TEIID LIZARDS OF THE GENUS PROCTOPORUS FROM BOLIVIA AND PERU

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ABSTRACT

Four species [*P. pachyurus* Tschudi, *P. bolivianus* Werner, *P. guentheri* (Boettger), *P. ventrimaculatus* Boulenger] occur in Bolivia and Peru. The first three (the *P. pachyurus* group) have an undivided translucent disc in the lower eyelid, a median occipital, two or three supraoculars, and squarish pregulars not forming chevrons. This group resembles *P. striatus* (Peters) in the last character, but differs from it in the first three. *P. pachyurus* (17 examined) and *P. bolivianus* (158) occur at about 2500-3800 m above sea level on the eastern Andean slopes, the former in central Peru, the latter in southern Peru and northern Bolivia. *P. guentheri* (30) occurs parapatrically at lower elevations (1000-2516 m). Although the hemipenes of *P. bolivianus* and *P. guentheri* resemble each other rather than that of *P. pachyurus,* in most respects *P. bolivianus* and *P. pachyurus* are more similar to each other. Specimens of *P. bolivianus* from the upper reaches of the Río Urubamba differ from those from the lower Río Urubamba valley in size, ventral coloration, presence of a loreal, and number of anterior supralabials. A small sample from Cuzco resembles those from the lower Río Urubamba valley in absence of a loreal and in femoral pore number, but resembles specimens from the

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upper valley in size and some aspects of coloration. *P. ventrimaculatus* (2; northern Peru, 2200-2700 m) has a divided eye disc, an enormous first superciliary resembling a supraocular, a small first supraocular touching the palpebrals, and a smaller second supraocular separated from the palpebrals by a superciliary. The relationships of *P. ventrimaculatus* may be with *P. striatus*. The name *P. petersi* (Boettger) is placed in the synonymy of *P. unicolor* (Gray). *P. bolivianus* is removed from the synonymy of *P. guentheri* and is used for the taxon formerly called *P. petersi; P. lacertus* (Stejneger), *P. longicaudatus* Andersson, and *P. obesus* Barbour and Noble are synonyms. *P. ocellifer* (Boulenger) and *P. anomalus* (Barbour and Noble) are placed in the synonymy of *P. guentheri*.

Introduction

More than ten years ago I examined most of the Peruvian and Bolivian lizards of the genus *Proctoporus* in North American museums. At that time, I was unable to decide to which population of these the name *Proctoporus petersi* applied. A recent opportunity to examine the holotype of *Proctoporus petersi* has, however, removed my doubts, and the imminent publication of a checklist of South American reptiles, being edited by James Peters, provides some urgency for recording new information on the taxonomy of these animals.

The specimens examined include two groups and four species. One group contains *Proctoporus ventrimaculatus*. I have examined two specimens of this form, both from northern Peru; I am uncertain about its affinities. The other group, with three species in Bolivia and southern Peru, is related to *Proctoporus striatus* of Colombia. These three southern species may be distinguished as a separate subgroup on the basis of the undivided transparent disc in the lower eyelid. Such an undivided disc occurs frequently in southern populations of many species of lizards in Boulenger's (1885) Group II of the family Teiidae, and does not indicate that the members of the subgroup are more closely related to each other than to *P. striatus*. The subgroup is purely a matter of my convenience.

Key to species of Proctoporus in Peru and Bolivia

The four species of the genus *Proctoporus* that I presently recognize in Peru and Bolivia can be distinguished by the following key.

1a. Dorsal scales 49 or more . . . . *P. pachyurus*
b. Dorsal scales 47 or fewer 2
2a. A pair of enlarged pregular scales in contact on midline behind the second pair of chinshields; belly clear yellow; conspicuous ocelli in males, 29-35 dorsal scales . . . . *P. guentheri*
b. No pair of enlarged pregulars; ventral scales uniformly dark or at least heavily spotted on lateral rows 3
3a. Supraoculars 2-2 or 3-3, separated from palpebral scales by a complete superciliary series . . . . *P. bolivianus*

b. Supraoculars 2, the first in contact with palpebrals and preceded by an enormous first superciliary (or, supraoculars 3, the middle in broad contact with the palpebrals) . . . . *P. ventrimaculatus*

Proctoporus pachyurus Group

DEFINITION. A continuous narrow zone of granules separating the ventral and lateral scales. Males with or without ocelli in pattern. Two or three supraoculars, all separated from upper palpebrals by superciliary series; first superciliary expanded onto dorsal surface of head or not. Translucent disc in lower eyelid composed of single scale. Median occipital almost always present. Pregulars (Ruibal, 1952: 478) variable, but usually not forming chevrons with apices forward; many pregulars quadrangular; pregulars and gulars separated by granular row. Limbs not or scarcely overlapping when adpressed. Tibial scales weakly keeled. Thenar scales, especially in *P. guentheri,* with weakly produced edge. Females with or without femoral pores; when present, fewer than in males; males with femoral pores; no preanal pores in either sex.

Lizards of the *P. pachyurus* group can be identified by the narrow zone of granules separating the lateral and ventral scales and by the undivided disc in the lower eyelid. The median occipital is absent in five specimens, although in six others it is replaced by two small scales and in one, it is partly fused to an occipital[1]; when series are available, presence of a median occipital is apparently a reliable feature to distinguish the *P. pachyurus* group from the *P. luctuosus* group (Uzzell, 1958).

RELATIONSHIPS. The relationships of the *P. pachyurus* group are with *Proctoporus striatus*. This is especially suggested by the arrangement of the pregular scales, the complete superciliary series, and the narrow zone of small scales just lateral to the ventral scales. *P. striatus* differs from members of the *P. pachyurus* group in having more (4-5) supraoculars, longer legs, a divided disc in the lower eyelid, and usually no median occipital (although Burt and Burt, 1931, reported variation in this character). *Proc-*

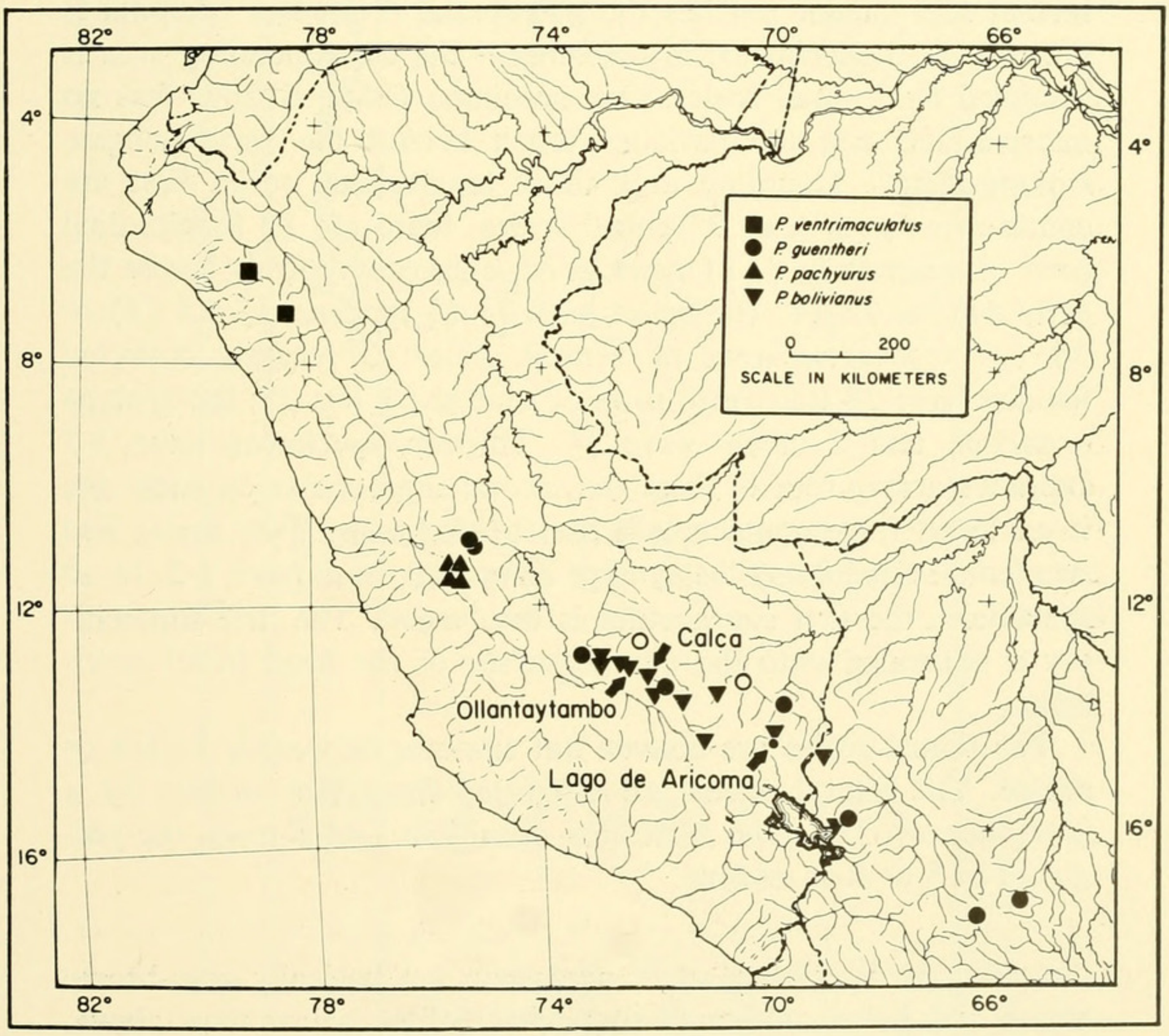
[1] One individual lacks an interparietal, therefore presence or absence of a median occipital is a meaningless distinction.

toporus hypostictus is perhaps related to *P. striatus* and the *P. pachyurus* group, although it shares many features with the *P. luctuosus* group (Uzzell, 1958).

Proctoporus pachyurus Tschudi

Proctoporus pachyurus Tschudi, 1845, Archiv für Naturgeschichte 11:161.

Tschudi (1845) described this species on the basis of two specimens that he collected in the valley of the Río Chanchamayo in eastern Peru. This river, located in Junín, joins the Río Paucartambo and gives rise to the Río Perené. The two syntypes,



Collection localities for four species of *Proctoporus* in Peru and Bolivia. Open symbols represent published records. Localities for *P. guentheri* are generally at lower altitudes than those for *P. pachyurus* and *P. bolivianus*. Arrows point to towns mentioned in text.

which are in the Musée d'Histoire Naturelle in Neuchâtel, Switzerland, were examined and described in detail by Peters (1862). I have recently examined one of these, and can add only that it, the specimen figured by Peters, is a female. Recent specimens of this species are from the valley of the Río Tarma, which flows into the the Río Chanchamayo (map). One of these had previously been reported by Griffin (1917).

