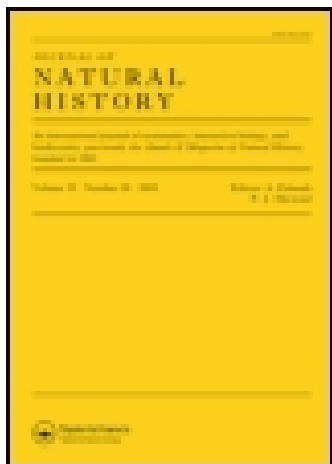


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in development with age, being larger in older specimens, and the gland of the upper arm is, I believe, subject to seasonal changes in size.

The occurrence of similar glands in two such widely different species as *Lemur catta* and *Hapalemur griseus*, and their complete absence in the other species referred to *Lemur* and in *Prolemur simus*, is a remarkable fact.

XXXII.—*Some Notes on Three-toed Sloths.*

By OLDFIELD THOMAS.

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To those whose interest it is to compare zoological characters in their relation to geographical distribution no group of Mammals is so unattractive as the sloths, on account (1) of their variability, especially in the skull, in specimens from the same place, (2) the slight and intangible characters that distinguish specimens from the most distant localities, and (3) the great state of confusion that has resulted from the descriptive efforts of Wagler, Gray, and Fitzinger. Early descriptions, without statements of locality, have been made the basis of various names, and it is a matter of the greatest difficulty to disentangle the confusion.

The present notes make no pretence of being complete, and are purposely worded somewhat vaguely, as such are the difficulties of the case that there is hardly a statement I can make which may not prove liable to modification as fuller series from all localities are studied.

Firstly, with regard to genera, I am disposed to recognize the collared sloth, *Bradypus torquatus*, Desmarest, 1817 (not Illiger, as usually quoted, for the latter author's two references are both *nomina nuda*), as forming a special genus, which may be distinguished by the inflated pterygoids, better developed premaxillæ, the median spout-like projection on the mandible, and the absence of a dorsal gland or "speculum" in the male*, all these characters being as in *Choloepus*. The generic name of *Scaepus*, Peters, is available for it.

* I can by no means subscribe to Dr. Allen's conclusion (Bull. Am. Mus. xx. p. 339, 1904) that "the presence or absence of this highly differentiated patch is not sexual"—a conclusion based on what I must consider the incorrect sexing of certain "females" by one of his collectors. Not only has it long been generally accepted that the speculum is characteristic of the male, but I find that in every specimen without speculum in our collection mammæ are to be found, while in no example with speculum is there any trace of them. With so large a collection, including so many different forms, this evidence appears to me conclusive,

Synonyms of *Scæopus torquatus* are *crinitus*, Gray, 1849 (ex Browne), and *affinis*, Gray, 1849. The species is confined to South-western Brazil, but the limits of its range are not known. Mr. A. Robert sent a nice series of it to the British Museum from Engenheiro Reeve, Espirito Santo, in 1903.

Passing now to true *Bradypus*, we find the question of the identification of its type-species, *tridactylus*, Linn., a question so productive of confusion among the early writers, has now been settled by the fixation as the typical locality of the latter as Surinam *—so that the Guianan species should bear the name *tridactylus*.

B. tridactylus is the best-marked of the species of the genus, being readily recognizable by the extension of the yellow colour of the face down the front of the neck—a character to which no approach is shown by any other species. Its skull is rather small and has generally a pair of peculiar fossæ or perforations in the floor (or, more strictly, the roof) of the anterior part of the mesopterygoid fossa; but, although so striking in well-marked cases that a person might excusably think it a character of generic value, this modification varies in different skulls, and is sometimes practically absent. The teeth are of average proportional size, the pseudo-canine † well differentiated, and the pseudo-incisor † small, usually about a quarter the size in section of one of the molars.

Wagler (1831) was the first properly to distinguish this species, to which he gave its current name of *B. cuculliger*, while other synonyms of it are *Acheus ai*, Less. ‡ (1827); *guianensis*, Blainv. (1839), a name doubtfully valid technically; *gularis*, Rüpp. (1845); and *cristatus*, Temm., Fitzinger, 1871.

B. tridactylus ranges over the whole of Guiana—French, Dutch, and British,—and our collection contains a good series of it, mostly presented by Mr. F. V. McConnell.

* See Thomas, P. Z. S. 1911, p. 132.

† These names are used respectively for the second and first upper teeth, which, really corresponding to the anterior premolars of ordinary Mammals, take on in the three-toed sloths something of the relative proportions of a canine and an incisor. The three remaining teeth on each side, acting as a premolar-molar series, are subequal, smaller than the pseudo-canine, larger than the pseudo-incisor.

