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NOTES ON AMPHISBAENIDS (AMPHISBAENIA; REPTILIA)

2. *Amphisbaena occidentalis* Cope from the Coastal Plain of Northern Peru.

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Amphisbaena occidentalis was described by Cope (1876, p. 176; 1885, pl.) from four specimens collected in the "Valley of Jequetepeque." Elsewhere (p. 159) in the first paper he described the locality as extending "from the Cordillera of Caxamarca to near the coast of Pacasmayo" in western Peru. The description did not include counts of body annuli nor the number of segments at midbody, so that Boulenger (1885, p. 443; also Strauch, 1881, col. 54) omitted the species from his catalog as it was "not sufficiently characterized." Boettger later (1889, p. 311) provided counts for five specimens collected in the immediate vicinity of Pacasmayo.

Boettger's paper appears to have been overlooked by Stejneger (1911, p. 203), who relied on a miscount (179 instead of 279 body annuli) of one of the types and described a single specimen from Piura as the new species *Amphisbaena townsendi*. Parker (1932, p. 178) obtained the body and tail counts

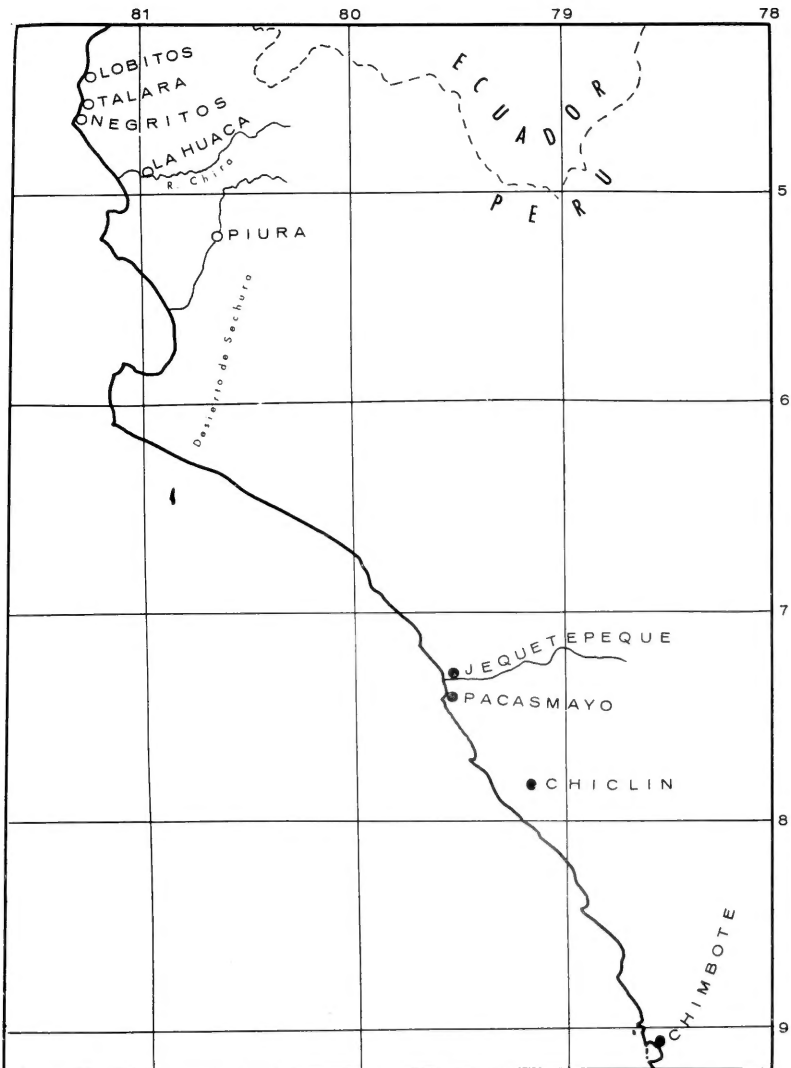


Figure 1. Map of northwestern Peru to show localities mentioned in the text.

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of Cope's types and placed *townsendi* into the synonymy of *occidentalis* in a note that also listed data for four specimens from Lobitos, Talara. He remarked that there seemed to be a north-south gradient in the number of caudal annuli within the composite sample.