VARIATION. Data on 10 males and 7 females are presented in Table 1. All of the specimens have an undivided disc in the lower eyelid, and a loreal that touches both the supralabials and frontonasal. A complete superciliary series separating the supraoculars from the palpebral scales occurs on 33 of 34 sides; in SMF 65286, the left second supraocular touches the palpebrals. A median occipital is present in 13 specimens; in the other 4 the corresponding area is occupied by 2 small scales. One specimen (SMF 65287) has no interparietal, and the parietals touch behind the very elongate frontoparietals. Counting only those longitudinal series that are continuous for at least 3 ventral scales, there are 12 longitudinal rows of ventrals in 8, 11 rows in 8[2]; enlarged ventrals across the belly number 12-14. The males have 24 (5 specimens), 25 (3) or 26 (2) transverse rows of ventral scales; 3 recently collected females have 26 transverse rows of ventrals; 1 has 25; the syntype examined and 2 others have 24. Thirteen specimens have 3-3 supraoculars; in four of these the second supraocular on each side is excluded from contact with the superciliaries. Two males and two females, including the syntype examined, each have 2-2. In all specimens, the first supraocular is the largest. The first superciliary is expanded onto the dorsal surface of the head in all specimens.

The dorsal scales are convex but smooth, or weakly keeled or striate. The lateral scales are separated from the ventrals by a granular row. The gular scales are usually in 7 or 8 rows, the pregulars in 5 or 6 at midline.

COLORATION. Specimens of *P. pachyurus* are basically gray-brown above and below, although somewhat lighter below than above. The ventral scales are each marked by diffuse dark pigment, and

[2] One individual was not scored.

TABLE 1. Variation in specimens of *Proctoporus pachyurus*. Figures represent ranges and (in parentheses) means

	Total femoral pores	Dorsal scale rows	Subdigital lamellae 4th finger	Subdigital lamellae 4th toe	Scales around midbody region	Hind leg / Snout-vent length
Acobamba 2 ♂♂	18-19 (18.5)	52-59 (55.5)	11-13 (12.2)	19-20 (19.5)	43 (43.0)	.35 (.350)
Tarma 6 ♂♂	16-21 (18.0)	51-55 (53.2)	12-14[1] (13.3)	20-22[2] (20.8)	40-44 (41.4)	.33-.39 (.355)
Tarmatambo 2 ♂♂	18-19 (18.5)	49-55 (52.0)	11-12 (11.5)	20-21 (20.5)	40-44 (42.0)	.34-.35 (.345)
Acobamba 3 ♀♀	8-9 (8.3)	54-55 (54.7)	13-14 (13.5)	19-21 (19.8)	41-43 (42.3)	.29-.32 (.311)
Huanuquillo 1 ♀	6	55	—	—	—	.37
Tarma 2 ♀♀	4-8 (6.0)	54-56 (55.0)	11-14 (12.5)	18-21 (19.5)	40-44 (42.0)	.33 (.330)
Syntype 1 ♀	5	54	—	—	—	.29

[1] 8 digits; [2] 7 digits

especially in younger specimens, this dark pigment tends to form ventral lines, one on each row of ventral or subcaudal scales.

Adults are more uniform above than the young. In the young there tend to be light dorsolateral lines bounded below by darker brown; these lines extend from the hind corner of the eye to the end of the body and onto the tail. They may be retained in adult females. There is usually a mid-dorsal dark stripe on the shoulder region. A bright white line passes from the middle of the lower border of the eye to the tympanum. There is a row of light spots along the upper side of the body between the limb insertions and below the dorsolateral light lines.

LENGTH. Both the largest male and the largest female (a syntype) examined are 58 mm snout to vent. Two males and one female with intact tails have tail over snout-vent length ratios of 1.4 to 1.9 (mean 1.76).

SEXUAL DIMORPHISM. The greatest dimorphism is in femoral pore number (Table 1). The preanal scale number is also dimorphic. Six females have six posterior preanals, while one has four plus two lateral slivers. Seven males have four posterior preanals, two have five, the median a small triangular wedge; and one has six. The pattern may also show some dimorphism, mature males being more uniform above.

BIOLOGY. Nothing is known about the biology of *Proctoporus pachyurus.*

RANGE. Although *P. pachyurus* is not known to occur sympatrically with other members of the genus, *P. guentheri* also occurs in the valley of the Río Chanchamayo (map). In this valley, the localities for *P. guentheri* are downstream from and lower (1000-1500 m above sea level) than the exact localities for *P. pachyurus* (2900-3800 m).

SPECIMENS EXAMINED. Peru: Junín: valley of Río Chanchamayo, MN unnumbered, syntype of *Proctoporus pachyurus;* Tarma, Tarma (3000 m) CM 1043, FMNH 134384-90; Huanuquillo (3800 m): FMNH 134391; Tarma, between Acobamba and Palcamayo (2900 m) SMF 65284-88; Tarmatambo (3300 m) AMNH 88323 (2 specimens).

Proctoporus bolivianus Werner

Proctoporus bolivianus Werner, 1910, Mitt. Naturh. Mus. Hamburg 27 (pt. 2): 30.
Oreosaurus lacertus Stejneger, 1913, Proc. U.S. Nat. Mus. 45: 546.
Proctoporus longicaudatus Andersson, 1914, Arkiv f. Zool. 9 (3): 6.
Proctoporus obesus Barbour and Noble, 1921, Proc. U.S. Nat. 58(2352): 616.

Proctoporus bolivianus was described from a single female with a body length of 48 mm collected at Sorata, La Paz, Bolivia, at about 2615 m above sea level (Werner, 1910). Dr. Erna Mohr has informed me that the holotype, formerly in the collection of the Zoologisches Museum in Hamburg, was lost during World War II.

Although Burt and Burt (1931) placed *P. bolivianus* in the synonymy of *P. guentheri,* several characters in the original description of *P. bolivianus* convince me that it is not conspecific with *P. guentheri.* These characteristics are, however, found among the other specimens that I have referred to *P. bolivianus.* Among the characters that I consider significant are the absence of large scales behind the second pair of chinshields (present in all but one of 30 specimens of *P. guentheri* examined), the larger number (26) of transverse rows of ventral scales (17 to 20 in *P. guentheri*), and the larger number (between 37 and 45, according to Werner's key) of dorsals (29 to 35 in *P. guentheri*). Werner's count of scales around the midbody region (28) is low for both species, but did not include the small granules between the dorsal and ventral scales.

VARIATION. Variation in several characters of the specimens of *Proctoporus bolivianus* examined is presented in Tables 2 through 5.

There is considerable geographic variation in this species. I have examined 158 specimens (89 males, 69 females) that I refer to *P. bolivianus,* but I am not convinced that I understand their relationships. I have examined series from several localities in the middle and upper Urubamba valley, and two series from near Limbani in the Río Madre de Dios drainage. The latter is separated by a very high divide from the upper Río Urubamba valley. My knowledge of this species in Bolivia depends on the descrip-

TABLE 2. Variation is several scale counts for males of *Proctoporus bolivianus*. Figures are ranges and (in parentheses) means; for larger samples the standard deviation times Student's t for 95% confidence limits is also indicated

	Ventral scale rows	Dorsal scale rows	Scales around midbody region	Total femoral pores	Subdigital lamellae 4th toe	Subdigital lamellae 4th finger
Cuzco, 20 mi. S 1 ♂	24	42	37	12	18 (18.0)	11 (11.0)
Cuzco – A 37 ♂♂	22-26 (23.9 ± 2.2)	37-44 (40.4 ± 4.0)	34-41 (36.8 ± 3.4)	9-12 (10.7 ± 1.8)	14-19[1] (16.2 ± 2.1)	9-13[2] (10.5 ± 1.5)
Cuzco – B 3 ♂♂	23 (23.0)	36-40 (38.3)	37-40 (38.3)	15 (15.0)	15-19 (17.3)	10-12 (10.8)
Calca 27 ♂♂	21-25[3] (23.3 ± 2.4)	36-43[3] (40.8 ± 3.7)	38-43[3] (40.6 ± 3.4)	10-14 (11.9 ± 1.9)	15-22[4] (18.3 ± 2.7)	10-14[5] (11.5 ± 1.7)
Ollantaytambo 1 ♂	22	44	41	14	21 (21.0)	13-14 (13.5)
Torontoy 1 ♂	23	41	42	13	18-20 (19.0)	13-14 (13.5)
Tinccochaca 2 ♂♂	20-21 (20.5)	34-37 (35.5)	35-38 (36.5)	11-12 (11.5)	16-18 (17.0)	11-12 (11.5)
Marcapata 2 ♂♂	21-23 (22.0)	41-44 (42.5)	39-41 (40.0)	10-12 (11.0)	19-22 (20.2)	12-14 (13.0)
Limbani 13 ♂♂	22-25 (23.2 ± 1.9)	37-41 (38.9 ± 3.0)	34-41 (37.3 ± 3.9)	10-13 (11.1 ± 2.3)	14-19[6] (16.9 ± 2.2)	9-12[7] (10.6 ± 1.6)
Pelechuco 1 ♂	23	41	37	15	16-17 (16.5)	10-11 (10.5)

[1] 69 digits; [2] 72 digits; [3] 26 males; [4] 52 digits; [5] 50 digits; [6] 28 digits; [7] 27 digits

TABLE 3. Variation in several scale counts for females of *Proctoporus bolivianus*. Figures are ranges and (in parentheses) means; for larger samples the standard deviation times Student's t for 95% confidence limits is also indicated

	Ventral scale rows	Dorsal scale rows	Scales around midbody region	Total femoral pores	Subdigital lamellae 4th toe	Subdigital lamellae 4th finger
Sicuani 1 ♀	22	39	42	4	18-19 (18.5)	10-12 (11.0)
Cuzco – A 28 ♀♀	22-27[1] (24.2±2.5)	39-47[1] (41.7±3.4)	33-38[1] (36.3±2.7)	2-4[1] (2.6±1.8)	14-18[2] (16.3±1.6)	9-12[3] (10.8±1.5)
Cuzco – B 2 ♀♀	24 (24.0)	40-42 (41.0)	38 (38.0)	0-1 (0.5)	17-18 (17.7)	11-13 (11.5)
Calca 21 ♀♀	22-26 (24.1±2.1)	40-45 (42.7±2.5)	38-45 (40.6±3.9)	0-4 (2.8±2.2)	17-20[4] (18.3±1.5)	10-13[5] (11.4±1.3)
Ollantaytambo 2 ♀♀	23-26 (24.5)	41-45 (43.0)	39-41 (40.0)	0 (0)	19-21 (20.0)	12-14 (12.7)
Torontoy 1 ♀	23	41	41	4[6]	20 (20.0)	12-13 (12.5)
Ñusta Hispana, Tinccochaca 3 ♀♀	20-21 (20.7)	37-40 (39.0)	39-40 (39.7)	2-8[6] (4.7)	17-20[7] (18.4)	11-14 (12.3)
Marcapata 2 ♀♀	22-24 (23.0)	38-43 (40.5)	41-43 (42.0)	0 (0)	18-19 (18.5)	11-13 (12.0)
Limbani 9 ♀♀	22-24 (23.1±1.8)	36-41 (39.0±4.1)	35-41 (37.1±4.3)	0-1 (0.2±1.0)	14-19[8] (16.7±2.9)	9-11[8] (10.1±1.6)

