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OBSERVATIONS ON *TYPHLOPS* FROM PUERTO RICO
AND SOME OF THE ADJACENT ISLANDS

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THE Chapman Grant Collection from the Greater Antilles, which was acquired jointly by the Museum of Zoology, University of Michigan, and the Museum of Comparative Zoology, Harvard University, included a large series of specimens of *Typhlops*, a number of them from islands upon which collections had not previously been made. In order to place these specimens correctly in the collections, it was found necessary to review the literature and to make a study of the forms represented.

Specimens loaned by the Museum of Comparative Zoology and the United States National Museum have been of much assistance in solving some of the problems. The drawings are by Miss Grace Eager, of the staff of the Museum of Zoology.

In the course of the study it was found that a number of specimens from Caja de Muertos and the mainland of Puerto Rico represent a distinct new species. It is a pleasure to associate with this species the name of Major Chapman Grant, who has added so materially to our knowledge of the herpetological fauna of the Greater Antilles.

***Typhlops granti*, new species**

HOLOTYPE.—No. 76669, Museum of Zoology, University of Michigan; Caja de Muertos (eight miles off Ponce, Puerto Rico); April 20, 1931; Chapman Grant, collector.

PARATYPES.—One from one mile north of Parguera, Puerto Rico; three from Caja de Muertos.

DIAGNOSIS.—Body long and slender; scales around the body 18-16-16 rows; mid-dorsal rows from rostral to spine about 370-386; snout broad, truncate, and strongly projecting; eyes very small but very distinct; rostral broad, somewhat wedge-shaped above; nasal suture complete.

DESCRIPTION OF HOLOTYPE.—Body long, slender; head slender, slightly depressed; snout projecting, broadly truncate; rostral broad, width at tip of snout contained about $2.2 \times$ in width of head in ocular region, dorsally somewhat wedge-shaped and not extending posteriorly to level of eyes; nostrils lateral, on a suture which completely divides the nasal and is in contact with the second supralabial; anterior portion of nasal in contact with the first and second, posterior portion in contact with the second and third supralabials; praecocular very slightly narrower than ocular, its anterior angle rounded, in contact with the third supralabial; ocular in contact with third and fourth supralabials; eye minute but very distinct; supralabials four, increasing in size posteriorly, the fourth at least twice as long as the third; praefrontal and interparietal a little larger than the frontal; supraocular very slightly enlarged; two somewhat enlarged scales on right parietal region, the anterior largest, the posterior only slightly larger than the body scales, on the left side of the head the posterior parietal is larger than the anterior; scale rows 18-16-16; about 384 mid-dorsal scales from rostral to spine; tail spine very short.

Color dorsally yellow, ventrally yellowish white; the dorsal scales have a pale brown tip, which has an anterior border of darker brown, a pattern which is evident only under a lens; head scales without distinct pattern.

Total length 154 mm.; length of tail about 2.6 mm.; tail length about $59.2 \times$ in total length; width of body 2.2 mm.; body width $70 \times$ in total length.

PARATYPES.—The paratypes vary little from the type. The total lengths are 85–153 mm., the scale rows are 18–16–16, the mid-dorsal series ranges about 370–386 in the three larger specimens. The slight differentiation of the parietals in the entire series may indicate that none of them are adult.

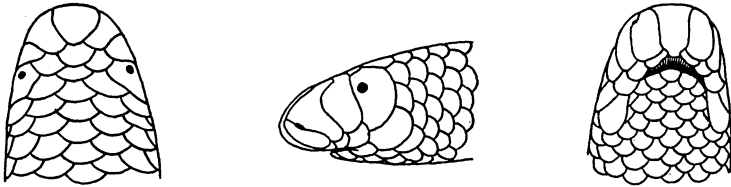


FIG. 1. Dorsal, lateral, and ventral views of the head of *Typhlops granti*, paratype from Caja de Muertos, Mus. Zool. No. 76671, about $\times 8$.