The present redescription was prompted by the discovery of 14 specimens collected in March 1864 by C. F. Winslow at La Huaca, River Chira, Peru and now in the collection of the

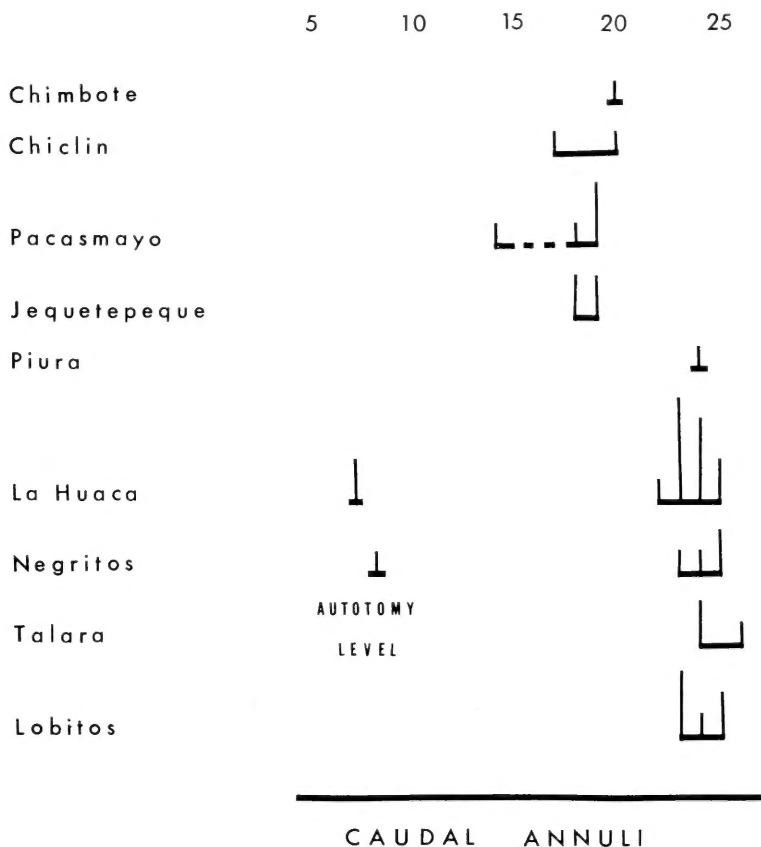


Figure 2. *Amphisbaena occidentalis*. Diagrammatic comparison of the number of caudal annuli for specimens from the several localities. The annulus at which autotomy occurred is indicated. One of the Pacasmayo specimens may have a damaged, but not autotomized, tail.

Peabody Museum at Yale University. These and some others tripled the available number of specimens (all of which have been reexamined) and doubled the known range of the species. The data for all specimens are given in the table.

Analysis of these specimens indicated that Parker was correct, in suggesting that *Amphisbaena occidentalis* was polymorphic, and disclosed a number of other characters in which the populations differed. The species consists of two clearly defined forms, ranging from Lobitos to Piura, and from Jequetepeque to Chimbote respectively (Fig. 1). These populations are differentiated by caudal counts (Fig. 2), body proportions (Fig. 3), chin shield arrangements (Figs. 4 and 5), and nature of caudal autotomy (Figs. 6 and 7).