[1] 26 females; [2] 50 digits; [3] 51 digits; [4] 41 digits; [5] 42 digits; [6] females with counts of 2 and 4 have pores distal on thighs; [7] 5 digits; [8] 18 digits

TABLE 4. Body length and frequencies of certain states for several characters in males of *Proctoporus bolivianus*. Frequencies are given as sides with state/sides examined

	Maximum body length (mm)	Loreal present[1]	2 supra-oculars[2]	3 supralabials anterior to angle[3]
Cuzco, 20 mi. S 1 ♂	40	2/2[4]	2/2	0/2
Cuzco-A 37 ♂♂	47	72/74	60/74[5]	58/74[6]
Cuzco-B 3 ♂♂	47	0/6[7]	6/6	0/6
Calca 27 ♂♂	48	54/54	54/54	38/54
Ollantaytambo 1 ♂	44	0/2	2/2	0/2
Torontoy 1 ♂	58	0/2[8]	0/2	0/2
Tinccochaca 2 ♂♂	49	0/4	4/4	0/4
Marcapata 2 ♂♂	58	1/4[9]	0/4	1/4[10]
Limbani 13 ♂♂	56	2/26[11]	6/26	24/26
Pelechuco 1 ♂	54	0/2	2/2	2/2

[1] states observed: present, partly delimited, absent; [2] states observed: 2, 3; [3] states observed: 3 or 4 unless noted; [4] loreal touches labials; [5] one additional side with irregular 3 could be counted as 2; [6] 2 additional sides with irregular minute 4 could be counted as 3; [7] partly delimited on both sides in two specimens; [8] partly delimited on both sides; [9] loreal irregular on one side, partly delimited on another; [10] counts include an irregular 4 and an irregular 5; [11] loreal separated from labials

tion of *P. bolivianus* and on examination of the holotype of *P. longicaudatus*.

The specimens from the upper part of the Urubamba valley (map: Calca and south) are rather different from those from the middle part (Ollantaytambo and north). The scalation characteristics that most suggest this difference are included in Tables 4 and 5, and include the greater frequency of a loreal and the higher number of individuals with three supralabials anterior to the posteroventral angle of the subocular (Fig. 1) in the specimens from Calca and south. Specimens from Calca and south also average considerably shorter in body length. Although the sample sizes

TABLE 5. Body length and frequencies of certain states for several characters in females of *Proctoporus bolivianus*. Frequencies are given as sides with state/sides examined

	Maximum body length (mm)	Loreal present[1]	2 supra-oculars[2]	3 supralabials anterior to angle[3]
Sicuani 1 ♀	34	2/2	2/2	0/2
Cuzco-A 28 ♀ ♀	48	56/56	46/56	54/56
Cuzco-B 2 ♀ ♀	31	0/4	4/4	0/4
Calca 21 ♀ ♀	47	42/42	42/42	31/42
Ollantaytambo 2 ♀ ♀	54	0/4	2/4	0/4
Torontoy 1 ♀	59	2/2	1/2	0/2
Ñusta Hispana, Tinccochaca 3 ♀ ♀	53	0/6	6/6	0/6
Marcapata 2 ♀ ♀	52	0/4	0/4	2/4
Limbani 9 ♀ ♀	54	0/18	8/18	18/18

[1] states observed: present, partly delimited, absent; [2] states observed: 2, 3; [3] states observed: 3, 4

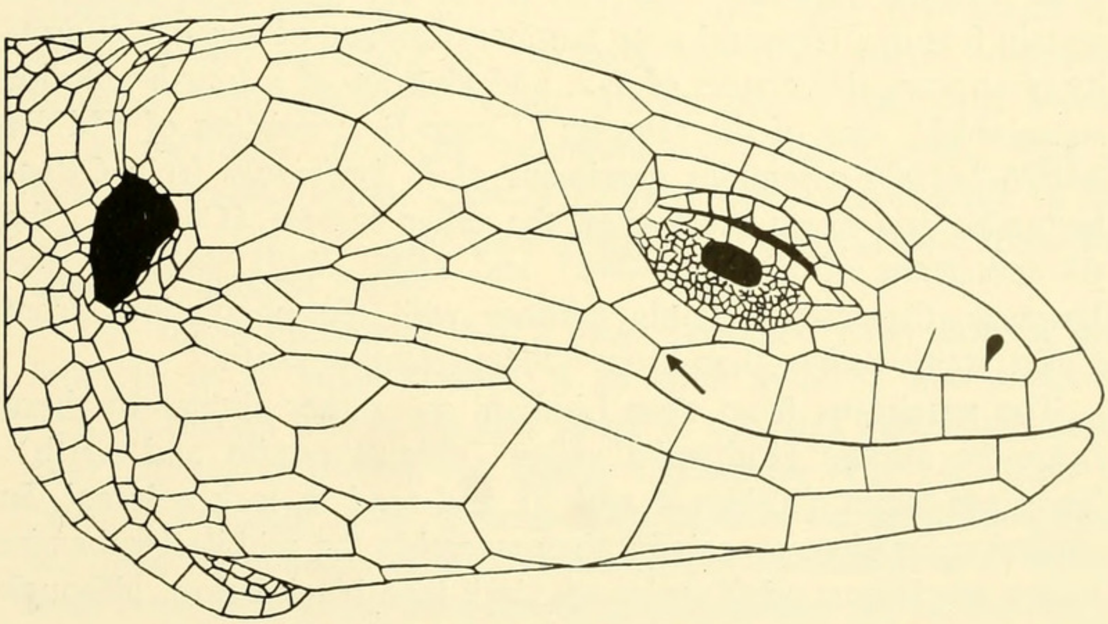


FIG. 1. Scales on the side of the head of *Proctoporus bolivianus* (FMNH 81373). The arrow on the fourth supralabial points toward the posteroventral angle of the subocular. This angle marks the point anterior to which supralabials were counted. × 11.

from Ollantaytambo and north are small, in two out of three samples the largest female is larger than the largest female from Calca and south; the largest male in all three samples is larger than the largest male from Calca and south[3].

Perhaps the most striking difference, however, is coloration. Analysis is complicated by the darkening of coloration with increasing size, especially on the ventral surfaces. Nevertheless, specimens from the region from Calca south are much lighter in coloration than those from Ollantaytambo north. The dorsal coloration of the upper Urubamba valley specimens is a chocolate brown with moderately well-defined dorsolateral light lines. Occasional males show some indication of ocelli along the sides. Ventrally, these animals have a clear gray-white midventral area, with dark brown pigment encroaching on it from the sides. The chin tends to be especially light. The tail is lighter above than the body, darker below than the midventral area. Often there is a thin, irregular dark line around the rostral, across the nostrils and the edges of the eyelids, across the parietals, and continuing posteriorly as a very irregular dark lateral border to whatever dorsolateral light line exists.

Among the specimens reportedly from near Cuzco, there is considerable variation. Differential characters are given in Table 6. The local relief in this region is so great that it is entirely possible that the variation observed is entirely microgeographic. In certain features (femoral pore number, absence of loreal, uniformity of supraocular counts of 2-2, and absence of a fourth anterior supralabial), one of the samples (Cuzco-B, consisting of FMNH 34096-34100) resembles specimens of *P. bolivianus* from Ollantaytambo and north more than the other sample (Cuzco-A, the 63 specimens of FMNH 40427 and ZSM 174/1938). In size, however, Cuzco-B certainly belongs with the populations from Calca south rather than from Ollantaytambo north.

The specimens from near Limbani are rather similar to those from the middle Urubamba valley (Ollantaytambo and north). They are larger (Tables 4 and 5) and tend to lack a loreal. In ventral coloration, especially, they resemble the middle Urubamba valley specimens; adult males are dark lead black below, although

[3] The male holotype of *Proctoporus obesus*, approximately 78 mm snout-to vent, is omitted from the Ñusta-Hispana-Tinccochaca sample in Table 4.

TABLE 6. Comparisons of two samples of *Proctoporus bolivianus* from near Cuzco. A: FMNH 40427 (63) and ZSM 174/1938. B: FMNH 34096-34100. ZSM 174/1938 has 12 femoral pores, a loreal on each side, 2-2 supraoculars, and 4-4 anterior supralabials

	Sample size	Total femoral pores[1]	Loreal present[2]	Two supraoculars[2]	Three anterior labials[2]
♂♂					
Cuzco – A	36	9-12 (10.6)	70/72	58/72[3]	56/72[4]
Cuzco – B	3	15(15.0)	0/6[5]	6/6	0/6
♀♀					
Cuzco – A	28	2-4 (2.6)	56/56	46/56	54/56
Cuzco – B	2	0-1 (0.5)	0/4	4/4	0/4

[1] range and mean; [2] sides with state/sides examined; [3] one additional side with an irregular third supraocular could be counted as 2; [4] two additional sides with an irregular, minute fourth supralabial could be counted as 3; [5] loreal partly delimited on both sides in two specimens

there may be a few light dots at the posterolateral corners of the ventral scales or in the middle of the scale itself in the lateral rows of ventrals. The lateral scales may also have dot-like pigmentless areas arranged somewhat in rows. The dorsal surface is uniformly dark, and dorsolateral light lines are almost invisible. The snout, however, is somewhat lighter, with the chinshields and lower labials lighter gray, the supralabials and the other head scales anterior to and including the parietals and interparietal somewhat browner. This difference is not due to loss of epidermal layers.

On the other hand, the specimens from near Limbani tend to have three supralabials anterior to the posteroventral angle of the subocular (Fig. 1), and thus resemble the specimens from the upper Urubamba valley.

The single individual that I have examined from Bolivia, the holotype of *P. longicaudatus,* is an adult male 54 mm snout to vent. Although it is in the size range of the dark individuals from near Limbani and from the middle Urubamba valley, it differs in being rather light, even more so than most of the specimens from the upper Urubamba valley. Unfortunately, specimens of *P. bolivianus* from Bolivia are very scarce in collections; one of the two of which I know (the holotype of *P. bolivianus*) has been destroyed.

