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by

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by

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ABSTRACT

Three species of *Perochirus*, *P. ateles*, *P. scutellatus*, and *P. guentheri* are recognized. The distribution of each species is limited to one island or small group of islands in the South Pacific. *Perochirus scutellatus* is found on the Caroline Islands. The New Hebrides is the locality for *P. guentheri*, and *P. ateles* is from Truk, Kapingamaringi, Guam, Marcus and Cocos islands. Although it was first described from Mindanao, new evidence suggests that the locality for the type specimen of *P. ateles* was in error. A key for identification is included.

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INTRODUCTION

Boulenger (1885, p. 154) established the genus *Perochirus* to accommodate four species of geckos described from islands of the Pacific Basin, previously assigned to the genus *Hemidactylus*, and a fifth, which he described. He had not seen the unique type of *Perochirus ateles*, and descriptions of other species were based on small samples of one or two specimens. The distinguishing characters noted for the new nominal genus were: first finger rudimentary, clawless; inner toe and other digits with claws; digits other than first strongly dilated, with distal scancers divided by a median groove and with terminal, compressed, clawed phalanges arising from within the dilated portion; dorsum covered with relatively uniform, granular scales.

Underwood, in a supplemental note to his paper on geckos (1954), placed *Perochirus* in the subfamily Gekkoninae, basing the assignment primarily on the shape of the pupil of the eye. Kluge (1967) referred the genus to his Group I of the Gekkoninae, which included those genera exhibiting a relatively low number of sclerical ossicles. He noted, however, that *Perochirus* differed from other Group I genera in that the parietal element of the skull is formed of a single bone, this conclusion being based on an examination of a single skull of one species, *P. guentheri* (Kluge, 1967, p. 35). Russell, in an unpublished doctoral dissertation (1972), found essentially the same distinguishing characters as Boulenger, and assigned the genus, along with *Gehyra* and *Hemiphyllodactylus*, to a group of related genera within the subfamily. This presumed relationship was based largely on the degree of reduction of the first digit and the origin of the compressed, clawed, distal phalange from within the dilated part on all digits but the first (Fig. 1). Wermuth (1965, p. 125) gave synonymies of the genus and species. Although the relationships of this group of genera are not yet entirely clear, the recognized species referred to each genus do appear to conform to natural entities at the generic level.

All together, six species have been referred to the genus *Perochirus*: *P. ateles*, *P. articulatus*, *P. depressus*, *P. guentheri* and *P. scutellatus*, which were described by Boulenger (1885), and *P. mestoni*, described by DeVis (1890, p. 1035). The last was placed in the synonymy of *Gehyra variegata* by Kluge (1963, p. 84) following examination of the holotype.

The current availability of large samples of *Perochirus* from scattered island populations, samples that were not available to Boulenger in 1885, makes it possible to arrive at more satisfactory conclusions as to the variability exhibited by some of the species and their ranges. Redefinition of valid species and the bases for my conclusions are presented in the following section.

In addition to examining the types of the nominal species referred to *Perochirus* in the collections of the Muséum National d'Histoire Naturelle, Paris (MNHN) and the

British Museum (Natural History), London (BMNH), I also examined specimens from several islands of the Pacific Basin in the collections of the Museum of Comparative Zoology, Harvard University (MCZ); American Museum of Natural History, New York (AMNH); Field Museum of Natural History, Chicago; National Museum of Natural History, Washington (USNM); and Carnegie Museum, Pittsburgh (CM) as well as the material in the collections of the California Academy of Sciences, San Francisco (CAS). I am deeply indebted to Miss A. G. C. Grandison, Mr. H. Marx, Drs. W. R. Heyer, E. E. Williams, R. G. Zweifel, C. J. McCoy, Jean Guibé, and Mme. R. Roux-Estere of the above institutions for their courtesy in permitting me to study this material.

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MATERIALS AND METHODS

Methods followed in standardizing counts and measurements include: (1) scansor counts beneath digits include only those scansors which are two to three or more times the breadth of the scales at the base of the digits; (2) inter-orbital scale rows which lie across the head at the approximate center of the eyes; (3) upper and lower labial counts, including the most posterior one which is distinctly larger than the adjacent scales; (4) head length from snout tip to posterior edge of ear opening; (5) eye diameter taken by placing the needle points of the Helios dial caliper within the eye socket and measuring the antero-posterior diameter (this measurement tends to vary slightly with the state of preservation); (6) head breadth at the widest point near the angle of the jaw; (7) other measurements as indicated by the anatomical terms defining them.