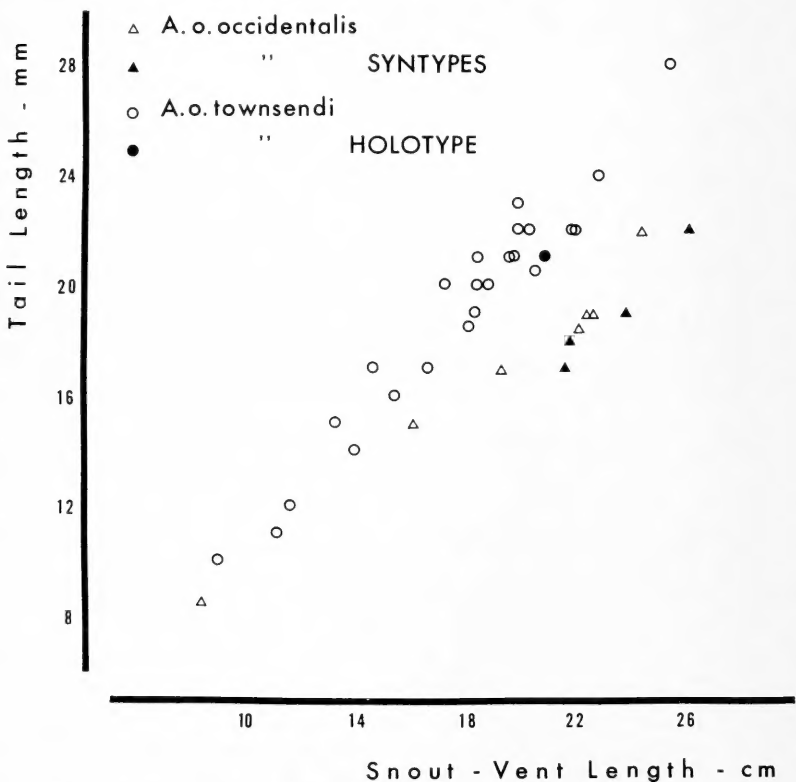


Figure 3. *Amphisbaena occidentalis*. Scatter diagram of tail versus snout-vent length for samples of the two races.

The lack of material from the region between Piura and Jequetepeque does not permit a closer definition of the "break" nor are there intergrade specimens. The decision to call these two forms races rather than full, geographically replacing, species has been taken with considerable reservations. It was based on their general similarity in head shape, head segment arrangement, counts of body annuli, and the remarkable and unique color pattern (Fig. 8). Yet the difference between them is considerably more than that observed in other subspecies situations in amphisbaenids (Vanzolini, 1951; Gans and Alexander, ms.). There is also some parallel to the situation of *A. silvestrii* and *A. neglecta* in Mato Grosso (Gans, ms.), involving two possibly sympatric "sibling" species again distinct from other forms. These two situations seem made to order for the attention of local cytotaxonomists.

It may well be true that the hiatus between the ranges of the two forms of *A. occidentalis* is not presently inhabited. Amphisbaenids seem to be highly dependent upon substrate humidity and all localities from which specimens of *A. occidentalis* have been examined lie along coastal river courses. The Desierto de Sechura between Jequetepeque and Piura is a region without permanent water, in which the water table may be low enough to prevent the survival of amphisbaenids.

It is a pleasure to acknowledge permission of the following curators to examine material stored in their institutions (referred to by the abbreviations in parentheses throughout the text): Mr. Charles M. Bogert, The American Museum of Natural History (AMNH); Dr. James E. Böhlke, The Academy of Natural Sciences of Philadelphia (ANSP); Miss A. G. C. Grandison, British Museum (Natural History) (BM); Dr. Robert F. Inger, Chicago Natural History Museum (CNHM); Dr. Philip S. Humphrey, Peabody Museum of Natural History at Yale University (PMY); Dr. Konrad Klemmer, Senckenbergische Naturforschende Gesellschaft (SMF); Dr. Doris M. Cochran, United States National Museum (USNM); Dr. Heinz Wermuth, Zoologisches Museum der Universität, Berlin (ZMU). I am indebted to Dr. Virginia Cummings for her care in preparing the drawings. Opportunity to visit several European Institutions was afforded by a grant from the estate of

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Amphisbaena occidentalis Cope, 1876.

A small species of *Amphisbaena* with a dark purplish-brown dorsal, and light ventral coloration. The dorsal color is produced by pigmentation of the segments and drops out by segments along the sides (occasionally on the back) producing a characteristic mottled effect. The dorsal surfaces of head and tail are more densely and solidly pigmented than those of the body. The head is flattened and there is considerable dorsoventral compression of the pectoral region. The muscle masses lying over the parietal portion of the skull do not change the outline of the head in large specimens. The rostral is small, scarcely visible from above. Pairs of nasals, prefrontals and frontals form a suture along the head, with the posterior edge of the frontals lying somewhat anterior to the angle of the mouth (for nomenclature see Gans and Alexander, ms.). The occipitals are no larger than the dorsal segments. Four supralabials, the second largest. Three infralabials plus a small fourth scale that also forms the angle of the gape and projects dorsad around the posterior edge of the last supralabial.