It seems highly probable that the population referred to *P. bolivianus* in the upper Urubamba valley could be recognized either as a distinct subspecies of *P. bolivianus* or as a distinct species. The sample labeled Cuzco-B could be interpreted as showing occurrence of a population with dark venter, no loreal, four labials anterior to the posteroventral angle of the last subocular, and numerous femoral pores, features typical of populations from Ollantaytambo north and elsewhere in the range of *P. bolivianus,* sympatrically with the populations in the upper Urubamba valley. I do not now name the upper Urubamba valley population. Except for Cuzco-B, the characteristics of samples along the Río Urubamba suggest changing frequencies of states as one moves from headwaters downstream. On the other hand, the characters by which the upper Urubamba valley specimens and by which the dark form from the middle Urubamba valley and the Limbani region differ from the populations that occur near the type locality of *P. bolivianus* are not clear. When more Bolivian material becomes available, recognition of the upper Urubamba valley population may seem in order. In my opinion, it is probably conspecific with *P. bolivianus.*

In addition to the features in Tables 2 through 5, certain other data were recorded on most individuals examined. The first superciliary may or may not be expanded onto the dorsal surface of the head. This character shows high correlation with the number of supraocular scales: when there are two, the superciliary is expanded dorsally; when there are three, the extra supraocular scale is usually anterior, and occupies the space that would be filled by a dorsal expansion of the first superciliary. In a small percentage of cases, the first superciliary is expanded even though three supraoculars are present. A median occipital is absent in two animals (Limbani); in another specimen, it is replaced by two small scales (Cuzco-A). The number of longitudinal ventral scale rows varies geographically, with 10 in most specimens from near Limbani and in the middle Urubamba valley, and 12 in the upper Urubamba valley.

Since body size shows important geographic variation, the largest male and largest female are listed for each population separately (Tables 4 and 5). Thirty-one males (21 to 58, mean 34.6 mm snout to vent) with tails intact have tail over snout-vent length ratios of 0.82 to 2.21 (mean, 1.57). Twenty-three females (20 to 54, mean 33.4 mm snout to vent), 1.00 to 1.94 (mean 1.65).

REMARKS. Four names are available for populations here referred to *P. bolivianus*. Characteristics of four holotypes are compared in Table 7. I am confident that all four names belong to a closely related group of individuals.

Oreosaurus lacertus. The holotype, USNM 49551, was collected at Tinccochaca, Cuzco, Peru (Stejneger, 1913). This locality (Bingham, 1916) is in the valley of the Río Vilcabamba, a small tributary that enters the Río Urubamba near 13° S latitude. The elevation here is approximately 2800 m. I have examined the holotype and three paratypes (USNM 49549, MCZ 12085, 12087). Certain additional data on the holotype are given in Table 7. Variational data on the paratypes are included in Tables 2 through 5.

The holotype of *Oreosaurus lacertus* has a continuous row of granular scales separating the ventral scales from those on the

TABLE 7. Characteristics of four holotypes in the synonymy of *Proctoporus bolivianus*

	Proctoporus bolivianus[1]	*Oreosaurus lacertus*	*Proctoporus longicaudatus*	*Proctoporus obesus*
Sex	♀	♂	♂	♂
Snout-vent length (mm)	48	49	54	78[2]
Dorsal scales	(37-45)	37	41	44[2]
Ventral scales	10 x 26	11 x 20	10 x 23	11x19[2]
Scales around midbody region	28[3]	38	37	40
Loreal	present	absent	absent	present[4]
Total femoral pores	0	12	15	8
Supraocular scales	3-3[5]	2-2	2-2	3-3
Pairs of chinshields in contact	2	2	2	3
Median occipital	present	present	present	present
First superciliary	not expanded[6]	expanded	expanded	not expanded
Ventral coloration	yellowish white	uniformly dark	each ventral with diffuse dark mark	dull cream
Labials to angle	—	4-4	3-3	4-4

[1] data from Werner (1910); [2] estimated; [3] not including lateral granules; [4] loreal separated from labials; [5] possibly the anteriormost was a dorsally expanded first superciliary; [6] an assumption based on a supraocular count of 3-3

sides of the body, and thus differs from members of the *Proctoporus luctuosus* group, which includes the type of the genus *Oreosaurus* (Uzzell, 1958).

Although *P. lacertus* has not been recognized as a distinct species for many years (Burt and Burt, 1931), the present allocation of the name is new. The name *lacertus* is, however, available for the large, dark population from near Limbani and from the middle Urubamba valley, if it becomes important to distinguish this population nomenclatorially.

Proctoporus obesus. This species was described (Barbour and Noble, 1921) from Ñusta Hispana, Cuzco, Peru. The locality is a monolith about one half mile from Rosapata (Bingham, 1913) in the valley of the Río Vilcabamba, a small tributary that enters the Río Urubamba at about 13° S latitude. The elevation in this region varies dramatically over short distances, but is probably about 2700 m at the valley floor.

I have examined the holotype of *Proctoporus obesus* (USNM 60748). Although E. C. Erdis is listed as the collector, it was almost certainly collected by a native. The head and body are separated and the skin has drawn back on each piece. There is at least one straight cut, as though a machete had been used on the animal. The neck is tightly constricted, suggesting that the body was not severed when the animal was captured, and that the animal was carried for some distance hanging by a thin noose around the neck. For these reasons, counting the scales is difficult, and many of the counts in Table 7 are estimates.

This individual differs from most of the specimens referred to *P. bolivianus* in its greater size and robustness. The scales are quite smooth, and the coloration is remarkably light for a member of this species, although under the microscope some mottling of the scales is apparent. The superciliary series on the right side is broken so that a corner of the second supraocular touches the palpebrals. The equivalent corner of the left second supraocular very nearly touches the palpebrals. There are four supralabials anterior to the posteroventral angle of the subocular and eight femoral pores; a loreal is present but separated from the labials.

There is enough room within my concept of *P. bolivianus* to include the holotype of *P. obesus,* even though other specimens from Ñusta Hispana and from nearby at Tinccochaca look rather different (Tables 4 and 7).

The name *Proctoporus obesus* has long resided in synonymy (Burt and Burt, 1931) but the present allocation is new.

Proctoporus longicaudatus. The holotype (NRS 3224) was collected by Neils Holmgrem and Erland Nordenskiöld at Pelechuco, La Paz, Bolivia, about 3567 m above sea level (Andersson, 1914). I have examined the holotype, and most of my observations are incorporated in Tables 2, 4, and 7.

Although this specimen is geographically closest to the type locality of *P. bolivianus,* the two holotypes differ in that the holotype of *P. longicaudatus* has no loreal and has two supraoculars on both sides. Both characters vary in one or more series referred to *P. bolivianus.*

The name *Proctoporus longicaudatus* has long been recognized as a junior synonym for the species to which it is referred, but the present allocation is new.

SEXUAL DIMORPHISM. The most striking sexual dimorphism is in femoral pore number (Tables 2 and 3). Coloration also is slightly dimorphic, females never being as dark, within their populations, as males. In certain populations, males have weakly developed ocelli. The number of posterior preanal scales also varies sexually; in a subsample of 23 males, counts include 4 (2 specimens), 5 (3), 6 (17), and 7 (1); in a subsample of 21 females, counts include 5 (2 specimens), 6 (12), 7 (5), and 8 (2).

BIOLOGY. Virtually nothing is known about the biology of *Proctoporus bolivianus.* The specimens from near Calca (FMNH 34101, 34119-22, 34137, 34333-35) were found under stones, as was the holotype of *P. longicaudatus.* One female contained one leathery egg in each oviduct.

RANGE. Specimens referred to *Proctoporus bolivianus* are known from the Urubamba and Madre de Dios drainages of the eastern Andes of central and southern Peru and northern Bolivia (map). Altitudes associated with specific localities vary from 2500 to 3600 m. No other species of *Proctoporus* is known to be sympatric with *P. bolivianus,* but *P. guentheri* occurs throughout all of the area inhabited by *P. bolivianus* at lower altitudes (825 to 2516 or perhaps 3362 m).

SPECIMENS EXAMINED. Bolivia: La Paz: Pelechuco (3567 m) NRS 3224 (holotype of *Proctoporus longicaudatus*).

Peru: Cuzco: Fort Sacsahuama (3600 m) FMNH 34096-100; Hacienda Urco, near Calca (2850 m) FMNH 34101 (22 specimens), 34119-22, 34137 (19), 34333-35; Cuzco (3362 m) FMNH 40427 (63), 40428, ZSM 174/1938; 20 mi S of Cuzco (3000 m) CAS 84753; Ñusta Hispana (2700 m) USNM 60699-700, 60748 (holotype of *Proctoporus obesus*); Ollantaytambo (2800 m) USNM 49549 (paratype of *Oreosaurus lacertus*), 60719, 60746, Sicuani (3515 m) AMNH 38823; Tinccochaca (2800 m) USNM 49551 (holotype of *Oreosaurus lacertus*), MCZ 12085, 12087 (paratypes of *O. lacertus*); Torontoy (2500 m) USNM 60726-27; Puno: Limbani (3200 m) BMNH 1901.8.2.28-29, 1904.10.26.91, 1907.5.7.1, FMNH 39360 (7), 40426 (11); Marcapata (3260 m) FMNH 83171-74.

Proctoporus guentheri (Boettger)

Oreosaurus guentheri Boettger, 1891, Zool. Anz., 14:345
Oreosaurus ocellifer Boulenger, 1902, Ann. Mag. Nat. Hist., Ser. 7, 10: 400. **New synonymy.**
Oreosaurus anomalus Barbour and Noble, 1921, Proc. U.S. Nat. Mus. 58: 614. **New synonymy.**

Oreosaurus guentheri was described from an adult male collected by Ernesto Guenther in the vicinity of Sorata, La Paz, Bolivia (Boettger, 1891). The elevation at this locality is about 2516 m. The holotype, formerly in the Lubeck Museum, was destroyed during World War II (G. von Studnitz, personal communication, 1960).

Many characteristics of the holotype of *P. guentheri* are listed in Table 9. These, together with the 9 rows of pregular and gular scales and the three posterior preanal scales identify it as belonging with the other specimens that I here refer to *P. guentheri*.