‡ This name was given to the "*Bradypus tridactylus*, L.," of Desmarest, which included all the forms of true *Bradypus* then known. It seems best placed as a synonym of *tridactylus*, especially as the animal is said by Desmarest to be very common in Cayenne. For the Brazilian *Ai* of Marcgrav it would be the earliest name, but there would be difficulty in justifying its use for that animal on technical grounds.

South of Guiana, from Para to Rio, and westwards up the Amazon, there occur a very uniform series of forms which may or may not be divisible into two or more species, but which it is impossible at present to clear up without many more sets of specimens. One locality only—Para—is well represented, as M. Robert got a series there in 1904.

Throughout this area the sloths are rather larger than *B. tridactylus*; the speculum is of normal size, as in that species, and of a rather less dark yellow colour, the general colour is brown mottled to a very variable extent with white, and the band of yellow velvety hair which passes across the forehead is usually about half an inch in breadth—say, 10–15 mm. The skull averages rather larger than that of *tridactylus*, and has generally a much inflated frontal region. The floor of the mesopterygoid fossa is usually flat, with or without median septum, and without special perforations. The teeth, although variable, are usually of what may be called normal proportions, the pseudo-incisor smaller—generally much smaller—than the molars, and the pseudo-canine decidedly larger than the latter.

The names for these sloths may be put in two groups—the Amazonian and the S.E. Brazilian—not that as yet I can see any valid reason for distinguishing the two specifically, but merely to help later workers.

(1) Amazonian: *B. infuscatus*, Wagl. 1831 (Brazil near Peruvian boundary); *brachydactylus*, Wagn. 1855 (syn. *speculiger*, Fitz. 1871) (Borba, Lower Madeira); *problematicus*, Gray, 1849 (Para); *unicolor*, Fitz. 1871 (Para); *smithii*, Gray, 1869 (Para). *B. marmoratus*, Gray, 1849 ("Brazil"), seems also to belong here, judging by the type, and, if the Upper Amazon *infuscatus* proves distinguishable, would be the first name for the Lower Amazon form.

(2) S.E. Brazilian: *B. ai*, Wagl. 1831, nec Less. 1827 (R. Matheus, Espirito Santo); *brasiliensis*, Blainv.* 1839 (Rio Janeiro); *pallidus*, Wagn. 1843 (Rio Janeiro); *blainvilliei*, Gray, 1849 (Brazil); *dorsalis*, Fitz. 1871 (Pernambuco—based on Marcgrav).

Series from many localities are needed before these Brazilian sloths can be properly worked out, the available specimens—apart from M. Robert's set from Para already mentioned—consisting of isolated examples, often without any exact locality at all.

Bradypus boliviensis, Gray, 1871 (type B.M. no. 46.7.28.24), seems to be a valid species. Its speculum is of medium size,

* Put in valid form on p. 64 of the article on *Bradypus*.

rather dark-coloured. The hairs of its throat are tipped with white, a point not seen in any other species, though probably not of great constancy. Its skull is large and solidly built, and the teeth are distinguished by the unusual character that the pseudo-incisor is very large—as large as or even larger than the pseudo-canine, which in turn is small, not exceeding the posterior molars in transverse section. These tooth-characters are, however, not to be seen in Gray's figure, which seems to have been taken from a wrong specimen. But that 46.7.28.24 is the proper type there can be no doubt, as its osteological number, 921. *a*, is quoted by Gray.

In Central America we have *B. castaneiceps*, Gray, 1871, of Nicaragua, and *B. griseus*, Gray, 1871, of Veragua, of which we have no further material, and I can add nothing to Alston's account of them except to note that Mr. Goldman considers them really distinct, and adds to them a third species—*B. ignavus*, from Panama and the Atrato River. It is, however, certain that *griseus* and *ignavus* at least are very closely allied to *B. flaccidus*. It is also to be observed that Dr. Allen has identified a sloth from Rio San Jorge, Bolivar, Colombia, with Philippi's *B. ephippiger*; and as an example from Condoto, Choco, Colombia, presented by Dr. Spurrell, agrees with Philippi's figure in the great size of the speculum, the breadth of the frontal band, the distribution of the light and dark face-markings, and the size of the teeth, I am disposed to accept Dr. Allen's identification, and put down *ephippiger*, which was described without exact locality, as a native of N.W. Colombia, therefore in the same region as "*B. ignavus*" came from.

In any case, however, the relations to each other of *griseus*, *ignavus*, *ephippiger*, and *flaccidus* clearly need much further investigation.

B. flaccidus, Gray, 1849, has as type-locality Venezuela (probably the region opposite Trinidad), and has as synonyms *dysoni*, Gray, 1869, and *columbicus*, Fitz., 1871.