261-79 body annuli from the back of last infralabial to and including the pore-bearing precloacals. The first four to six annuli of the neck region shorter than body annuli. Since the posterior edge of the frontals lies anterior to the fourth infralabial the annuli curve forward dorsally. This may be compensated for by an elongation of the dorsal segments of the 7th to 12th annuli (approximately). These annuli thus appear more or less V-shaped in dorsal view. Three to four dorsal half annuli (not included in the counts) are generally present in this region and there is a tendency toward considerable irregular interdigitation and complexity in the ventral portion of this (the pectoral) region. The six precloacal annuli also tend toward irregularities and asymmetries. Segments per midbody annulus generally 16 or 18 dorsals, 24 or 26 ventrals, 42 or 44 total. Ranges are 16 - 19 dorsals, 22 - 27 ventrals, 38 - 47 totals.

Dorsal and ventral folding lines (grooves) are present but not differentiated. The lateral lines may be faintly indicated in approximately 50% of the specimens, on others they are only noticeable as aligned intersegmental sutures.

There are four precloacal pores in all specimens, followed by six to nine precloacal segments, of which the central six are often large and of equal size. The post-cloacal segments are generally subject to splitting, yielding 11 to 16 very irregular radial segments. The pores of males are large and generally pigmented, those of females smaller, faintly indicated and nonpigmented. No other characters show significant sexual dimorphism.

KEY TO SUBSPECIES OF *A. occidentalis*

1. 18 to 21 caudal annuli; no autotomy constriction; no specimens with autotomized tail; tail shorter (fig. 2); 3 post-genitals in first row; little if any elongation of dorsal segments of trunk annuli 7 to 12 *A. o. occidentalis*
2. 22 to 26 caudal annuli; the seventh and/or eighth caudal annulus narrower, often with pigmented ventral segments, and with tail constricted at this autotomy level; some specimens with autotomized tail; tail longer; 4 to 5 post-genitals in first row; marked elongation of dorsal segments of trunk annuli 7 to 12 *A. o. townsendi*

Amphisbaena occidentalis occidentalis Cope, 1876

Amphisbaena occidentalis Cope, 1876, p. 176. **Terra typica:** "Valley of Jequetepeque," James Orton, col. **Syntypes:** ANSP 11355-8.

Locality records:—Peru:—ZMU 9631. Departamento Ancash: Chimbote CNHM 5661. Departamento La Libertad: Chiclín CNHM 34290-1. Pacasmayo (Boettger, 1889, 1893; Boulenger, 1890; Parker, 1932); BM 1889.7.19.1; SMF 11815-18. "Valley of Jequetepeque" (Cope, 1876, 1885, 1892; Boulenger, 1885; Stejneger, 1911; Camp, 1923; Parker, 1932; Burt and Burt, 1933); ANSP 11355-58.

Amphisbaena occidentalis townsendi Stejneger, 1911,
new combination.

Amphisbaena townsendi Stejneger, 1911, p. 283. **Terra typica:**
"Piura, Peru," C. H. T. Townsend, col. **Holotype:** USNM
47987.

Locality records:—Peru:—Departamento Piura: Piura
(Stejneger, 1911; Burt and Burt, 1930, 1933; Parker, 1932);
USNM 47087. La Huaca, Río Chira PMY 508-1 - 14. Negri-
tos CNHM 5725, 41554. Near Negritos CNHM 38681. Que-
brada Pariñas, near Negritos CNHM 8361, 8385. Talara
AMNH 66642. Pariñas Valley, northeast of Talara CNHM
8450-51. Lobitos, Talara (Parker, 1932); BM 1929.12.12.2-5.
30 miles from Lobitos BM 1932.9.5.9-10.