I have examined 30 specimens (14 males, 16 females) of this species, including two holotypes. The specimens come from central and southern Peru and northern and central Bolivia; they thus encompass all three type localities for proposed names for this species. Although geographic variation is apparent in the series examined (Table 8), the following features characterize the

TABLE 8. Variation in specimens of *Proctoporus guentheri*

	Dorsal scale rows	Scale rows around midbody	Transverse rows of ventrals	Total femoral pores	Subdigital lamellae 4th finger	Subdigital lamellae 4th toe	Hind leg / Snout-vent length
Perene Valley							
9♂♂	29-33 (30.4)	30-40 (35.1)	17-18 (17.8)	14-16 (14.7)	7-9 (8.1)	13-15 (14.0)	.29-.37 (.320)
10♀♀	30-33 (31.2)	30-40 (34.4)	17-19 (18.2)	0-6 (1.8)	7-9 (8.4)	13-16 (14.4)	.26-.39[1] (.320)
Holotype of *O. anomalus*							
♂	30	40	18	15	10-11 (10.5)	15-16 (15.5)	.33
"Juliaca"							
♂	31	30	19	12	8 (8.0)	12[2]	.31
♀	31	32	19	4	7-8 (7.5)	13-14 (13.5)	.27
Cuzco							
♂	33	37	20	19	9[2]	15-16 (15.5)	.32
Holotype of *O. ocellifer*							
♂	29	30	19	15	—	—	.34
Santo Domingo							
♂	32	33	18	12	7-8 (7.5)	13 (13.0)	.30
♀	32	35	19	9	8 (8.0)	12-14 (13.0)	.28
Holotype of *O. guentheri*[3]							
♂	35	30	20	15	—	—	.37
Cochabamba 2♀♀	34-35 (34.5)	41-43 (42.0)	19-20 (19.5)	2-4 (3.0)	8-10 (9.0)	15-16 (15.3)	.34-.36 (.350)
Palmar 2♀♀	33-35 (34.0)	36-38 (37.0)	20 (20.0)	4-7 (5.5)	9-10 (9.5)	14-16 (14.7)	.32-.34 (.331)

[1] 9 females; [2] 1 digit; [3] data from Boettger (1891)

TABLE 9. Characteristics of three holotypes in the synonymy of *Proctoporus guentheri*

	Oreosaurus guentheri[1]	*Oreosaurus ocellifer*	*Oreosaurus anomalus*
Sex	♂	♂	♂
Snout-vent length	32	35	37
Supraoculars	3-3	3-3	3-3
Loreal	present[2]	absent	absent[3]
Median occipital	present	present	present
Pairs of chinshields in contact	3[4]	2[5]	2[5]
Rows of pregulars plus gulars	9	8	9
Scales around midbody region	30	30	40
Dorsal scale rows	35	29	30
Ventral scales	8 x 20	8 x 19	10 x 18
Total femoral pores	15	15	15
Ocelli	9-11	7-8	8-12
Light dorsolateral stripe	—	present	present
Belly pigmentation	uniform yellow	uniform yellow	uniform yellow

[1] data from Boettger (1891); [2] separated from supralabials; [3] partly indicated on left side; [4] I interpret the posteriormost pair as enlarged pregulars (Fig. 2); [5] followed by a pair of enlarged pregulars (Fig. 2)

species. There are usually 3-3 supraoculars and the first superciliary is usually not expanded onto the dorsal surface of the head; BMNH 1902.11.28.4, however, has 2-2 supraoculars and an expanded first superciliary. There is a large pair of pregulars (Fig. 2) filling the space behind the second pair of chinshields and between the third, except in ZSM 173/1938. The superciliary series is complete except for one side in ZSM 173/1938. All individuals have an undivided translucent disc in the lower eyelid. Only two individuals (AMNH 23209, ZSM 43/1950) lack a median occipital, but a third (ZSM 165/1954) has the median and left paramedian occipitals fused, and a fourth (also ZSM 43/1950) has two small scales in this area. Other characters that distinguish *P. guentheri* from Peruvian and Bolivian congeners (*P. pachyurus* and *P. bolivianus*) include the lower number of dorsal scales (29-35) and of transverse ventral scale rows (17-20). Specimens of *P. guentheri* have large, flat scales on the under side of the lower forelimb.

VARIATION. Data on the specimens examined are included in Table 8. In general, Bolivian specimens have more transverse rows of dorsal and ventral scales, more scale rows around the mid-body region, more subdigital lamellae, and more longitudinal rows of ventral scales than Peruvian specimens.

The loreal is variably present in *Proctoporus guentheri.* It is absent in 18 of the specimens from the Perené valley; one female (FMNH 45475) has both a loreal and a frenoocular on both sides. On the left side in the holotype of *Oreosaurus anomalus,* a loreal is completely delimited from the frenoocular and partly delimited from the nasal by a short diagonal groove from the frenoocular. The specimens from "Juliaca", from Cuzco, from Santo Domingo, and the holotype of *O. ocellifer* have no loreal. The holotype of *O. guentheri* has both a loreal and a frenoocular on both sides. One of the specimens from Yungas del Palmar (ZSM 43/1950) has no loreal, but the other three females from Bolivia have the

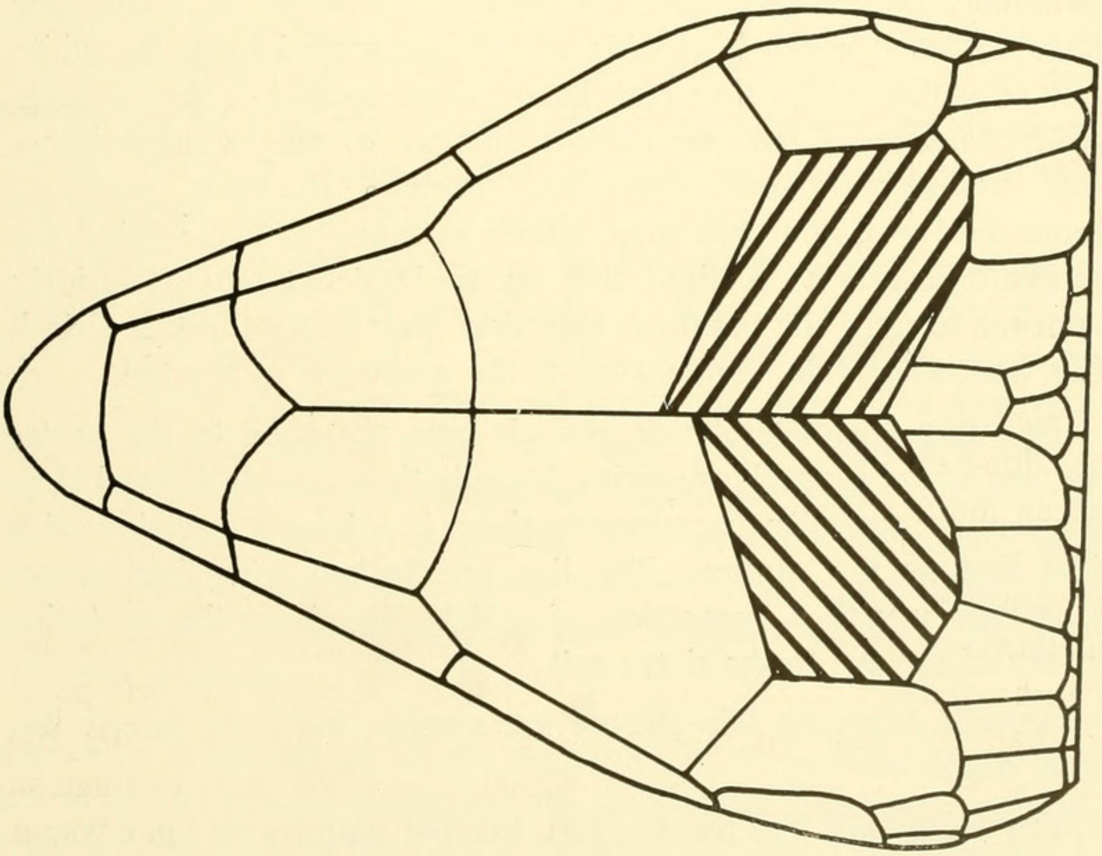


FIG. 2. Scales on the underside of the head of *Proctoporus guentheri* (AMNH 23223). The enlarged pregular scales are barred. × 10.

loreal partly marked just as in the holotype of *O. anomalus.* The frequency of partly delimited loreals in Bolivian specimens makes the occasional occurrence of a completely delimited loreal, as in the holotype of *O. guentheri,* seem rather likely to occur.

In general, the specimens of *P. guentheri* have two rows of small pregular scales, at least at the middle of the throat. They have 6-9, (mean 6.9) rows of gular scales before the collar.

COLORATION. In males from the Río Perené area, the belly is yellow cream, with a few dark brown flecks on the extreme posterior part. The throat and chin are the same, with numerous minute brown flecks. The tail is moderately flecked below with dark brown on yellow cream; the flecking is lighter along the lateral seams, forming light lines. The dorsum has a yellow cream ground color, very heavily flecked with brown, giving a warm brown appearance. In some specimens, the flecking tends to form a linear series of dots, but the pattern is not lined mid-dorsally. The dorsolateral flecking is arranged to form light, dark-bordered lines that are well developed only on the shoulder and above the hindlimb insertions. Below this light line there is a series of ocelli, the dark border of which is as wide as a dorsal scale length, the white spot of which has a diameter about three fourths a dorsal scale width. This series has one ocellus anterior to the forelimb insertion, usually one just above the forelimb insertion, numbers about 8-11 per side, and may extend as many as two behind the hindlimb insertion. A light line on the tail extends posteriorly from the level of the hindlimb insertion. Below this there is a dark line, and below this, the flecking of the underside of the tail.

The light dorsolateral line extends onto the head to the posterior end of the superciliary series. Usually there is a dark line below the canthus rostralis; occasionally there is a faint suggestion of a light line on the canthus. The lips are flecked with light areas, occasionally with a suggestion of a light line from the posterior corner of the eye to the rictus oris.

Females from the Río Perené are similar, but have poorly defined ocelli.

The young are like the females, but the pattern on the dorsum and sides is more nearly linear, with light dorsolateral and paravertebral lines, a dark median line, and dark borders to the dorsolateral light lines. There is a row of light dots between the legs just above ventral scales.

Specimens of *P. guentheri* from Bolivia resemble northern ones, but generally the dorsal and lateral surfaces are darker brown. The single female with well-developed ocelli (ZSM 43/1950) is from Bolivia.

LENGTH. The largest male examined is 40 mm snout to vent; the largest female 47 mm. Three small females (snout-vent lengths 22-25 mm) have tail over snout-vent length ratios of 1.7; two larger females (35 and 37 mm snout to vent) have ratios of 1.7 and 2.0 respectively. A small male (22 mm snout to vent) has a tail over snout-vent length ratio of 1.8; two larger males (35 and 40 mm snout to vent) have ratios of 1.8 and 1.9, respectively.

SEXUAL DIMORPHISM. The conspicuously dimorphic features are the number of posterior preanal scales, the number of femoral pores (Table 8) and the development of lateral ocelli. ZSM 43/1950, an adult female 47 mm snout to vent, has seven well-developed ocelli along each side, but this is very unusual. The number of femoral pores in males varies from 12 to 19; in females, from 0 to 9. BMNH 1902.11.28.5 has three medial pores and one distal one on the right side, four medial pores and one distal one on the left. If the intervening scales on each side also had pores, this female would have a total of about 17 pores.

Thirteen Peruvian males have the following counts of posterior preanal scales: 2: eight individuals; 3: four; 5: one (ZSM 173/1938). The holotype of *P. guentheri,* the only Bolivian male for which I have data, had three posterior preanals. Ten Peruvian females have counts of three four times; one of these has only a narrow posterior median wedge; two additional females have three plus a lateral sliver on each side. Five occurs three times, and another female has five with the median scale semidivided by a groove at the posterior end. All four Bolivian females have five posterior preanals.