But by what characters it can be positively distinguished from the Brazilian forms I have not sufficient good material to be certain.

From Ecuador the Museum contains, firstly, a set of five adults and two young from Sarayacu on the Upper Pastasa River, and, secondly, an adult from the Balzar Mts., Guayas district, W. Ecuador. These appear to me to represent two forms for which no names are available. The first may be called

Bradypus macrodon, sp. n.

Most nearly allied to *B. infuscatus*, but the teeth heavier.

General colour pale brown, the white marbling of the posterior back generally extensive, with a well-marked brown median line, but in one specimen there is scarcely any white, and in another but little. Face and chin brown, the light frontal band narrow, about half an inch (say, 10–15 mm.) in breadth, whitish rather than yellow in most of the specimens. Hairs on crown overhanging the frontal band rather darker than those on the body generally. Speculum of medium size, $2\frac{1}{2}$ inches long in the type, paler yellow than in most other species, its median black band broad. Limbs freely marbled with white.

Skull much as in *B. infuscatus*, the forehead rather less convex than usual. Nasals, as usual, quite variable in shape and length, some convex and some concave anteriorly. Interparietal also extremely variable, its antero-posterior diameter in the type 15 mm., and in another specimen 7 mm. Mesopterygoid fossa widely open, its floor smooth and flat, or with a slightly raised median ridge, but without deep pits or excavations.

Teeth very large, much heavier than in *infuscatus*. Pseudo-incisor very large, oval in transverse section, the longest diameter pretty well equalling that of the molars, 4.3 mm. in the type, 5 mm. in another specimen. Pseudo-canine similarly very large and heavy, its greatest diameter about 6.2 mm., far exceeding the molars in bulk. Molars rarely less than about 5 mm. in greatest diameter.

Skull-dimensions of type :—

Naso-occipital length 78.5 mm.; condylo-basal length 78.3; greatest breadth (on squamosal) 56; nasals, length 12.5, least breadth 12.3; interorbital breadth 25.5; palate length from gnathion 29; postpalatal length 43; tooth-series 29; breadth between outer sides of pseudo-canines 22.6.

Hab. Sarayacu, Upper Pastaza River, Oriente of Ecuador.

Type. Adult male. B.M. no. 80. 5. 6. 56*. Collected by Clarence Buckley. Seven specimens examined.

This species is no doubt most nearly allied, as is natural, to *B. infuscatus*, but differs by the materially larger size of the teeth. Even in this character, however, one specimen fails (skull no. 80. 5. 6. 59); but among sloths such variations must be expected.

* The skulls were not individually allocated to the skins when they came, but I think there is little doubt as to the reference to each other of the type-skin and skull.

Bradypus violeta, sp. n.

Allied to *B. macrodon*, but distinguished from that, as from every other sloth, by the great extent of the yellowish velvety hair of the face, which extends upwards on the crown to the level of the ears nearly 60 mm. from its anterior commencement; the hairs of the cheeks as far as the ears also of the same colour and quality. Sides of throat likewise inclining to yellowish, in continuity with the cheeks, but the chin dark brown as usual, and the dark eye-streak also present. Nape, shoulders, and middle line at withers brown, the rest of the back nearly wholly white, as are also the hind limbs. Fore limbs brown, marbled proximally with white. Under surface dark brown anteriorly, whitish brown posteriorly. Speculum not known, the only specimen being a female.

Skull like that of *B. macrodon*, the forehead a little more swollen. Teeth of similar size and proportions.

Skull-measurements of type :—

Naso-occipital length 72 mm. ; greatest breadth (on jugal) 49·5 ; nasals, length 14, least breadth 12·3 ; interorbital breadth 24 ; palate length from gnathion 28·5 ; tooth-series 27·2 ; breadth between outer corners of pseudo-canines 20 ; greatest diameter of pseudo-incisor 4, pseudo-canine 6, second molar 4·8.

Hab. Balzar Mountains, Guayas, W. Ecuador.

Type. Adult female. B.M. no. 80. 5. 6. 83. Collected by Mr. Illingworth.

Characterized by its nearly wholly velvet-clothed face.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

January 24th, 1917.—Dr. Alfred Harker, F.R.S., President,
in the Chair.

Mr. SCORESBY ROUTLEDGE, M.A., gave an account of Easter Island. He said that the Expedition, that he had had the honour to command, was organized with the object of carrying out a long-standing wish of various bodies interested in anthropology. This wish was that Easter Island, and other islands most near to it, though far distant from it, should be thoroughly examined, and that all information and material thereon found should be carefully considered on the spot, or, if possible, be brought back for comparative study.

This programme necessitated a vessel being specially designed, built, and equipped for the purpose. A schooner with auxiliary motor power, the 'Mana,' of 90 tons gross register, 78 feet