramen is similar to that of the other specimen (5.6 mm versus approximately 5.7 mm, respectively) and notably greater than in even much larger specimens of *S. auduboni* (less than 5 mm, usually considerably so). Several qualitative differences can be seen, but pending larger samples to assess variability, will not be considered.

A left premaxilla (MNM 5689-123-2) is available (Fig. 2A, B). The ventral, posterior extension appears relatively long and thin compared to that of *S. auduboni.* The anterior end of the incisive foramen is discrete with the medial margin extending slightly ventral to the lateral margin. In *Lepus* and *Sylvilagus,* the anterior ends of the premaxillae turn abruptly downward, orienting the ends of the anterior incisors vertically or even somewhat caudally; this angulation is absent in *A. agilis,* suggesting relatively procumbent upper first incisors.

Thus far, Dry and U-Bar caves are the only localities to produce postcranial material referable to *A. agilis.* In these deposits, the postcranial remains of *Lepus* and *Sylvilagus* are associated with those of a pygmy-sized leporid, which we refer to *A. agilis.* Much of this material is so similar morphologically to the associated leporids that size is the basic criterion for separating this species from the others. Since the type specimen of *A. agilis* is a single dentary having no direct association with postcranial elements, we approached referring postcranial material to *A. agilis* with some caution. Comparisons made with *Brachylagus idahoensis* (Merriam) from Isleta Cave, Bernalillo Co., New Mexico, and *S. leonensis* from San Josecito Cave, Nuevo León, México, showed no significant size overlap with *A. agilis.* The latter taxon is larger and less robust than is *B. idahoensis,* with the distal point of the fusion of the fibula to the tibia occurring lower on the shaft in *B. idahoensis. S. leonensis* is nearer in size, but still significantly smaller than *A. agilis.* There is no evidence from cranial or mandibular material that either *B. idahoensis* or *S. leonensis* occurs at these sites, and we feel confident that this postcranial material belongs to *A. agilis.* The limb bones of *A. agilis* are relatively slender compared to those of the associated leporids, but still possess well-developed articular surfaces with pronounced processes for tendon and ligament attachment, indicating adult status.

*Comment.*—This taxon has been referred to in several works as "Species A" or "Leporidae, undescribed rabbit" (Harris, 1985a, 1985b; Messing, in press).

## DISCUSSION

The unique combination of characters observed in the mandible and lower dentition readily distinguishes *A. agilis* from other leporids, often from even highly fragmented material. These features are consistent within the species, do not seem to be significantly affected by individual variation or allometry, and have little overlap with other leporids known to be in the region during the Pleistocene.

*Paranotolagus complicatus* Miller and Carranza from the early Blancan of Guanajuato, México, displays a somewhat similar pattern of enamel crenulation in the lower dentition, though the folds of $P_3$ are basically different and the crenulations developed to even greater degree. Miller and Carranza (1982:102) suggest that the degree of crenulation could denote "adaptation

TABLE 3.—*Comparison of limb bone length ratios of* Aztlanolagus agilis *with those of four Recent leporids.*

|  | Aztlanolagus agilis | Lepus californicus* | Lepus europaeus* | Sylvilagus floridanus* | Oryctolagus cuniculus* |
|---|---|---|---|---|---|
| humerus / femur | 79.4 | 80.9 | 78.4 | 76.3 | 73.3 |
| femur / tibiofibula | 83.6 | 84.3 | 88.7 | 88.3 | 92.2 |

* After Campbell (1969).

to a preferred diet of grass." Certainly a diet of grasses or other abrasive foods is reasonable for *A. agilis,* also, though the elongate jaws suggest a very different feeding style than in the short-jawed *P. complicatus.*

*Aztlanolagus* appears to show a culmination of a trend from early Tertiary times of forward migration of the lower incisor. In late Eocene and Oligocene leporids, such as *Mytonolagus* and *Palaeolagus,* the incisor terminates under the cheek teeth as far back as $M_2$. In more advanced leporids, the incisor termination has migrated to a position just in front of $P_3$ and near the dorsal surface of the mandible (for a review of lower incisor evolution, see Dawson, 1958:63–66). According to Dawson (1958), Bohlin postulated that a relative lengthening of the diastema is responsible for the anterior migration of the lower incisor termination. In *A. agilis,* the lower incisor is advanced forward, away from the cheek teeth, to leave a sizable gap between it and $P_3$. This is apparently due not to a shortening of the incisor, but to a lengthening of the diastema.