REMARKS. Although all of the synonyms of *P. guentheri* were described in the genus *Oreosaurus,* the species has a narrow groove of granular scales along the side of the body (Uzzell, 1958, Fig. 1-C) and thus does not belong to the *Proctoporus luctuosus* group which includes the type species of *Oreosaurus.*

Characteristics of three holotypes in the synonymy of *P. guentheri* are given in Table 9.

I have examined the holotype of *Oreosaurus ocellifer* Boulenger (BMNH 1902.5.29.183, reregistered as 1946.8.31.22). It is an adult male collected by G. Okenden in the valley of the Río Marcapata, Cuzco, of southeastern Peru (Boulenger, 1902). This locality is about 300 km northwest of the type locality of *P. guentheri.* The slight differences between the holotypes of *Oreosaurus ocellifer* and *O. guentheri* are largely those expected on the basis of the geographic variation in this species. The holotype has the enlarged pregulars that occur in most *P. guentheri* (Boulenger called them chinshields). I therefore consider *P. ocellifer* a junior synonym of *P. guentheri* (new synonymy).

The holotype of *Oreosaurus anomalus,* USNM 60704, was collected by Edmund Heller near San Fernando in the valley of the Río San Miguel, Cuzco, Peru (Barbour and Noble, 1921). The elevation here is about 1900 m. I have examined the holotype; the only way in which it differs from other individuals of *P. guentheri* is in the presence of very regular supranasal scales. It is conceivable that supranasal scales characterize a population of *Proctoporus* in the Urubamba valley, but much more likely this individual is anomalous, as the name suggests. Certainly it is conspecific with *P. guentheri.* I therefore consider the name *P. anomalus* a junior synonym of *P. guentheri* (new synonymy).

Although *P. bolivianus* Werner (1910) was placed in the synonymy of *P. guentheri* by Burt and Burt (1931), I believe that *P. bolivianus* is a different species (see discussion of *P. bolivianus*).

The specimens (AMNH 1703, 7414) supposedly from about 4500 m above sea level near Lake Aracona, Juliaca, Peru, resemble the specimens from Peru more than the specimens from Bolivia. Lake Aracona is vastly higher than other localities for *P. guentheri.* The American Museum material supposedly from this region collected by H. H. Keays seem to include several specimens with erroneous localities. Dunn (1942) reported that Harvey Bassler suggested that American Museum material labeled Juliaca was sent from there by a member of the Inca Mining Company (apparently Keays), but was probably collected near the mine at Santo Domingo, at about 1200 m above sea level.

The specimen from Cuzco (ZSM 173/1938) is from a higher altitude than others of this species (3362 m). I believe that this elevation is above the actual range of the species. The specimen has several unusual features (absence of enlarged pregular scales [Fig. 2], high number of femoral pores, and relatively massive head) that suggest local differentiation in this area. These unusual features do not occur in the holotype of *Oreosaurus anomalus,* geographically the closest specimen.

BIOLOGY. Little is known about the biology of this species. Three females have each contained a single leathery egg; the dimensions are such (4.5 x 7 mm, more or less) that I doubt that more than a single egg enlarges at one time. A similar interpretation has been made for *Ecpleopus gaudichaudi* (Uzzell, 1969b). Most members of Group II of the Teiidae lay two eggs (Uzzell, 1959, 1965, 1966, 1969a; Fouquette, 1968).

RANGE. Localities for specimens of *Proctoporus guentheri* examined are in central and southern Peru and central Bolivia on the eastern slopes of the Andes; elevations associated with specimens that I have examined, except for the doubtful pair from Juliaca, vary from 1000 to perhaps 3362 m above sea level. In the northern part of its range, *P. guentheri* occurs in the same drainage as *P. pachyurus,* but apparently at lower altitudes. In the central and southern part of its range, it occurs in the same drainages as *P. bolivianus,* but again at lower altitudes.

Charles F. Walker (personal communication) has examined a specimen of *P. guentheri* (NRS 3225) from Linguapata, (Carabaya), Puno, Peru, at 825 m above sea level.

SPECIMENS EXAMINED. Bolivia: Cochabamba (2516 m): ZSM 165/1954 (2 specimens); Yungas del Palmar: ZSM 43/1950 (2).

Peru: Cuzco: (3362 m): ZSM 173/1938; Marcapata Valley: BMNH 1902.5.29.183, reregistered as 1946.8.31.22 (holotype of *Oreosaurus ocellifer*); San Fernando, Río San Miguel (1900 m): USNM 60704 (holotype of *Oreosaurus anomalus*); Junín (Tarma): Chanchamayo (1000-1500 m): AMNH 23161; FMNH 45475; La Merced (1000-1500 m): AMNH 23203, -05, -07, -10, -13, -18-23, -28; MCZ 49578-9; UMMZ 121443-44; ZSM 290/1929 Puno (Carabaya): Santo Domingo (1862 m): BMNH 1902.11.28.4-5; Juliaca, Lake Aracona (= Lago de Aricoma): AMNH 1703, 7414.

The Hemipenis of Species of the *Proctoporus pachyurus* Group

Hemipenes were removed from one individual of each species of the *Proctoporus pachyurus* group. They were prepared for examination by slitting them along the sulcus spermaticus, washing them over night in distilled water, staining them in a dilute solution of alizarin red S in 0.5 percent KOH, and destaining them in distilled water.

The hemipenis of *P. pachyurus* (SMF 65285, left organ; Fig. 3) is unusual in several features. It differs from the hemipenes of the other two species of the *P. pachyurus* group in lacking spines on the basal part of the median welt (Fig. 3A), and in having the spinous areas of the flounces much reduced (Fig. 3B). In the lateral pocket, there are seven lateral flounces with spines, and six with spines on the median welt; in the medial pocket, seven lateral and seven medial flounces have spines. The spines in any flounce with spines are largest near the center of the row, and decrease in size toward either end of the spine row. There is considerable variation in the length of the spiny row in each flounce. The flounces in each pocket are chevron shaped, and continuous across the apices of the chevron, which is basal and dorsal to the free edge of the median welt. The distal end of the hemipenis is arranged so that when everted, there would be two lobes. The lobes bear a series of fleshy folds.

The hemipenis of *P. bolivianus* (FMNH 81372, left organ; Fig. 4) differs from that of *P. pachyurus* in having nearly completely spinous flounces. As in *P. pachyurus*, the flounces are chevron-shaped, with the apices of the chevrons basal and dorsal to the free edge of the median welt. In the lateral pocket, there are 14 flounces on the lateral wall, 11 on the medial wall; in the medial pocket, there are 11 on the medial wall, 14 on the lateral, so that the two pockets form mirror images of each other. The extra flounces on the lateral walls appear to continue across the basal part of the median welt as four rows of very irregular spines (the basalmost row has but a single tooth, Fig. 4C). Although the flounces are continuous across the apices of the chevrons, there is a small gap separating the tooth rows (Fig. 4B). As in *P. pachyurus*, the hemipenis is bilobate distally when everted, and each lobe bears a series of fleshy folds.

The hemipenis of *P. guentheri* (ZSM 290/1929, left organ;

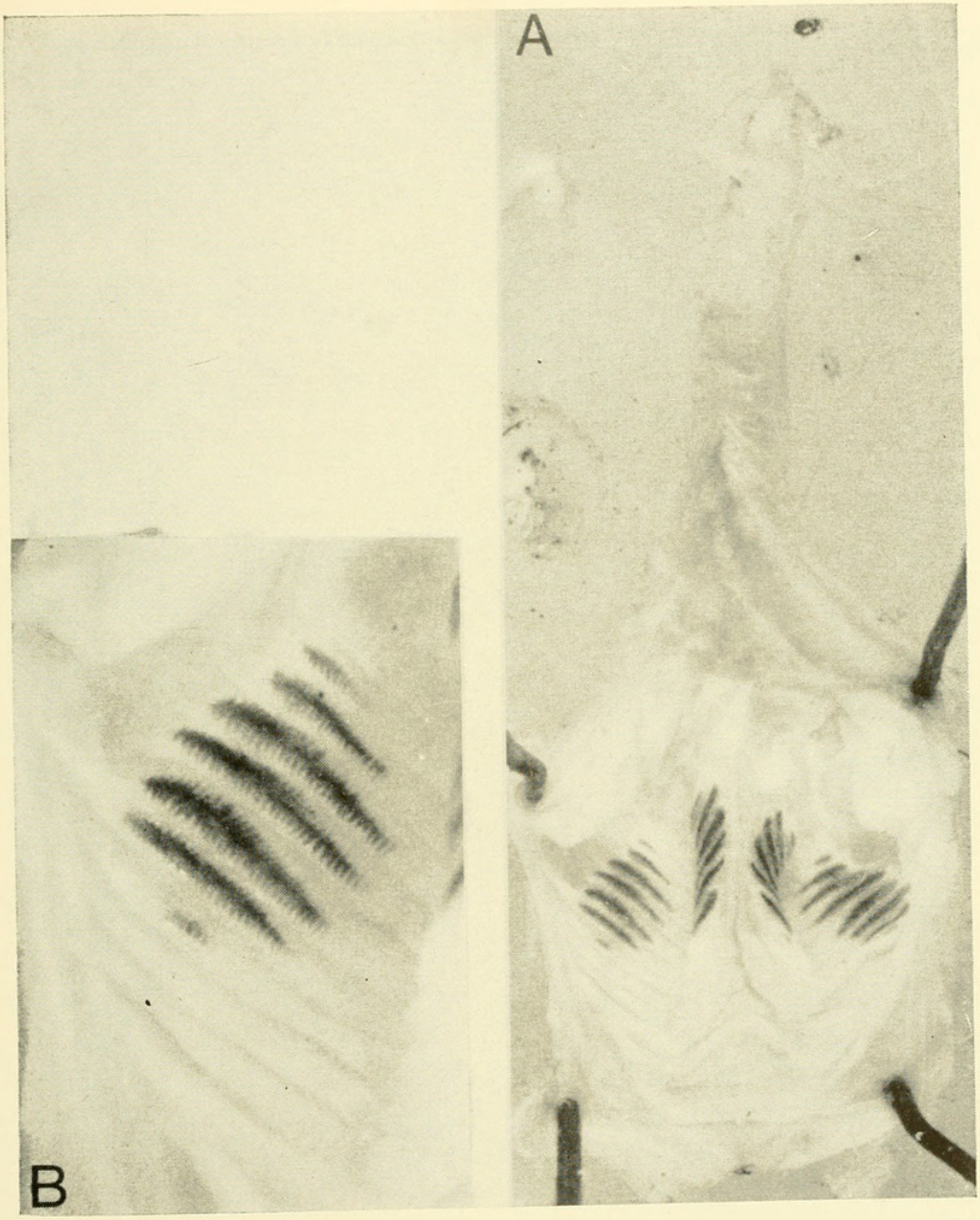


FIG. 3. Structure of the left hemipenis of *Proctoporus pachyurus* (SMF 65285). The inverted organ has been slit along the sulcus spermaticus. A) The entire organ showing general arrangement of flounces in the lateral (left) and medial (right) pockets. There are no enlarged teeth. × 14. B) Details of teeth in lateral wall of lateral pocket; additional flounces without teeth are also shown. × 42.

