REMAINS OF MAMMALS FROM CAVES IN THE REPUBLIC OF HAITI

BY

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On March 4 and 5, 1921, Mr. J. S. Brown and Mr. W. S. Burbank, while engaged in geological surveys for the Republic of Haiti, under the direction of the U. S. Geological Survey, examined two caves at the northwest end of the Republic of Haiti. Their object was not to undertake a thorough exploration of the deposits on the cave floors but merely to determine whether or not these deposits contained the remains of mammals representing a fauna older than that which has been found in the kitchen middens of the Dominican Republic. Such older faunas are known in Cuba, Porto Rico and Jamaica, but none has hitherto been recorded from the island of Haiti. The bones obtained by Mr. Brown and Mr. Burbank have been submitted to me for examination and report.

Concerning the caves Mr. Brown writes:

The caves from which these bones were taken are located on the slopes of the mountains north of the northwest end of the central plain of Haiti, northeast of the town of St. Michel de l'Atalye, commonly known as St. Michel, and northwest of the large American-owned plantation, managed by Mr. H. P. Davis and commonly known to Americans as the Davis Plantation. By the Haitians this plantation is called l'Atalye. The distance from the caves to the coast in an air line is about 40 kilometers.

The larger cave is about 3 or 4 kilometers northeast of St. Michel and an equal distance northwest of the Davis Plantation. Its altitude is about 600 meters above sea-level, nearly 200 meters above the central plain. It is one of a large number of caves evidently formed at a fairly remote period when hydrologic conditions differed considerably from those obtaining at present. Many of the caves including the one here referred to are located high on the mountain slope without any apparent relation to present drainage, either surface or subterranean. The caves are dry, there is little evidence of active solution, and they are apparently being filled with residual clay, rain-wash, and general cave breccia material. Many of them contain a thick floor cover of guano left by the thousands of bats that now inhabit or recently have inhabited the caves. The large cave mentioned above is about 40 meters in length, and from 10 to 20 meters in width and height and contains several large columns formed by the juncture of stalactites and stalagmites. It has two large openings separated by a pillar, and a third small opening on the

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sloping hillside, which afford entrance nearly on the plane of the floor. Near
the rear there is also an opening or skylight, about 5 meters in diameter, to
the surface, through which long hanging roots of the figuier tree grow down
into the cave. Rocks and surface wash falling down the skylight have made
a small cone of coarse debris beneath it. The cave is the scene of occasional
Voodoo ceremonies and contains a few sacred offerings of porcelain ware,
food, and money left by the Haitians. Near the center of the cave in the
middle of one of the largest open spaces an excavation 1.6 meters deep was
made. The hole was a little more than a meter in diameter. Only firm, dry,
reddish dirt with a rather granular appearance was encountered. There
was very little guano and no bones whatever, the rock floor of the cave
appears to be very deep down here, and was not approached by this pit.
Another hole was made very near the extreme rear end of the cave about
1 meter from the wall and 5 meters from the cone of debris beneath the
skylight. This hole was about a meter in diameter and less than a meter
in depth (2½ feet). The material was full of rocks and boulders and hard
to excavate. Near the surface a living root of a tree, 15 centimeters in diam-
eters was encountered and the hole was dug partly around it. From very
near the surface downwards the hole yielded bones of a small rodent, and
about half a meter below the surface a larger vertebrate bone was found.

The smaller cave is located about 2 kilometers northnorthwest of the Davis
Plantation and perhaps 3 kilometers east of the larger cave. It is on the
south side of a deep dry ravine. The present opening of the cave is some-
what spherical in shape and its diameter is about 30 meters. The roof
is arched, all in one chamber, and the floor is convex, the rear half being
nearly bare rock, partly covered by a few inches of guano left by bats. The
mouth, still large but originally much larger, is choked by a great pile of
debris from the cliff that rises above it. This debris has rolled inward as well
as outward, covering the floor of the front part of the cave. The excavation
here was made at the lowest part of the cave, adjacent to one of the steep
vertical rock walls, following down the wall for 1.6 meters. The hole was
about 1½ meters in diameter. At the bottom the rock wall sloped inward
rapidly and when excavation was stopped the entire bottom of the hole was
on rock. The material excavated was about 50 to 60 percent loose stones,
with just enough dirt and guano to fill the space between. The upper half
meter of this hole yielded no bones whatever, as the material was apparently
debris recently slumped in. Below the half meter mark small rodent bones
appeared in increasing numbers all the way to the bottom, many resting on
the rock floor. At a depth of almost a meter several larger bones were found
in undisturbed material, and near the bottom imperfect slivers of a longer
bone apparently nearly replaced by calcareous material. In both caves the
bones of the small rodents were abundant and many duplicate fragments
were rejected. The larger bones, however, are rare, and thorough examina-
tion probably would be necessary to secure a satisfactory collection.