In preliminary study of limb bones, we compared length ratios from a composite series of limb elements to ratios compiled by Campbell (1969) on *Oryctolagus cuniculus, Sylvilagus floridanus, Lepus europaeus,* and *L. californicus.* The humerus : femur index of *A. agilis* falls between *L. europaeus* and *L. californicus* (Table 3), both of which are highly specialized for running. The hind limbs in *A. agilis* also were found to be especially adapted for running, with a relative tibiofibula length greater than that of any of the four species compared. Such a length increase in the distal segments must be accompanied by either a strengthening of the limb or a decrease in body weight to prevent the acceleration force from breaking the limb (Gambaryan, 1974). The tibiofibula of *A. agilis* is not reenforced, but long and narrow, consistent with its small body mass and cursorial nature.

*Phylogenetic Origin.*—In general practice, phylogenetic relationships among leporids usually are based on characteristics of the third lower premolar, $P_3$ (e.g., Dice, 1929; Hibbard, 1939, 1963). Although individual variation and differences in age and wear can confuse these relationships, no other single element carries as much information about the evolutionary history of the group. The structural changes seen in $P_3$ usually take the form of new reentrant folds or changes in size and complexity of existing ones and are seldom so extensive as to completely mask generic affinities. They instead create recognizable patterns of inheritance that allow lines of descent to be traced from one group to the next.

As with other leporids, the origin of *A. agilis* may best be determined from features in the enamel pattern of $P_3$; however, its origin is clouded by the complexity of the lower dentition, which is somewhat similar to that seen in some Old World leporine rabbits.

Hibbard (1963) hypothesized that there were two major lines of leporines descended from the genus *Alilepus* and possessing an anterior reentrant fold. One of these led to *Nekrolagus,* with the posterointernal fold of *Alilepus* closed to form an enamel lake. By conjunction of this enamel lake with the posteroexternal fold, the *Lepus* pattern formed, appearing in a small proportion of *Nekrolagus* $P_3$s. This condition, together with the loss of the anterointernal fold, is seen in all descendents of *Nekrolagus* that were known to Hibbard, including the modern genera *Lepus, Sylvilagus, Oryctolagus,* and *Caprolagus.* The other line, known only from the Old World, retained the open posterointernal fold of *Alilepus* and developed a well-marked

anterointernal fold. The living genera *Pronolagus* and *Pentalagus* show this pattern, and the latter, particularly, has complexly folded lower dentition. Descent of *A. agilis* from the latter line would require independent derivation of the enamel lake from the posterointernal fold. Such independent occurrence apparently has occurred in genera such as *Chadrolagus* (Gawne, 1978) and *Pratilepus* (Hibbard, 1963). However, since the *Lepus* pattern in $P_3$ is known to occur in *Aztlanolagus*, though rare, this genetic pattern also would require independent attainment.

At present we favor a close relationship with *Nekrolagus* since considerable variation in the degree of crenulation is common within modern genera; *Nekrolagus* teeth possess, in some individuals, all the folds seen in *A. agilis*; the *Lepus* pattern is seen occasionally in both; and because of geographic considerations. The present known distribution of *A. agilis* strongly suggests that the known range likely represents the northern periphery of its geographic distribution. The failure to identify this or a similar taxon from farther north in North America argues against an immigration of the Eurasian line in Late Pliocene or in Pleistocene times, while our relatively poor knowledge of the Late Cenozoic fossil record of México and Central America could easily conceal the presence of *Aztlanolagus* stock.

Thus we suggest that during the Late Pliocene and Early Pleistocene, while *Nekrolagus* populations in the north were varying toward the "pro-*Sylvilagus*" grade, evolutionary pressures to the south were not selecting for the *Lepus* pattern, though the trait was already present in the southern populations. Divergence both from the *Sylvilagus-Lepus* line and the ancestral *Nekrolagus* line led, eventually, to *Aztlanolagus*.

Extinction of *A. agilis*, probably before the height of late Wisconsinan full-glacial conditions, is one of the few cases of generic disappearance of a small mammal in the late Pleistocene of North America.