Fig. 5) is rather similar to that of *P. bolivianus*. There are 19 lateral and 14 medial flounces in the lateral pocket, 14 medial and 19 lateral flounces in the medial pocket. The arrangement of flounces thus is a mirror image in the two pockets. One distal

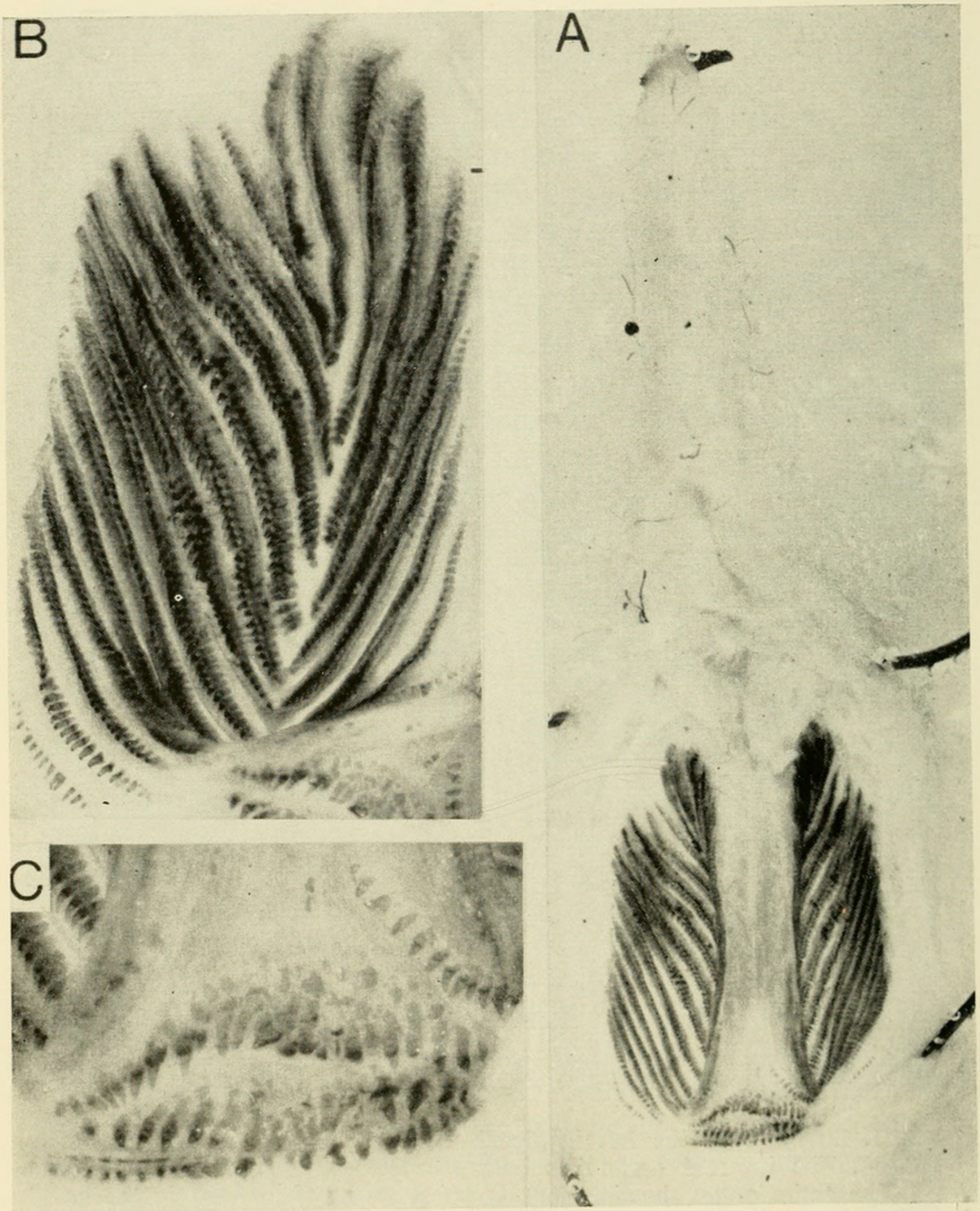


FIG. 4. Structure of the left hemipenis of *Proctoporus bolivianus* (FMNH 81372). The inverted organ has been slit along the sulcus spermaticus. A) The entire organ, showing general arrangement of flounces into lateral (left) and medial (right) pockets, and location of teeth at base of median welt. $\times$ 10. B) Details of flounces and teeth in lateral pocket. The median welt has been folded back to show the apices of the chevron-shaped flounces. $\times$ 16 C) Details of the irregular teeth at the base of the median welt. $\times$ 26.

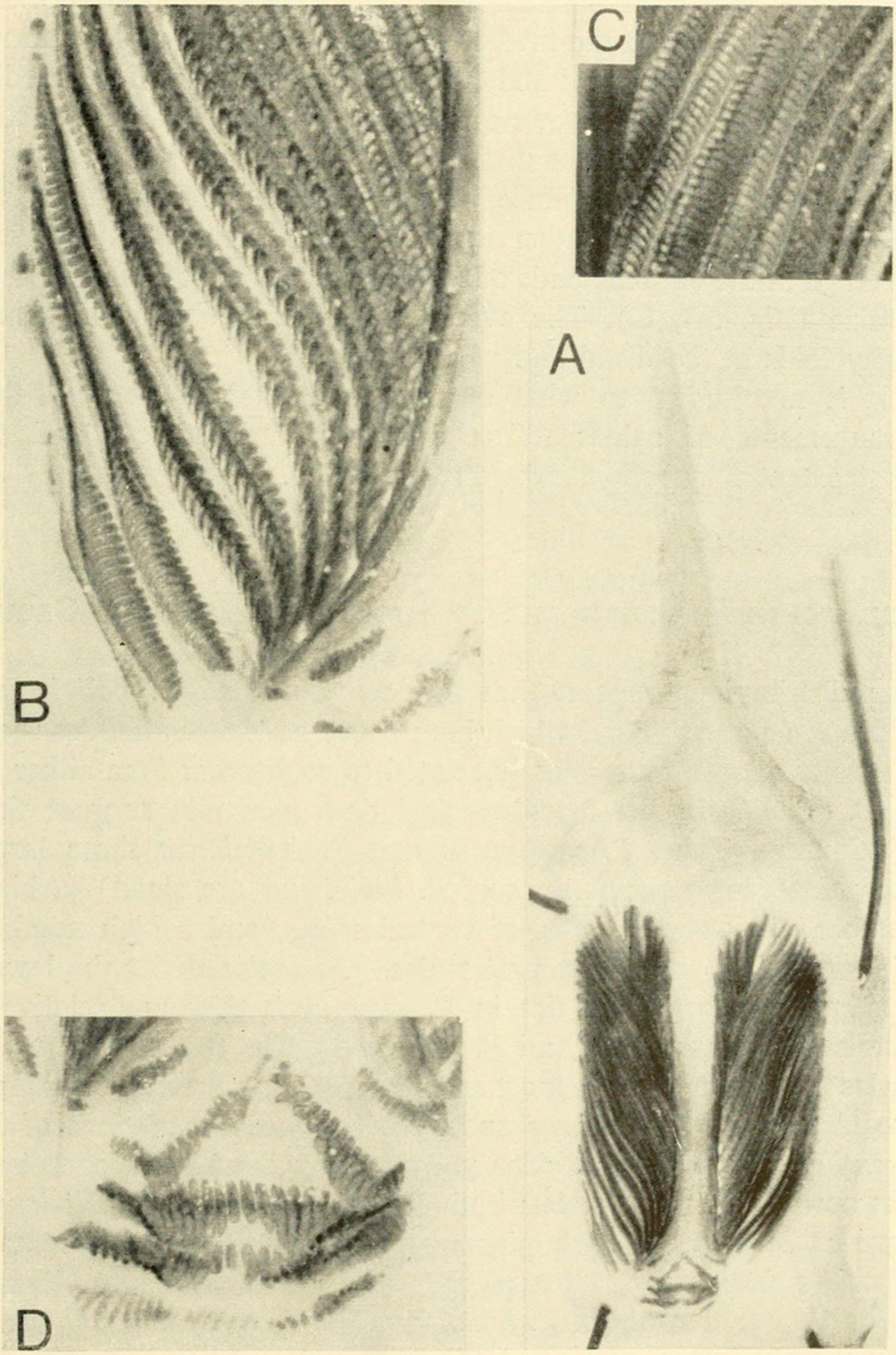


FIG. 5. Structure of the left hemipenis of *Proctoporus guentheri* (ZSM 290/1929). The inverted organ has been slit along the sulcus spermaticus. A) The entire organ, showing general arrangement of flounces in the lateral (left) and medial (right) pockets, and the teeth at the base of the median welt. × 9. B) Details of teeth in the basal part of the lateral pocket. × 30.C) Details of teeth in the middle part of the medial pocket. × 30. D) Details of teeth at the base of the median welt. × 30.

flounce and four basal flounces from the lateral wall of each pocket do not continue onto the medial wall, but the remaining 14 form chevrons, the apices basal and dorsal to the free edge of the median welt. There are four rows of teeth across the basal part of the median welt (Fig. 5D); the distalmost of these could be considered an additional median flounce of each pocket. The teeth in the flounces appear to be rather uniform in size along the flounces, although at the extreme ends of the flounces, they become reduced in size (Fig. 5B, C). The everted organ is bilobate and bears fleshy folds at the distal end of each lobe.

It is not known to what extent the differences between the arrangements of spines reflect interspecies differences and to what extent they reflect individual variation.

Relationships within the Proctoporus pachyurus Group

The distributions suggest that *P. pachyurus* and *P. bolivianus,* which are allopatric and which both occur at higher altitudes than *P. guentheri,* are more closely related to each other than either is to *P. guentheri.* The morphological data generally support this relationship. Thus, *P. pachyurus* and *P. bolivianus* share large body size (some populations of *P. bolivianus* are small), a high number of transverse rows of ventral scales, and a high number of longitudinal rows of ventral scales. The scales under the lower forelimb are large and flat in *P. guentheri;* they are relatively smaller in *P. pachyurus* and *P. bolivianus.* The enlarged pregular scales that are present in most specimens of *P. guentheri* examined are absent in *P. pachyurus* and *P. bolivianus.* Populations of *P. guentheri* are uniformly clear yellow below, and have conspicuous ocelli, at least in males; both *P. pachyurus* and *P. bolivianus* have at least some dark pigment superimposed on the ventral ground color; ocelli, when present, are not conspicuous. Externally, the relationship of *P. bolivianus* to *P. pachyurus* is so close that it seems necessary to point out again that the two species can be distinguished by the number of dorsal scale rows. On the other hand, the structure of the hemipenis marks *P. pachyurus* off as a quite distinct species, although individual variation in the structure of the hemipenis has not been studied.