REMARKS.—This slender, long-bodied *Typhlops* strongly resembles *T. microstomus*, from Yucatan. *T. microstomus*, however, has a subocular, the eye is scarcely visible, the scale rows on the single specimen in the Museum of Zoology are 18–18–18, and the mid-dorsal series is 484. We have not had the opportunity of examining *psittacus*, which Werner describes¹ as having 24 scale rows around the body (in his key following the description the scale rows are given as 20). Aside from the difference in scale counts *psittacus* also has a subocular. A specimen of *tenuis* has 310 mid-dorsal rows, a less distinct eye, a peculiarly shaped rostral which narrows on the tip of the snout and expands on the upper surface of the head, and different coloration and proportions. The Hispaniolan species *pusillus* has 20 rows of scales and a divided praeocular. *T. sulcatus* (Navassa Island) has 20 rows of scales and no nasal suture. Comparison was made with a specimen each of *rostellatus* and *monensis*, of the approximate length of the type of *granti*. The *rostellatus* had 20–20–18 rows of scales around

¹ "Neue Reptilien und Batrachier aus dem Naturhistorischen Museum in Brüssel," *Zool. Anz.*, 26 (693), 1903: 247–8.

the body, a shorter mid-dorsal series (349), a much larger eye, a narrower rostral, different proportions (body width in total length: $70 \times$ in *granti*, $44 \times$ in *rostellatus*), and a different coloration. The *monensis* had 20–18–18 rows of scales around the body, a shorter mid-dorsal series (339), a larger eye, and different proportions (body width in total length $39.2 \times$).

THE JAMAICENSIS GROUP

The following annotated list of the more significant references will serve the purpose of a historical review of this group.

REVIEW OF THE LITERATURE

- 1802 Shaw, George, Gen. Zool., 3: 588.
Anguis jamaicensis, type locality, Jamaica.
- 1844 Duméril, André, and Gabriel Bibron, Erp. Gen., 6: 290, 293.
Typhlops richardii, type locality, St. Thomas.
Typhlops platycephalus, type locality, Martinique.
- 1862 Reinhardt, J. and C. F. Lütken, Vid. Medd. naturg. Foren. Kjöbnh: 164–5.
Lists *T. lumbricalis* from Cuba, Jamaica, Martinique, and Guadeloupe, *T. richardii* from Cuba, Portorico, Guadeloupe, *T. platycephalus* from Martinique.
- 1893 Boulenger, George Albert, Cat. Sn. Brit. Mus., 1: 30–1.
Typhlops platycephalus, Dominica.
Typhlops lumbricalis, Cuba, Jamaica, Hayti, St. Thomas, Antigua, Barbados (?), Berbice. *T. richardii* is included in the synonymy of this species.
- 1904 Stejneger, Leonhard, Rept. U. S. Nat. Mus. for 1902: 557, 684–7.
Lists *T. lumbricalis* from Porto Rico and states that it has been recorded from Martinique, Guadeloupe, Dominica, St. Kitts, Antigua, the Virgin Islands, Mona, Haiti, Cuba, and Jamaica. He points out that Boulenger's *platycephalus*, described from Dominican specimens with 24 scale rows, apparently differs from the species of Duméril and Bibron, and may appropriately be named *dominicana*. He states that many of Plee's specimens, sent from Martinique to the Muséum d'Histoire Naturelle where they were credited to this island, actually were collected in Porto Rico.
- 1910 Barbour, Thomas, Bull. Mus. Comp. Zool., 52 (15): 299.
Lists *T. lumbricalis* from Jamaica.