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TABLE OF DATA FOR ALL SPECIMENS

Museum Number	Sex	Annuli	Seg-ments	Chin Shield	Length
ZMU 9631	♂	267 + 3 + 17S	46	3	213 + 18
CNHM 5661	♀	262 + 3 + 20S	18/24	3	160 + 15
CNHM 34290	♀	266 + 3/4 + 17S	41	3	192 + 17
CNHM 34291	♀	263 + 3 + 20S	16/26	3	243 + 22
BM 1889.7.19.1	♀	272 + 4/5 + 18S	18/26	3	220 + 18.5
SMF 11815	♂	265 + 4 + 19S	43	3	223 + 19
SMF 11816	juv	268 + 3 + 19S	47?	3	83 + 8.5
SMF 11817	♀	272 + 5 + 14 +	18/26	3	243 + 16?
SMF 11818	♀	272 + 4 + 20S	20/28	3	226 + 19
ANSP 11355	♂	275 + 3 + 18S	18/26	3	?260 + 22
ANSP 11356	♀	270 + 4 + 19S	44	3	237 + 19
ANSP 11357	♂	266 + 4/3 + 19S	16/24	3	215 + 17
ANSP 11358	♂	269 + 4 + 18S	44	3	217 + 18
USNM 47087	♂	275 + 2 + (8)24S	18/26	4	208 + 21
PMY 508-1	♀	267 + 3/4 + (7)23S	16/26	4	187 + 20
PMY 508-2	♀	271 + 4 + (8)23S	16/26	4	139 + 14
PMY 508-3	♀	264 + 4 + 7 A	19/26	5	211 + x
PMY 508-4	♂	263 + 3 + (8)25S	44	4	183 + 21
PMY 508-5	♀	272 + 3 + 7 A	42	4	191 + x
PMY 508-6	♂	261 + 3/2 + (8)24S	42	5	145 + 17
PMY 508-7	♀	267 + 3 + (7)23S	44	4	182 + 19
PMY 508-8	♂	265 + 3 + (8)22S	16/24	5	165 + 17
PMY 508-9	♀	266 + 3 + (8)23S	42	4	182 + 19
PMY 508-10	♂	264 + 3 + (7)23S	16/26	4	197 + 21
PMY 508-11	♀	263 + 3 + (7)24S	18/26	4	195 + 21
PMY 508-12	♂	271 + 3 + (8)24S	18/26	4	183 + 20
PMY 508-13	♀	266 + 3/4 + ()24S	44	4	171 + 20
PMY 508-14	juv	272 + 3 + (8)25S	42	5	89 + 10
CNHM 5725	♂	279 + 3 + (8)23S	16/22	5	219 + 22
CNHM 41554	♂	273 + 2 + 8 A	16/26	5	230 + x
CNHM 38681	♀	269 + 3/4 + (7)25S	18/26	5	197 + 23
CNHM 8361	?	271 + 3 + (8)25S	18/26	4	132 + 15
CNHM 8385	♀	271 + 4 + (7)24S	18/26	4	180 + 18.5
AMNH 66642	♀	277 + 3 + ()24S	18/25	4	153 + 16
CNHM 8450	♂	275 + 3 + (8)24S	17/24	4	198 + 22
CNHM 8451	♂	277 + 3 + (9)26S	47	5	202 + 22?
BM 1929.12.12.2	♀	271 + 3 + (8)25S	18/26	5	252 + 28
BM 1929.12.12.3	♀	273 + 4 + (8)24S	16/25	5	227 + 24
BM 1929.12.12.4	juv	272 + 5 + (8)23S	18/28	5	111 + 11
BM 1929.12.12.5	juv	278 + 3 + (8)25S	18/26	5	116 + 12
BM 1932.9.5.9	♂	269 + 4 + (8)23S	16/24	5	218 + 22
BM 1932.9.5.10	♀	279 + 4/5 + (9)23S	17/26	5	204 + 20.5