In addition to various fragments too imperfect to permit of exact
determination the collection includes remains of the following mam-
mals.
Large cave: Mandibles, 3 (2 right, 1 left). Probably referable to this species are 2 femora (1 right, 1 left), 1 broken innominate, 3 upper incisors and 6 lower incisors.

Smaller cave: Mandibles, 9 (2 right, 7 left). Probably referable to this species are several fragments of long bones, 6 broken innominate, 2 broken scapulae, a few phalanges, 5 upper incisors, 9 lower incisors.

**APHÆTREUS gen. nov. (Echimyidae)**

*Type.—* Aphætærus montanus sp. nov.

*Characters.—* Mandible and its teeth resembling those of Isolobodon or Plagiodontia. Mandibular cheekteeth prismatic, growing from persistent pulps, their essential structure as in the two related genera but the entire toothrow appearing as if compressed antero-posteriorly with the result that the dentine and cement spaces are narrowed; the enamel plates are brought closer together, and the crown of each tooth becomes obviously wider than long instead of apparently longer than wide; inner reentrant angle confluent with postero-external angle, so that the enamel pattern is made to consist of an anterior V and a posterior I completely isolated from each other by a band of cement; \( m_3 \) nearly as large as \( m_2 \).

*Remarks.—* While the general features of the mandible and teeth indicate that Aphætærus is allied to Plagiodontia and Isolobodon the exact relationship of the genus cannot be determined until the maxillary teeth are known. The increased width and compact structure of the crowns, the large size of \( m_3 \), the narrowness of the dentine and cement plates, and the division of the enamel pattern into two separate parts are all specialized features as compared with the conditions found in the two better known genera. All but the last could have been derived with equal facility from a structure similar to that occurring in either genus; the peculiarity of the enamel pattern, however, appears to have come from a type resembling Isolobodon rather than Plagiodontia. In these genera the maxillary teeth differ strikingly from each other but the mandibular teeth are scarcely distinguishable except by the relative depths of the inner and outer reentrant angles. The outer angle in Plagiodontia, extends across about one-third of the width of the crown, so that it meets the much longer posterior reentrant from the inner side at a point conspicuously ectad to the middle of the crown. In Isolobodon, however, it extends more than half way across, so that its length is greater than that of the corresponding inner angle: the point of meeting is there-
fore endad to the middle of the crown. In Aphætreus the two opposed reentrants have joined so as to isolate the posterior segment of the enamel pattern, but there is a slight narrowing of the cement band and a bending toward each other of the enamel plates in the region where the points of the reentrants touch in Isolobodon. Nothing of the kind occurs at the level where contact takes place in Plagiodontia. Another feature which suggests Isolobodon is the character of the cement surfaces exposed on the sides of the teeth. In Plagiodontia these surfaces are irregularly and minutely pitted; in Isolobodon and Aphætreus they are transversely ridged.

Division of the enamel pattern of the lower cheekteeth into the elements seen in Aphætreus is unusual; but it occurs in various Hystricoid genera which are not necessarily near allies of the present genus or of each other, as Chinchilla, Dactylomys, Amblyrhiza and some species of Echimys.

**APHÆTREUS MONTANUS sp. nov.**


*Measurements.*—Type: from sigmoid notch to upper border of alveolus of incisor, 45 + mm. (alveolus slightly imperfect); depth at middle of m3, 6.4; diastema, 11 +; mandibular toothrow (alveoli), 20.0; mandibular toothrow (crowns), 20: crown of first lower molar, 4.2 x 5.2 (5.2 x 5.0); crown of second lower molar, 4.4 x 5.4 (4.8 x 4.8): crown of third lower molar, 4.8 x 4.8 (4.0 x 3.8).

*Specimens examined.*—Large cave: Mandibles, 2 (right), one with complete set of cheekteeth the other (No. 10734) lacking pm4 and m1. Perhaps referable to this species are 2 femora, larger than those supposed to represent Isolobodon.

**ITHYDONTIA gen. nov. (Echimyidae)**

*Type.*—Ithydontia levir sp. nov.