PEROCHIRUS Boulenger

Perochirus Boulenger, 1885, Cat. Liz. Brit. Mus., London, 1:154 (type species: *Hemidaetylus ateles*, A. Duméril).

Dorsum covered with granular scales, relatively uniform, without tubercles; several rows of enlarged scales in place of chin shields; digits, except for first (inner), strongly dilated and with several distal scansors divided at the mid-point; all digits, except much reduced first finger, with a claw; distal claw-bearing phalanges compressed and, except on inner toe, rising free from within dilated portion rather than from its tip; digits with basal to moderate webs (Fig. 1).

PEROCHIRUS ATELES (A. Duméril)

- Hemidactylus ateles* A. Duméril, 1856, Arch. Mus. Hist. Nat. Paris, 8:462, p. 9, fig. (type loc: Zamboanga, Mindanao Island, Philippines [doubtful locality]; type in the Museum d'Histoire Naturelle, Paris).
- Hemidactylus ateles articulatus* Fischer, 1882, Arch. Naturgesch. Berlin, 48:297 (type loc: Ponape Island, Caroline Islands; type in the British Museum [Natural History]).
- Hemidactylus ateles depressus* Fischer, 1882, Arch. Naturgesch. Berlin, 48:300 (type loc: Ruk Island (=Fefan Island), Truk Group, Caroline Islands; syntypes in the British Museum [Natural History]).
- Perochirus ateles*: Boulenger, 1885, Cat. Liz. Brit. Mus., London, 1:154; Taylor, 1922, Philip. Bur. Sci., Publ. 17:65; Wermuth, 1965, Das Tierreich, 80:125.
- Perochirus articulatus*: Boulenger, 1885, Cat. Liz. Brit. Mus., London, 1:156; Burt and Burt, 1932, Bull. Amer. Mus. Nat. Hist., 63:509; Brown, 1956, Proc. Pac. Sci. Cong., 3A:1487; Niering, 1963, Ecol. Monog., 33:155; Wermuth, 1965, Das Tierreich, 80:125.
- Perochirus depressus*: Boulenger, 1885, Cat. Liz. Brit. Mus., London, 1:155.
- Perochirus klugei* Wermuth, 1965, Das Tierreich, 80:125.
(Replacement name for *H. a. depressus*, Fischer, 1882.)

I have examined the types of *P. ateles* and *P. ateles depressus* along with the reasonably large sample from Truk Islands (see Material examined). For those characteristics believed to distinguish the two nominal taxa, the types and examples from the additional series are in close agreement in appearance. Indeed, they overlap to such a degree that they must be regarded as one species, the types probably coming from the same population. It should also be noted that one character (rostral higher than broad) used by Boulenger (1883, p. 154) to distinguish *P. ateles* from other species was incorrectly described. Boulenger had not examined the type of *P. ateles*. When the rostral of the type is measured with a dial caliper, it is 4.0^{\pm} units broad and only 2.6^{\pm} units high (antero-posterior measurement).

The pattern and number of enlarged pore-bearing scales and pores are in basic agreement (Table 1) for the types of *P. ateles* and one of syntypes of *P. depressus*, as are webbing, scale and scansion counts and tail characteristics. Also, the type of *P. articulatus* and a second specimen from Ponape fit the definition of this species as determined by the larger sample from the Truk Islands. The superficial appearance of more depressed head for the larger syntype of *P. depressus* as compared to *P. articulatus* is not confirmed

when the ratios of head depth at the posterior edge of the orbit to head breadth are compared (about 50% to 58% for two examples from Ponape and 55% to 62% for several specimens from Truk Islands). The somewhat narrower tail noted for the type of *P. articulatus* is in close agreement with the condition exhibited by the smaller syntype of *P. depressus*. Lastly, the granular or flat condition of ventral scales does not differ markedly for the types and varies somewhat between axilla and groin.

The species of the genus, except for the unique type of *P. ateles* (labeled Zamboanga, Mindanao, Philippines), were described from specimens collected in the Caroline Islands, Western Pacific Basin, and New Hebrides. The type localities of the populations from the Carolines and New Hebrides have been reconfirmed in recent years and populations conspecific or very closely related to the Truk and Ponape populations have been found on other islands of Micronesia. The type locality given for *P. ateles* has not been reconfirmed although extensive explorations have been conducted on the Zamboanga Peninsula as well as elsewhere on Mindanao and adjacent islands in the Philippines in the early 1900's and in recent decades.