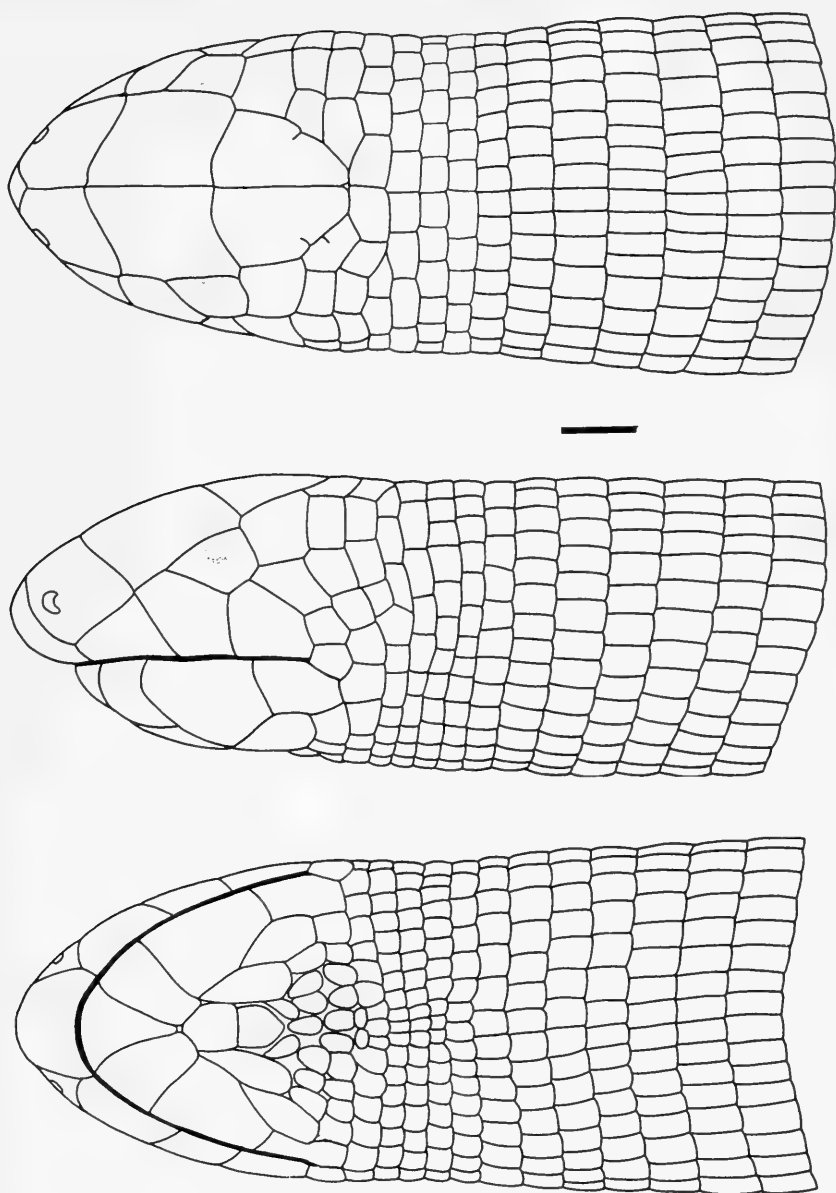


Figure 4. *Amphisbaena o. occidentalis*. Dorsal, lateral and ventral views of the head and neck of CNHM 34290 from Chiclín, Dept. La Libertad. The line equals 1 mm to scale. (V. Cummings, del.)

Figure 5. *Amphisbaena o. townsendi*. Dorsal, lateral and ventral views of the head and neck of PMY 508-9 from La Huaca, Dept. Piura. The line equals 1 mm to scale. (V. Cummings, del.)