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- 1914 Barbour, Thomas, Mem. Mus. Comp. Zool., 44 (2): 322.
Lists *T. lumbricalis* from the Guianas to both Lesser and Greater Antilles, *platycephalus* from Martinique.
- 1915 Barbour, Thomas, Proc. Biol. Soc. Wash., 28: 77.
Notes on Guadelupean *Typhlops* as *lumbricalis*.
- 1919 Barbour, Thomas, and Charles T. Ramsden, Mem. Mus. Comp. Zool., 47 (2): 185-6.
Lists *T. lumbricalis* from South America, Jamaica, Haiti, Mona, Porto Rico, St. Thomas, St. Croix, St. Kitts, Antigua, Guadeloupe, Dominica, Martinique, several of the Bahamas, and Cuba.
- 1920 Schmidt, Karl Patterson, Ann. N. Y. Acad. Sci., 28: 195-7.
Applies the name *richardii* to Porto Rican *Typhlops*. He considers it distinct from *lumbricalis* because of the greater adult length, larger number of scales around the body, the higher mid-dorsal count, and the differences in coloration.
- 1922 Barbour, Thomas, in Handbook of Jamaica: 4.
Lists *T. lumbricalis*, with a range from Cuba and the Bahamas through the West Indian chain to the Guianas.
- 1924 Cochran, Doris M., Journ. Wash. Acad. Sci., 14 (8): 174-7.
Discusses the status of some of the island *Typhlops* with 20 and 22 scale rows. For the Jamaican species (with 22 scale rows) she revives Shaw's *jamaicensis*, and includes the Porto Rican and St. Thomas series, pointing out that the mid-dorsal count is highest on Jamaica and lowest on St. Thomas. She reexamined the National Museum's Guadeloupean *Typhlops* and found them to be *dominicana*. She mentions as species with 20 scale rows *lumbricalis* from Cuba, Santo Domingo, and Abaco, and *sulcatus* from Navassa.
- 1928 Schmidt, Karl Patterson, N. Y. Acad. Sci., 10, Pt. I: 125-8.
Lists the Porto Rican species as *platycephalus*, and states that because of the insularity of *jamaicensis*, *platycephalus*, and *richardii*, he prefers to consider them as distinct.
- 1929 Amaral, Afranio do, Mem. Institut. Butantan, 4: 127.
Lists *T. lumbricalis* from Antilles, "*platycephala*" from Lesser Antilles, and ignores *richardii* and *jamaicensis*.
- 1930 Barbour, Thomas, Zoologica, 11 (4): 106.
Lists *T. jamaicensis* from Jamaica, St. Thomas, Porto Rico, and Martinique, with the statement that this distribution is unnatural and that further material from St. Thomas and perhaps St. Croix may reestablish *richardii*.

- 1932 Grant, Chapman, Journ. Dept. Agric. Puerto Rico, 16 (1): 47-8.
 Lists "*Typhlops jamaicensis*, sp?" from Caja de Muertos, with a later statement "the *Typhlops* appears to be distinct."
 ———, *Ibid.*, (3): 333.
 Lists two specimens of *T. jamaicensis* from St. John.
 ———, *Ibid.*, (3): 344.
 Lists thirty-two specimens from Tortola as *T. richardii*, mentioning the darker coloration and smaller size as distinguishing characters from *jamaicensis*.
 ———, *Ibid.*, (4): 402.
 Lists "*Typhlops* sp." from Puerto Rico, Vieques, and Culebra, *T. richardii* from the Virgin Islands.
- 1933 Parker, H. W., Ann. & Mag. Nat. Hist., 11 (10): 151.
 States that, while the average scale count for the form of each island will be found to be slightly different, the range of variation in each island overlaps that of the other islands to such an extent that until these averages are thoroughly established, it is perhaps more convenient to call the whole group *T. jamaicensis*.

From this annotated bibliography it will be seen that the Puerto Rican *Typhlops* with 22 scale rows, known for many years as *lumbricalis*, was clearly differentiated from that species by the careful analysis of Cochran (1924), who revived the name *jamaicensis* and applied it to the Jamaican, Puerto Rican, and St. Thomas *Typhlops* (22 scale rows), synonymizing *richardii* and *platycephalus* with this species. Schmidt (1928) differentiated *jamaicensis*, *platycephalus*, and *richardii* mainly because of their insularity. Parker (1933) has found it "more convenient" to retain *jamaicensis* for the entire group.

In any *Typhlops* study certain difficulties are apparent. Accurate scale counts of these diminutive snakes are difficult, save for the rows around the body. Only one count of the scales around the body is usually given in descriptions, and frequently there is no statement as to where it was made. Since a reduction in the number of scale rows may occur about the middle of the body, a single count made in this area may not represent the highest number of scale rows characteristic of a species. To avoid this difficulty we have made anterior, mid-body, and posterior counts. The earlier investigators

usually counted the mid-ventral body and tail scales. This count, especially on the light-bellied forms, where the scales are scarcely differentiated, is less accurate, we feel, than the mid-dorsal or vertebral count, from the rostral to the tail spine, which we have employed. Only perfect specimens were used. Questionable counts were verified by more than one person. Even with this care, the count, because of the high number of poorly differentiated scales, is subject to errors.