*Characters.*—General structure of lower molars as in Isolobodon and Plagiodontia, but shaft of tooth more compressed antero-posteriorly, and reentrant angle of outer side extending directly inward, without backward slant, its extremity coming in contact with anterior instead of posterior reentrant angle of inner side. Cement transversely ridged on exposed surface of shaft as in Isolobodon.

1Measurements in parenthesis are those of a specimen of Plagiodontia (No. 200412) of approximately equal size.
Remarks.—Though this genus is based on two isolated teeth only its characters appear to be well defined. The curvature of the shaft and the position of the worn surface of the crown on the summit of the shaft exactly coincide with these features in the first and second lower molars of *Isolohodon*. Oriented according to them the teeth in the two genera show no obvious points of difference except that the longitudinal ridges on the inner side of the shaft are wider in *Isolohodon*. The enamel pattern, however, has the peculiar characters that have been described. As in *Isolohodon* the anterior reentrant fold is the longer of the two on the inner side, but instead of curving rapidly forward so as to come almost or quite in contact with the enamel of the anterior wall of the shaft, it extends obliquely inward and backward, meeting the tip of the outer reentrant at a point not far ectad to the middle of the crown. The postero-external fold is directed almost straight inward, without the forward curve which the same fold shows in *Isolohodon*.

That these peculiarities are not a mere abnormal individual development of *Isolohodon* seems sufficiently indicated by their similarity in two teeth from opposite sides and from different individuals, as well as by the absence of tendencies of a similar kind in the 34 jaws which contain teeth among our series of *Isolohodon* remains.

**Ithydontia levir** sp. nov.

Type.—A right mandibular tooth probably *m₂* or *m₃*, No. 10735 U. S. National Museum. Collected in the larger of the two caves northeast of St. Michel de l'Atalye, northwest end of the central Plain of Haiti, by J. S. Brown and W. S. Burbank.

Characters.—An animal about the size of *Isolohodon portoricensis* Allen; shaft of lower molar, type (right). 2.8 x 4.0 mm., second specimen (left) 3.0 x 4.6.

Specimens examined.—Two lower molars (one right, one left), both from the larger cave. One (the type) was found loose among the small miscellaneous bones, the other was imbedded, near a broken mandible of *Isolohodon*, in a small mass of matrix adhering to the dorsal vertebra of the ground sloth. The second specimen (No. 10736) represents an older individual than the type.

**Brotomys voratus** Miller (?)

Larger cave: Three femora (2 right, 1 left).

Smaller cave: A right upper incisor, and three imperfect humeri.

In the absence of skulls and cheekteeth the identification of *Brotomys* among the remains collected in the caves is uncertain. The
femora and humeri resemble specimens from the kitchen middens of San Pedro de Macoris, Dominican Republic, the only locality at which the species has hitherto been found. The incisor is smaller than the corresponding tooth of the type, but it shows no obvious peculiarities in structure. It is not the tooth of an introduced rat.

**GROUND SLOTH**

**MEGALOCUUS? sp?**

Larger cave: One nearly perfect caudal vertebra, and one imperfect vertebra probably a dorsal; also a fragment which appears to be the proximal end of the radius of a young animal.

Smaller cave: Two imperfect caudal vertebrae. The proximal end and a fragment of the shaft of a rib may have come from the same individual.

The animal appears to be about the size of the Porto Rican *Acratocnus*, but the caudal vertebrae differ in so many details of form from corresponding bones lent me by the American Museum of Natural History through Dr. Matthew and Mr. Lang that there is little probability of generic identity between the two sloths. Dr. Matthew has kindly examined the vertebra from the larger cave. He regards it as representing an animal nearly related to *Megalocuus* of Cuba, though not certainly a member of the same genus. Measurements: Largest caudal vertebra (from larger cave), probably about the sixth of the series (No. 10740); length of centrum, 18 mm.; anterior face of centrum, 19 x 16; posterior face of centrum, 20.5 x 15.5; neural canal, 6.5 x 4.4; greatest width from tip to tip of transverse processes, 46; width of transverse process at middle, 12; depth including posterior zygapophysis, 27. Dorsal vertebra (No. 10739); centrum, 24 x 19; neural canal, 23.6 x 15.

**MAN**

Smaller cave: The head of a left human femur (No. 10743) was found at a depth of about a meter in undisturbed material associated with the caudal vertebrae of the Ground Sloth and the rib which I suppose to represent the same animal. Its substance is lighter and less infiltrated with mineral matter than the sloth bones. From the same excavation was taken a small fragment of chipped stone (chert) which Dr. Walter Hough has identified as an artifact. The exact level at which this was found was not noted.
UNIDENTIFIED MAMMALS

Smaller cave: Three fragments from a foot (No. 10744) and one piece of a large bone (No. 10745) represent mammals that I have been unable to identify.