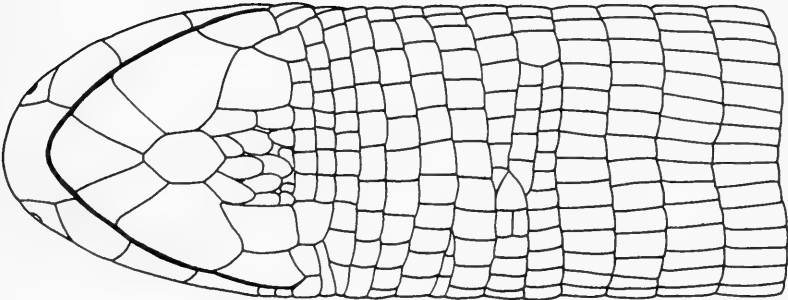
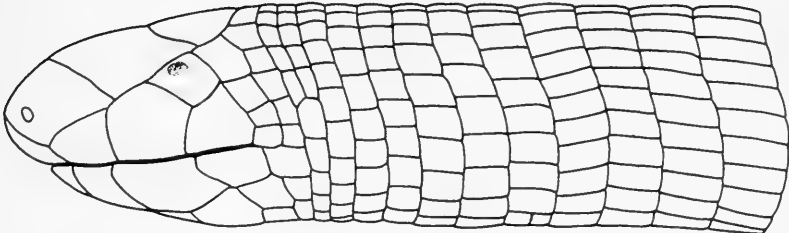
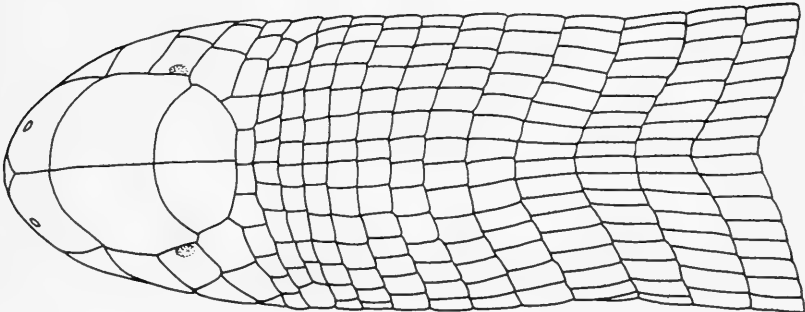
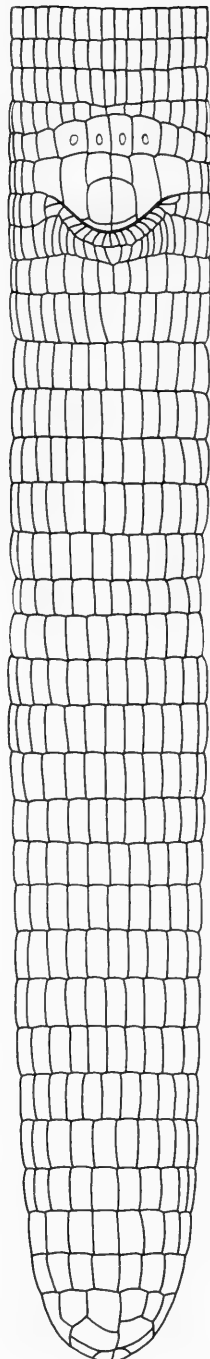
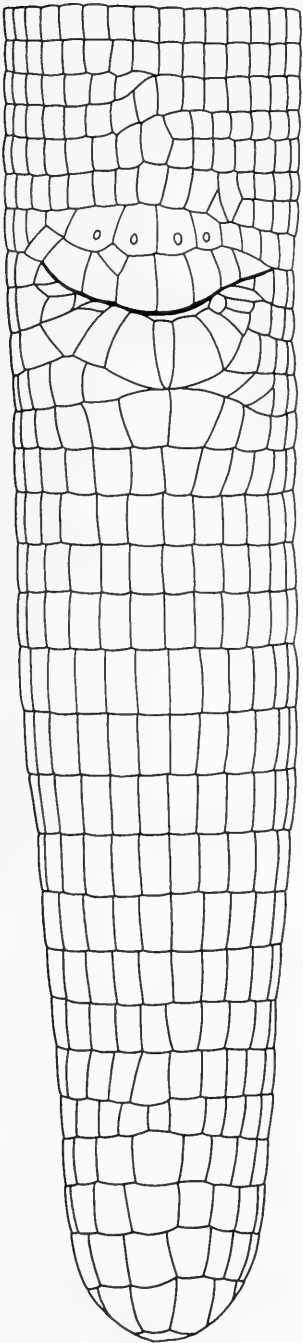