In view of these confirming data as well as the fact that the types of *P. ateles* and *P. depressus* are similar in the characters studied, and fall within the range of variability for the Truk population (as noted above), I regard these samples as representing a single species, for which *P. ateles* is the oldest available name. In addition, I regard the locality of Zamboanga, Mindanao Island, Philippines as probably in error. I suggest that the type of *P. ateles* may possibly have come from the same Truk population as the type of *P. depressus*. Supporting evidence, although circumstantial, for this suggestion is the fact that the Astrolabe and the Zélée visited the Rauk (=Ruk, Truk group) type locality of *P. depressus* Fischer, in December, 1838, and Zamboanga, Mindanao Island only a month later in January, 1839 (Dumont d'Urville, 1843, 5:132 ff and 1845, 8:2 ff).

MATERIAL EXAMINED

Mindanao Island, Philippines (questionable locality): MNHN 6602, holotype of *Hemidactylus ateles*; Ruk (also called Fefan) Island, Truk group, Caroline Islands: BMNH 1926.8-.14.73-74 (syntypes of *Hemidactylus ateles depressus*); Boquet Island, Truk group, Caroline Islands: BMNH 1946.8.26-.38 and 95.5.17.5 (holotype of *Hemidactylus ateles articulatus*); Kapingamarangi Islands: CAS 123734-42 and USNM 139823-221; Marcus Island: USNM 31074-75 and AMNH 22243-44; Guam and Cocos Islands: USNM 191890-91, MCZ 104502, CM 25389-97; Arno Atoll: USNM 132151; Tinian Island: USNM 123748.

DESCRIPTION

A moderate-size *Perochirus*, snout-vent length of 12 mature males about 55 to 88 mm; habitus moderately depressed,

somewhat stocky; snout moderately tapered, tip rounded, its length about 40% to 44% of head length; internasal distance about 35% to 41% of snout length; breadth of head 75% to 95% of head length and 18% to 22% of snout-vent length; rostral large, quadrangular, broader than long (not longer than broad as erroneously stated for the type of *P. ateles*), marked usually by a median posterior groove; nostril surrounded by rostral, first labial, supranasal, and two posterior scales; supranasals separated by 2 or occasionally 3 scales; 11 to 12 upper labials, 8th or 9th beneath center of eye; 10 or 11 lower labials; mental small, triangular, smaller than adjacent labials; 3 or 4 rows of slightly enlarged scales in position of chin shields, anterior series the largest; about 30 to 34 interorbital scale rows; scales on snout (and, to a somewhat lesser degree, in interorbital region) enlarged compared to those on dorsal surface of body; scales on dorsal and lateral surfaces of body granular, uniform; tubercles absent; limbs moderately well developed, length of hind limb (extended in preserved condition) 70% to 90% of the axilla-groin distance; digits partly webbed, about 1/5 to nearly 1/3 of length; fingers and toes, except for first, broadly dilated; web shortest between 4th and 5th toes, longest between 2nd and 3rd toes and 4th and 5th fingers; 1st toe attached throughout nearly all of the scansor bearing part; 16 to 21 short scansors under 5th toe, terminal 6 or 7 scansors divided; 6 to 9 scansors beneath first toe undivided; all digits on forelimb but 1st clawed, with distal compressed phalanges arising within the dilated portion and, when depressed, usually extending for less than half their length beyond dilated part; a short series of about 6 to 10 enlarged scales in pore series (bearing 2 to 5 pores for three males and none for ten males), this series followed by several rows of scales, enlarged in varying degree, anterior to vent; distinctly enlarged scales and pores absent from femoral areas; tail depressed and broad, especially in males, breadth just posterior to swellings about 58% to 82% of breadth of head (measured in twenty specimens); about 16 to 18 rows of somewhat enlarged and more or less square-shaped scales on the ventral surface of tail near the base in smaller syntype of *P. depressus*; lateral margin of tail with a series of rather long spine-like scales at intervals; in second syntype, margin of tail relatively smooth.

Color in preservative. Dorsal surfaces light reddish-brown or reddish-tan, sometimes with a blotched pattern; venter grayish to dirty-ivory, often with some brownish blotches, especially on head, throat, and, on some specimens, the anterior part of body and tail.

ECOLOGICAL NOTE

In the Kapingamarangi Islands, *P. ateles* was collected on coconut palms and one specimen was taken from an arboreal fern in a breadfruit tree.