## ACKNOWLEDGMENTS

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## APPENDIX

### *Hypodigm*, Aztlanolagus agilis

All specimen numbers refer to the Resource Collections, Laboratory for Environmental Biology, University of Texas at El Paso (UTEP), except those whose first four numbers are 5968—these are Museum of New Mexico specimens currently housed at UTEP. Localities designated by the numerical prefix of each specimen are as follows, with radiocarbon dates where available: Dry Cave, Eddy Co., NM: Lost Valley (UTEP Loc. 1), 29,290 ± 1,060 (TX-1774); Sabertooth Camel Maze (UTEP Loc. 5), 25,160 ± 1,730 (TX-1775); Room of the Vanishing Floor (UTEP Loc. 26) and Above Room of the Vanishing Floor (UTEP Loc. 27), 33,590 ± 1,550 (TX-1773). Anthony Cave, Dona Ana Co., NM, and El Paso Co., TX (UTEP Loc. 29). U-Bar Cave, Hidalgo Co., NM (MNM Loc. 5689), >31,150 (A-4148), 35,890 ± 2,640 (A-4221). Jiménez Cave, Chihuahua, México (UTEP Loc. 91).

*Skull elements.*—Palate, 5689-1-45; L maxilla with $P^2$–$M^3$, 5689-1-181; partial L maxilla, 5689-1-183; L premaxilla, 5689-123-2.

*Mandibles and lower dentition.*—Partial dentary with $P_3$–$M_3$, 5689-6-29; partial dentary with $P_3$–$M_2$, 1-1202, 1-1207; partial dentary with $P_3$–$M_1$, 5-277, 26-311, 5689-98-1; partial dentary with $P_3$–$P_4$, 91-790, 5689-1-59; partial dentary with $P_4$–$M_2$, 29-135, 5689-69-1; partial dentary with $P_4$–$M_1$, 1-1169, 1-1197, 27-332; partial dentary with $P_4$, 1-1200; partial dentary with $M_1$, 1-1196; edentulous partial dentary, 1-1203, 5-248, 5-250, 5-251, 26-1107, 91-175, 5689-1-155, 5689-1-195, 5689-4-10, 5689-4-12, 5689-4-18, 5689-73-2; isolated $P_3$, 1-1208, 1-1212, 29-137, 91-1044, 91-1045, 91-1046, 5689-4-1, 5689-4-2, 5689-4-3, 5689-4-23, 5689-4-91, 5689-4-92, 5689-6-21, 5689-6-24, 5689-6-25, 5689-8-2, 5689-9-8, 5689-9-9, 5689-78-8, 5689-78-9, 5689-90-2, 5689-90-3, 5689-123-3; isolated $P_4$, $M_1$, or $M_2$, 5-286, 29-138, 5689-1-49, 5689-4-4, 5689-4-5, 5689-4-6, 5689-4-7, 5689-4-11, 5689-4-15, 5689-4-16, 5689-4-20, 5689-4-21, 5689-4-24, 5689-4-26, 5689-4-27, 5689-4-93, 5689-4-94, 5689-6-12, 5689-6-26 (2), 5689-8-3, 5689-9-10, 5689-81-3, 5689-82-1, 5689-86-12, 5689-90-1, 5689-92-1, 5689-99-9 (2), 5689-108-1, 5689-123-4 (2), 5689-123-5 (3).

*Postcranial material (mostly partial).*—Humerus, 1-1216, 1-1223, 5-132, 5-274, 26-1682, 27-214, 27-714, 27-1128, 27-1129, 5689-1-30, 5689-4-103, 5689-4-107, 5689-4-109; radius, 27-250, 27-315, 27-842; sacrum, 27-405; innominate, 1-1218, 1-1222, 5-83, 27-219, 27-724, 27-845; femur, 1-1219, 1-1225, 5-81, 5-82, 5-135, 5-246, 5-255, 5-247, 5689-4-108; tibiofibula, 1-1205, 5-79, 5-257, 5-258, 5-272, 5-273, 26-95, 26-1423, 26-1471, 26-1472, 27-831, 27-1084, 27-1091, 27-1560, 5689-1-46, 5689-1-47, 5689-1-198, 5689-1-199, 5689-4-13, 5689-4-14, 5689-4-106, 5689-78-11; astragalus, 5689-4-22, 5689-4-104, 5689-4-105; metatarsal II, 5689-71-6.