The parts of the foot are a broken metapodial and two basal phalangeal extremities, probably the opposite ends of one bone. The piece of metapodial measures: Length 56 mm., greatest diameter of imperfect head about 10.5, least diameter of shaft 5.4. Phalanx: width at base, 11.0; height at base (median), 10.0; width of distal extremity, 9.2; depth of distal extremity at middle 4.6, at side 5.4; width of shaft 10 mm. behind extremity, 6±. In size and form the bones have some resemblances to the corresponding parts in man, seal, and capybara; but the differences from all three are such as to preclude identity. It seems not improbable that they represent a large unknown rodent.

The fragment of large bone is 110 mm. long, 45 mm. wide and 19 mm. thick. In general form it is not unlike a section from the rib of a small finback whale in the region of greatest curvature near the head, but its structure is obviously that of the bone of a land mammal. There is an inner area of loose spongy tissue and an outer dense wall from which, at the broken edges, the spongy material flakes along definite planes of cleavage. The wall varies in thickness from 2.5 to 6 mm. This structure, as well as the condition of the bone, is essentially as in the rib of the small ground sloth from the same cave. A suggestion of ground sloth is also found in the form of the fragment when viewed from the broader side; the general outline is then somewhat like the median portion of the femur of Acratocnus in Anthony's figure 2 of plate 73 (Mem. Am. Mus. Nat. Hist., N. S., vol. 2, 1918), though the size indicates an animal much larger than the Porto Rican sloth. The fragment is, however, actually as well as relatively narrower in its lesser diameter, while its surface is smoother and less marked by muscle attachments than that of the femur of Acratocnus. While it seems evident that this bone represents a land mammal, perhaps a ground sloth, larger than any known member of the Haitian fauna it is not possible at present to form any clear idea as to what this animal may have been.

OBSERVATIONS ON THE FAUNA REPRESENTED IN THE CAVES

The known indigenous land mammals of the Island of Haiti, bats and Solenodon excepted, have been, up to the present time, the three Hystricoid rodents Plagiodontia, Isolobodon and Brotomys, each represented by a single species. The first was living in the early part of the nineteenth century, but recent attempts to find it alive
have failed. It has no known very near relative on any other island. The other genera are known from skeletal remains only: *Isolobodon* has been collected in Porto Rico and on two of the Virgin Islands: *Brotomys* has not been found elsewhere than on Haiti, but there is a nearly related genus in the cave deposits of Cuba. That all three of these animals were used as food by pre-Columbian man is clearly shown by the frequency with which their bones occur in kitchen midden deposits. One of them, *Isolobodon*, is the most abundant mammal among the specimens collected by Mr. Brown and Mr. Burbank, while another, *Brotomys*, is probably represented. That the caves were used by early man is indicated by the presence of the chert artifact and perhaps also by the occurrence of the human femur. The deposits in the caves have, however, none of the features commonly seen in heaps of human refuse, such as bits of broken pottery, and an abundance of remains other than mammalian. The considerable distance (about 40 kilometers) from the coast is a further reason for regarding the deposits as not to any important degree human in origin. Moreover, Mr. Brown tells me that he particularly considered the possibility of such origin, but that the evidence all appeared to show that the deposits were the work of natural agencies. It therefore seems reasonable to assume that the assembling of the mammalian remains owes little if anything to the influence of man. Probably the rodents whose bones Mr. Brown found to be so abundant at all levels except in the superficial deposits were carried in for food by the giant extinct owl described by Dr. Wetmore in his report on the birds from the caves.¹

While the cave fauna includes two of the mammals known from the kitchen middens of the Dominican Republic it also includes two genera of rodents, a small ground sloth, two large unidentified mammals and an extinct owl that have not been found in these obviously recent deposits. The two rodents have no known near relatives on other islands, but the ground sloth is allied to genera previously discovered in Cuba and Porto Rico. The former presence on other islands of an owl resembling in size at least the one now discovered in the extinct fauna of Haiti is indicated by the abundance in Cuban and Porto Rican caves of the remains of rodents too large to have been carried there by such owls as are now living. There seems no reason to doubt that the life represented by the remains from these two Haitian caves formed part of the same older, perhaps Pleistocene, vertebrate fauna whose presence on the other islands of the Greater Antilles has recently become known.

¹ Remains of Birds from Caves in the Republic of Haiti, Smithsonian Misc. Coll., Vol. 74, No. 4, 1922.