RANGE

Truk Islands, Kapingamarangi Islands, Guam, Tinian, Ponape; and Marcus Island in the Pacific Basin. Zamboanga Peninsula, Mindanao Island, Philippines, said to be the type locality of *P. ateles*, is assumed to be in error.

PEROCHIRUS GUENTHERI Boulenger

Perochirus guentheri Boulenger, 1885, Cat. Liz. Brit. Mus., London 1:155 (type loc; New Hebrides; syntypes in British Museum [Natural History]); Kluge, 1967, Bull. Amer. Mus. Nat. Hist., 135:29; Wermuth, 1965, Das Tierreich, 80:125.

MATERIAL EXAMINED

New Hebrides: BMNH 60.3.18.10-11 (syntypes of *Perochirus guentheri*) BMNH 1973.1519, AMNH 60288.

DESCRIPTION

A relatively small to moderate sized *Perochirus*, snout-vent length of one mature male 67.5 mm; habitus moderately depressed, stocky; snout moderately tapered, tip rounded, its length about 42% to 44% of length of head; internasal distance, about 40% of snout length; breadth of head 78% to 85% of head length and 20% to 22% of snout-vent length; rostral large, quadrangular, broader than long, marked by a median posterior groove; nostril surrounded by rostral, 1st upper labial, supranasal and 2 posterior scales; supranasals separated by 1 or 2 scales; 9 to 11 upper labials, 8th or 9th beneath center of eye; 8 or 9 lower labials; 4 or 5 rows of somewhat enlarged scales, anterior ones largest, in place of chin shields; about 30 or 32 interorbital scale rows; scales on snout and (to a lesser degree) in interorbital region enlarged relative to those on dorsal surfaces of body; scales on dorsal and lateral surfaces of body granular, relatively uniform; enlarged tubercles absent; limbs moderately developed, length of hind limb (extended in preserved condition) 74% to 81% of axilla-groin distance; digits about 1/5 or less webbed, least webbing between 4th and 5th toes, greatest between 2nd and 3rd fingers; 1st toe free for about 1/2 to 3/4 of length of scissor-bearing portion; digits, except for 1st finger, clawed; distally-compressed claw bearing phalanges rise from within dilated part on all but 1st toe; compressed phalanges on 2nd through 5th digits, extend beyond dilated portions usually for less than 1/2 their length; a short medianly arched series of about 12 to 15 enlarged preanal scales in pore series, bearing a series of 10 to 12 preanal pores in males, continuous with a very short row of somewhat enlarged non-pore-bearing scales on proximal end of thigh; between pore row and vent several rows of scales enlarged to various degrees, form an anteriorly pointed wedge. A couple of rows anterior to pore row appear somewhat enlarged; tail depressed and usually broad, dorso-ventral depth just posterior to basal ventral swellings 59% to

60% of breadth at same point; tail breadth 81% to 88% of head breadth; lateral margin of tail on basal unregenerated half, with a short spine about every 6th or 7th row of scales on mature male syntype, such spines absent from broken tail of other syntype.

Color in preservative. Dorsum light reddish-brown to gray with a reddish diffusion; venter whitish-ivory with only a few minute, dark flecks on the scales.

RANGE

Known only from New Hebrides.

PEROCHIRUS SCUTELLATUS (Fischer)

Hemidactylus ateles scutellatus Fischer, 1882, Arch. Naturgesch. Berlin, 48:229 (type loc: Greenwich Island, Caroline Islands, type in the British Museum [Natural History]).

Perochirus scutellatus: Boulenger, 1885, Cat. Liz. Brit. Mus., London, 1:156; Wermuth, 1965, Das Tierreich, 80:125.

Perochirus articulatus (part*): Niering, 1963, Ecol. Monog., 33:155.

MATERIAL EXAMINED

Greenwich Island (=Kapingamarangi of recent authors)
Caroline Islands: BMNH 1946.8.14-76 (holotype of *Hemidactylus ateles scutellatus*), and CAS 139653, Tetau Islet in this group.