PROCTOPORUS PETERSI (BOETTGER)

Ecpleopus (Oreosaurus) petersi Boettger, 1878, Ber. Offen. Ver. f. Natur. 17-18:9.

I consider *Proctoporus petersi* a junior synonym of *P. unicolor* (Gray).

Proctoporus petersi was described (Boettger, 1878) from an adult male (SMF 11763) that the Senckenberg Museum obtained in 1849 as an exchange from the museum in Milano. The type locality given by Boettger—Province of Pará in northern Brazil—has long been considered doubtful (Burt and Burt, 1933).

Recently I examined this specimen in the Senckenberg Museum. Although I have comparatively little to add to the description given by Boettger, the following five points are, I believe, critical for correct placement of this name. There are 3-3 supraoculars, of which the middle on each side is in contact with the palpebrals. There are 8-8 lamellae under the fourth fingers, 12-13 under the fourth toes. The transparent disc in the lower eyelid is divided into 3-4 pieces by vertical grooves. The innermost femoral pores, contrary to Boettger's figure, are preanal, and are separated by two rather than four small scales. The pregulars immediately behind the paired chinshields are elongate, rather than squarish or wider than long. This set of characters readily distinguishes the holotype of *Proctoporus petersi* from *Proctoporus bolivianus*, the form to which the name is usually applied. Each of these characters, on the other hand, occurs as a regular feature of *Proctoporus unicolor* (Gray), from the higher altitudes of Ecuador. I therefore place *Proctoporus petersi* in the synonymy of *P. unicolor* (new synonymy), although the name is perhaps available should local geographic variation in *P. unicolor* warrant recognition of subspecies.

The history of the application of this name seems easily explained. Neither Boettger nor Wilhelm Peters, to whom Boettger showed the holotype, knew *Proctoporus unicolor* except from Gray's original description. Boulenger (1885), in his catalog of the lizards in the British Museum, left the species *petersi* in the genus *Oreosaurus;* it is readily distinguished from the other lizards that Boulenger placed there. Finally, the two characters figured by Boettger that might have insured its correct placement (the arrangement of the femoral pores and of the superciliary series) are both incorrect in Boettger's drawing. Although Boettger provided a great deal of information on the holotype of *P. petersi,* none of the counts of scales (dorsals, ventrals, scales around midbody region) and, in fact, almost no feature mentioned by Boettger, will distinguish *P. unicolor* from *P. bolivianus,* although I believe that they represent distinct genera.

Proctoporus ventrimaculatus Boulenger

Proctoporus ventrimaculatus Boulenger, 1900, Ann. Mag. Nat. Hist. Ser. 7, 6:185.

The holotype of *Proctoporus ventrimaculatus* (BMNH 1900.3.30. 17, reregistered as 1946.8.2.34) was collected by P. O. Simons near Cajamarca (Cajamarca), Peru, about 2700 m above sea level (Boulenger, 1900). I have examined the holotype and another specimen (MCZ 18807) that I consider to be *P. ventrimaculatus.* The second specimen comes from Huambos (or Huamboo), Cajamarca (Chota), Peru, some 100 km to the NNW of the type locality (map), and about 2200 m above sea level. Both specimens are females. Certain of their characters are compared in Table 10.

The arrangement of the pregular scales of *P. ventrimaculatus* in three transverse rows of rectangular scales gives the throat considerable similarity to that of *P. pachyurus* or *P. striatus.* On the other hand, the arrangement of the dorsal head scales is quite distinctive. Above the eye, there are three large scales. The posteriormost is separated from the palpebral scales by one elongate posterior superciliary. I consider the anteriormost to be an enlarged superciliary, although Boulenger (1900) considered it to be a supraocular. If it is a supraocular, it is not separated from the palpebral scales by a superciliary. The middle scale I consider to be the first of two supraoculars. Boulenger considered it to be the second of three supraoculars. Regardless, it is not separated from the palpebral scales by superciliary scales. These three scales are illustrated in Fig. 6.

The loreal of MCZ 18807 is a small scale separated from the supralabials by contact between the very large nasal and the rather small frenoocular. The holotype has no loreal. Under the posterior corner of the eye in MCZ 18807, there is a large infralabial

TABLE 10. Characteristics of two specimens of *Proctoporus ventrimaculatus*

	Snout-vent length (mm)	Femoral pores	Dorsal scale rows	Scales around midbody region	Rows of ventrals		Median occipital	Loreal	Subdigital lamellae	
					longitudinal	transverse			4th finger	4th toe
BMNH 1900.3.30.17	34	3-3	32	33	22	10	P	A	9-9	14-15
MCZ 18807	35	2-2	33	34	21	12	A	P	8-8	12-13

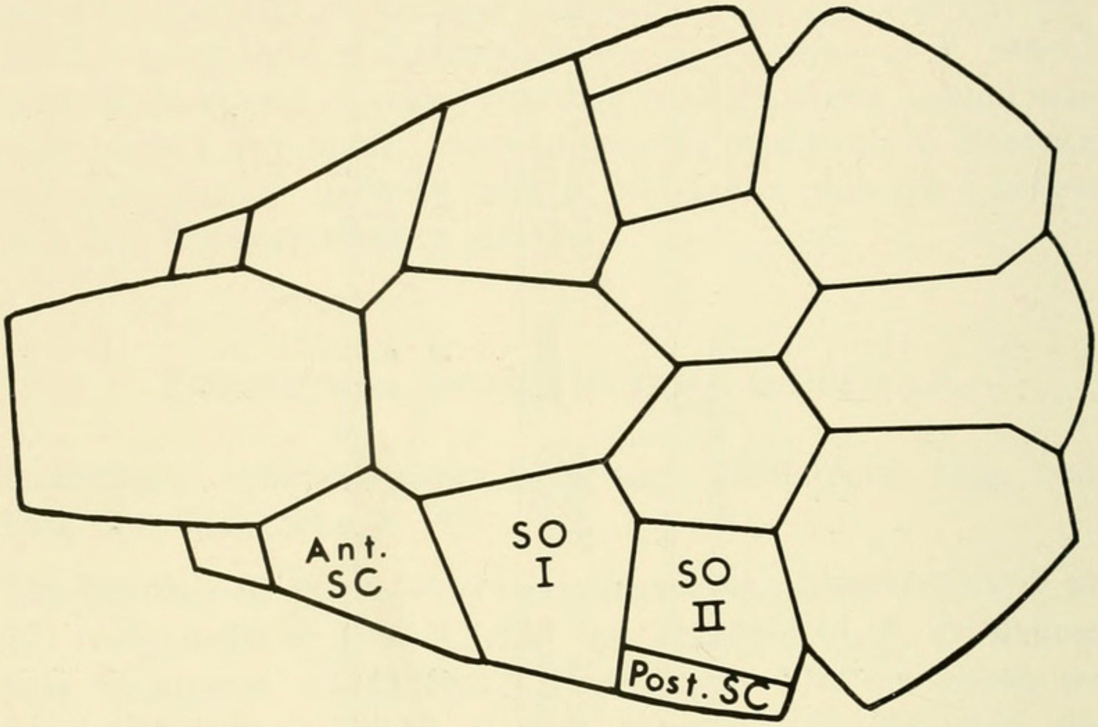


FIG. 6. Scales on the top of the head of *Proctoporus ventrimaculatus* (MCZ 18807). Ant. SC - anterior superciliary; Post. SC - posterior superciliary; So I and SO II - first and second supraoculars. × 13.

that reaches the lip line in a point between the third and the very small fourth labials. This scale is not enlarged in the holotype.

The ventral and lateral scales of *P. ventrimaculatus* meet in a narrow granular zone with little or no intercalation of the dorsal and ventral rows; the arrangement is thus like that in *P. striatus* and that figured for *P. guentheri* (Uzzell, 1958: Fig. 1-C). The preanal scales number five in the posterior row in the holotype, six in MCZ 18807. The innermost pores are femoral, not preanal.

The tibial scales are smooth. The scales above and beneath the forearm are smooth rather than striate; those below the forearm are relatively small. There is no enlarged scale on the upper surface of the upper arm. The limbs are relatively short, not overlapping when adpressed; the hind limb is about 29 percent of the snout-vent length. The thenar scales of the palm and the inner scales of the basal pairs of subdigital lamellae on the fourth toes are not conspicuously enlarged.

The eye disc is clear and divided into three parts. The anterior and posterior parts are smaller in the holotype than in MCZ 18807.

The two specimens differ somewhat in coloration. The holotype is rather uniform dark above. The ventral scales have large black spots on a light background. MCZ 18807 is also generally dark above and below, but with light, dark-bordered dorsolateral lines from the posterior corner of the eye to the tip of the tail. There is a suggestion of a dark mid-dorsal line at the shoulders. The venter is very dark, the scales having only light posterior margins.

Nothing is known about geographical variation or sexual dimorphism in this species.

REMARKS. The arrangement of the pregular scales into transverse rows of quadrangular scales suggests that *P. ventrimaculatus* is related to *P. striatus* and members of the *P. pachyurus* group. The arrangement of supraoculars is very distinctive, however, and I am uncertain that *P. ventrimaculatus* is closely related to *P. striatus* or *P. pachyurus,* although I see no other obvious relatives for the species. Both *Proctoporus unicolor* and its relatives and *Proctoporus columbianus* and its relatives regularly have the superciliary series incomplete and one or more supraoculars touching the palpebral scales. Both of these groups, however, have the pregular scales arranged in chevrons, the apices forward. A whole series of other characters also distinguishes *P. unicolor* and its relatives from *P. ventrimaculatus.*

Much of the detail included for this species is to distinguish *P. ventrimaculatus* from AMNH 18310, a specimen related, I believe (Uzzell, 1958) to *Proctoporus striatus.*

Nothing is known of the biology of *P. ventrimaculatus.*

No other species of *Proctoporus* are known from northern Peru. Huambos is on the divide between Marañón and Pacific drainages; Cajamarca is in the headwater drainage of the Río Cajamarca, which flows into the Río Marañón (map).

ABBREVIATIONS

AMNH	—	American Museum of Natural History, New York
BMNH	—	British Museum (Natural History), London
CAS	—	California Academy of Sciences, San Francisco
CM	—	Carnegie Museum, Pittsburgh
FMNH	—	Field Museum of Natural History, Chicago
MCZ	—	Museum of Comparative Zoology, Harvard University
MN	—	Musée d'Histoire Naturelle, Neuchâtel
NRS	—	Naturhistoriska Riksmuseet, Stockholm

SMF — Senckenberg Museum, Frankfurt
USNM — United States National Museum, Washington
UMMZ — University of Michigan Museum of Zoology
ZSM — Zoologische Staatssammlung, Munich

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