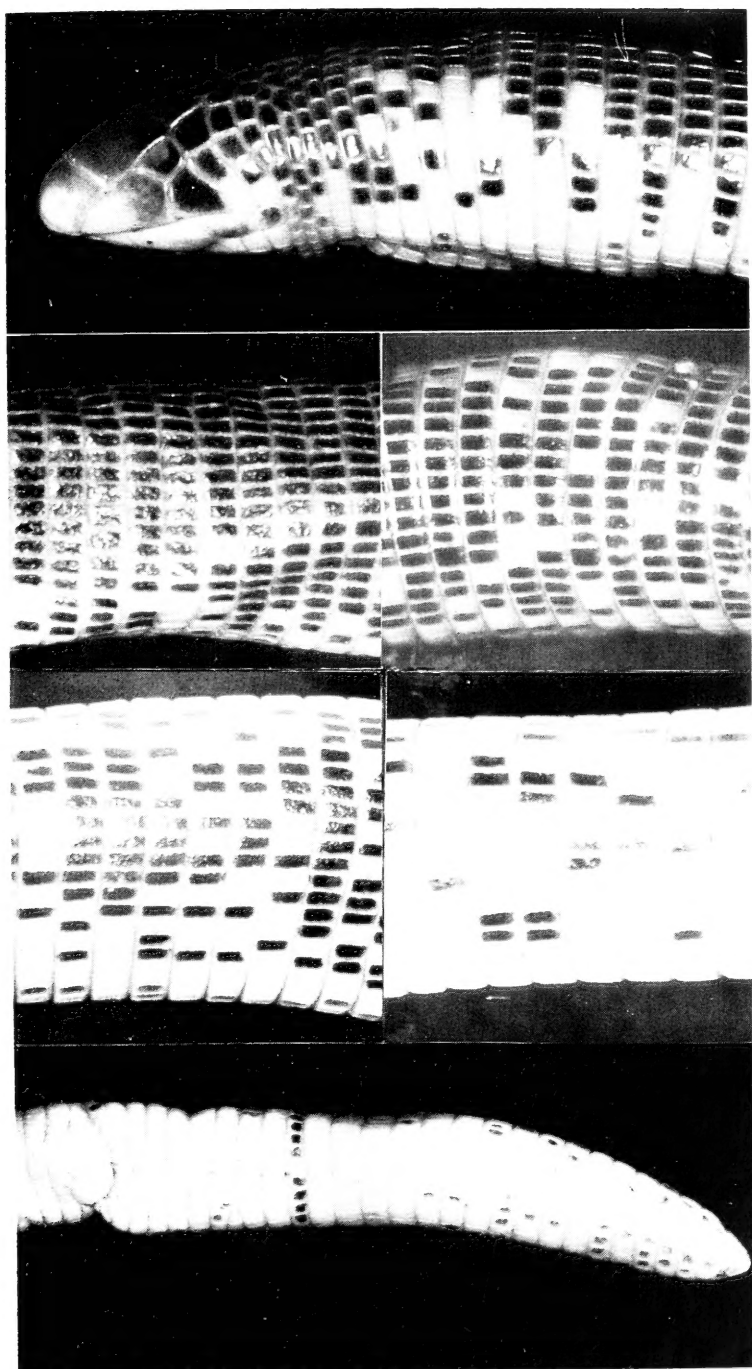
Figure 6. *Amphisbaena o. occidentalis*. Ventral view of cloaca and tail of same specimen as figure 4. Note lack of autotomy level. The line equals 1 mm to scale. (V. Cummings, del.)

Figure 7. *Amphisbaena o. townsendi*. Ventral view of cloaca and tail of same specimen as figure 5. Note the narrowing of the eighth postcloacal annulus indicating the preferred autotomy level. The line equals 1 mm to scale. (V. Cummings, del.)



Figures 8 - 13. *Amphisbaena occidentalis*. Photographs demonstrating the color patterns. Figs. 8 - 9 show *A. o. occidentalis*, and figs. 10 - 13 show *A. o. townsendi*.

Figure 8. Lateral view of the head of CNHM 34290 from Chiclin, Dept. La Libertad. Figure 9. Dense dorsal and sharply delimited lighter ventral coloration shown in three-quarter view of the midbody of the same specimen. Figures 10 - 12 show the various stages of lightening on the dorsal color (by the lack of pigment on an increasing number of dorsal segments) within a single series, on midbody dorsal views of PMY 508-4 (Fig. 10), PMY 508-3 (Fig. 11) and PMY 508-9 (Fig. 12) all from La Huaca, Dept. Piura. Figure 13. Ventral view of cloaca and tail of CNHM 8385 from Quebrada Pariñas, Depto. Piura. Note the sharp pigmentation of the reduced postcloacal annulus, which marks the preferred level of autotomy. Also the extremely faint, non-pigmented precloacal pores in this female specimen.





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