DESCRIPTION

A large *Perochirus*; snout-vent length of mature males 116 mm to 124 mm (2 specimens); habitus stocky, somewhat depressed; snout moderately tapered, tip rounded, its length about 44% of head length; internasal distance about 35% of snout length; head breadth 76% to 86% of head length, and 20 to 22% of snout-vent length; rostral large, quadrangular, broader than long, marked by a median posterior groove; nostril surrounded by rostral, 1st labial, labial, supranasal and two posterior scales; supranasals separated by 1 large scale; 12 upper labials, 8th or 9th beneath center of eye; 11 lower labials; mental triangular, usually smaller than adjacent labials, 3 or 4 rows of somewhat enlarged scales in place of chin shields, anterior scales largest; about 50 to 54 interorbital scale rows; scales on snout and to a lesser degree in the interorbital region enlarged relative to those on dorsal surface of body; scales on dorsal and lateral surfaces of body granular, relatively uniform; enlarged tubercles absent; limbs relatively well-developed, length of hind limb (extended in preserved condition) 88% to 98% of the

axilla-groin distance; digits webbed about $1/6$ to $1/5$ of their length; least webbing between 4th and 5th toes, greatest between 3rd and 4th fingers; fingers and toes, except for 1st, broadly dilated, 1st toe free from second for about $1/2$ length of scansor-bearing portion; 23 to 26 scansors beneath 4th toe, 6 or 7 terminal scansors divided, 6 to 7 undivided beneath first toe; all digits but 1st clawed; the distal compressed claw-bearing phalanges, rising from within dilated part on all but 1st toe; compressed phalanges on 2nd through 5th digits, when depressed extend beyond dilated portion for about half the length; a long, medianly arched continuous series of enlarged preanal and femoral scales in pore series extending about $3/4$ of length of thigh and bearing a continuous series of about 50 pores in males; pore series followed by several rows of somewhat enlarged scales in preanal region; thighs bordered posteriorly by small scales which do not differ from those on posterior surface of thighs; tail depressed and relatively broad, ventral breadth just posterior to swollen base 63% to 68% of breadth of head; $20\pm$ rows of somewhat enlarged and rather square-shaped scales on ventral surface of tail; lateral margin of tail without spines except for a pair at base.

Color in preservative. Dorsum grayish diffused with brown or dark gray, head anterior to postorbital region brownish; venter yellowish-white.

ECOLOGICAL NOTE

The Tetau Island specimen was taken on a coconut palm.

RANGE

Recorded specifically from Tetau Island and possibly other islands in the Greenwich (Kapingamarangi) Islands.

DISTRIBUTION

This genus of gekkonid lizards appears to be limited to islands of the Pacific Basin (the unconfirmed Philippine record I believe to be an error, as noted under *P. ateles* above). While *P. ateles* is represented by populations on several Micronesian islands, *P. guentheri* and *P. scutellatus* appear to have more restricted distribution and are known only from a restricted island or atoll group. High densities are not evidenced for any of the populations, and the small samples available from populations of the widely dispersed species are not sufficient to evaluate adequately possible island differences. However, it may be appropriate to note that the four specimens from Marcus Island (however badly faded) exhibit a blotched color pattern not evidenced in the samples from other populations.

TABLE 1
PERTINENT SCALE COUNTS AND MEASUREMENTS FOR SPECIES OF *PEFOCHIRUS*

SPECIES	Snout-Vent Length (mm) Of Adult Males	Number of First Toe Scansors	Number of Fourth Toe Scansors	Number of Preanal & Femoral Pores	Ratio: Diameter of Eye Snout-Length	Ratio: Diameter of Eye Head-Length	Ratio: Length of Hind Limb Axilla-Groin Distance
<i>P. ateles</i> (type)	88±	8-9	17	4	0.730	0.311	0.796
<i>P. depressus</i> (co-types)	68-81	7-8	18-21	2-5	0.724-0.775	0.314-0.323	0.783-.839
<i>P. articulatus</i> (type)	-	6	16	-	0.771	0.331	0.886
Sample of 22	54-79 (sample of 10)	6-10	16-21	-	0.672-0.825	0.282-0.353	0.720-.881
<i>P. guentheri</i>	67-71	7-8	18-21	10-12	0.720-0.792	0.309-0.345	0.738-.806
<i>P. scutellatus</i>	116-124	9-10	23-26	45-52	0.547-0.594	0.240-0.261	0.878-.981

KEY TO THE SPECIES OF *PEROCHIRUS*

1. Enlarged pore scales in short series of about 4 to 10 or 12, limited to preanal region or extending only onto distal end of thigh, bearing pores in males for known males in *P. guentheri* and for part of males of *P. ateles*; eye relatively large, its diameter greater than 65% of snout length; about 30 to 40 interorbital scale rows at center-plane of eyes; snout-vent length rarely as great as 90 mm for mature specimens..... 2

Enlarged pore scales in long series of about 50, extending for about 3/4 of length of thigh, bearing about 50 pores in males; eye relatively small, its diameter usually less than 60% of snout length; about 50 interorbital scale rows at center-plane of eyes (recorded from Micronesia); snout-vent length of mature specimens may be greater than 100 mm.....*P. scutellatus*

2. Row of enlarged pore scales short, 4 to 10 in number, limited to preanal region, usually without pores in the males, or with a small number in median preanal scales (2 to 5 in sample) for some males; first toe rather closely attached to second toe throughout length of scansor-bearing portion; ventral scale rows at mid-point of fore-limbs about 30 to 34; (recorded from Micronesia)*P. ateles*

Row of enlarged pore scales moderate, 10 to 12 in number, extending to base of thigh, bearing 10 to 12 pores in mature males; first toe free from second for about 1/2 or more of scansor-bearing portion; ventral scale rows at mid-point of fore-limbs about 40; (recorded from New Hebrides).....*P. guentheri*

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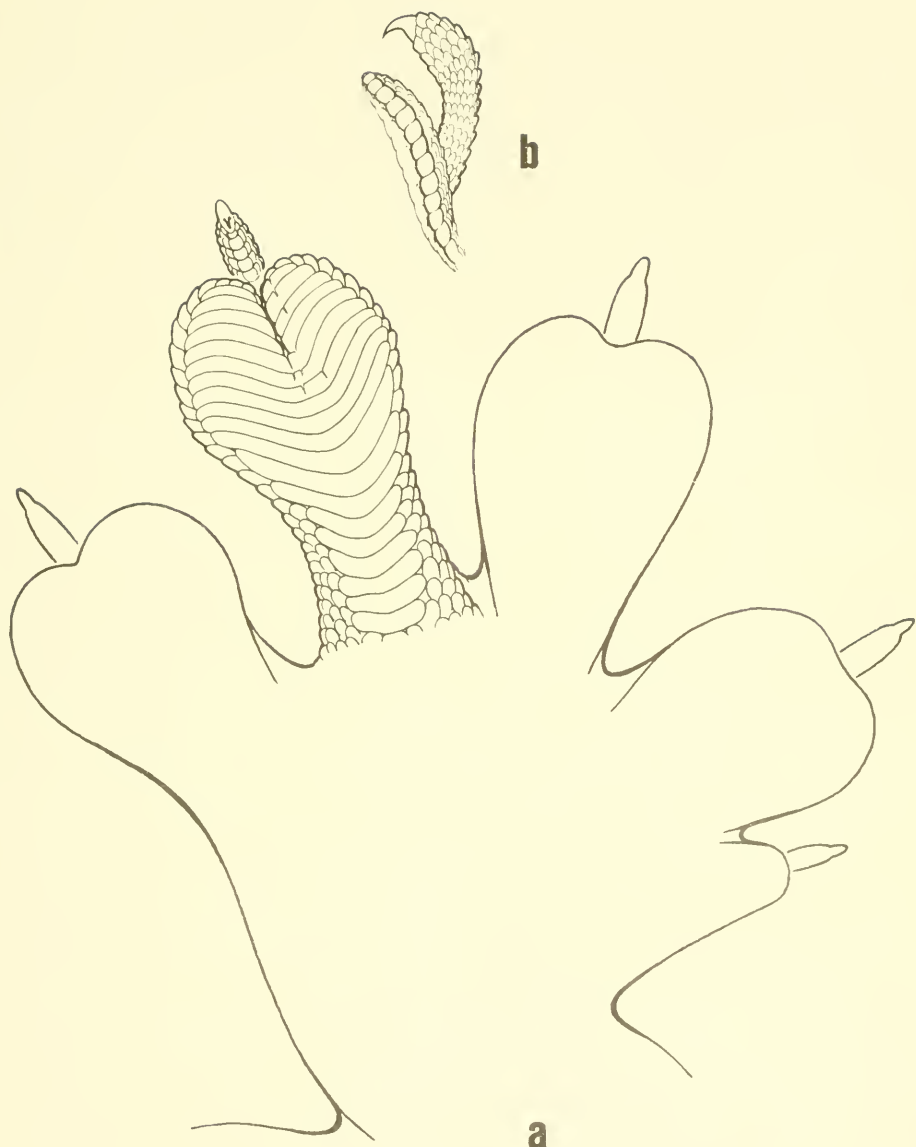
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FIG. 1. Digits of *P. ateles*. A. Example of digital scissor divided at mid-point. B. Claw arising free from dilated portion of toe rather than tip.



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