In our analysis of the *jamaicensis* group we endeavored to make use of all possible comparative measurements, but we feel that these, unless they differ widely, are probably not of definite diagnostic value. The diameter of the body differs according to the age, state of nourishment, and the preservation of the individual specimen. The diameter of the head, when this measurement is made always at the same level, compared with the total length, is more constant. Previous writers have used the width of the rostral compared with the head width without stating where these measurements were made. We have measured the width of the rostral at the tip of the snout, and compared it with the width of the head at eye level. It is almost impossible to measure the length of the tail accurately.

For the purposes of this study the following specimens were available: sixteen from Jamaica, sixty-four from Puerto Rico,² one from Caja de Muertos, one from Vieques, one from Cayo Luis Peña, seventeen from Culebra, three from St. Thomas, two from St. John, and thirty-one from Tortola.

In these specimens we have found that the rows of scales around the body number: Jamaica, 22-22-22; Puerto Rico, 24-22-20 (1), 24-20-20 (3), 22-22-20 (7), 22-20-20 (23), 22-20-19 (3), 22-20-18 (26), and 20-20-18 (1);³ Caja de

² The following localities in Puerto Rico are represented in the Grant Collection: vicinity of Canovenas, 40; Río Piedras, 4; Cayey, 7; Humacao, 15; Camp Buchanan, 3; Mayagüez, 1, hillside west of pass to Parquera, 1; San Juan, 3.

³ This specimen has the praeoculars and supraoculars fused, but we can discover no other differences from other Puerto Rican specimens than the apparently aberrant scutellation.

Muertos, 22-20-18; Cayo Luis Peña, 22-22-20; Vieques, 22-20-20; Culebra, 22-22-20 (2), 22-20-20 (6), 22-20-19 (3), and 22-20-18 (6); St. John, 22-22-18 and 22-20-18; St. Thomas, 22-20-20 (1), 22-20-18 (2); Tortola, 22-22-20 (8), 22-20-20 (6), and 22-20-18 (17). It seems evident from the figures that the Jamaican series, with no reduction of scale rows posteriorly on the body, may be separated by this character alone from those of the other islands, which all have such a posterior reduction.

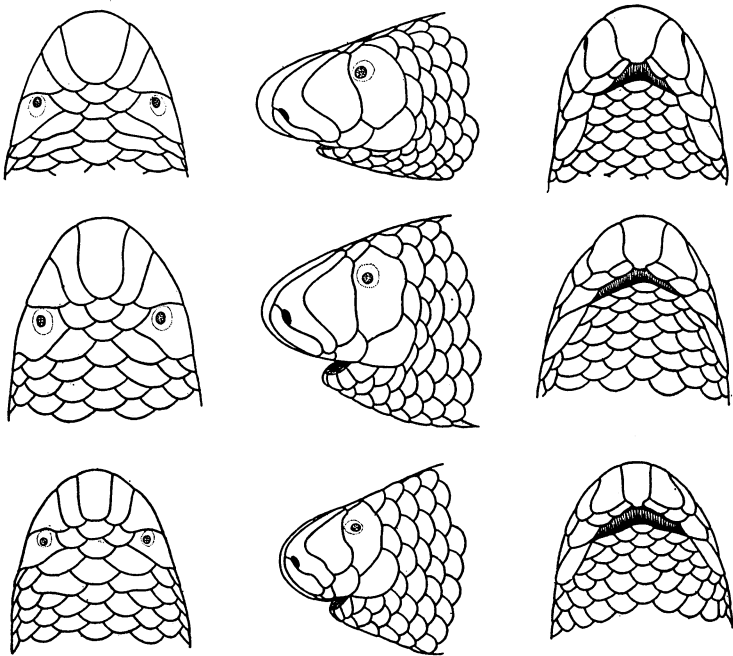


FIG. 2. Dorsal, lateral, and ventral views of the head of *Typhlops* of the *jamaicensis* group, about $\times 5$. Upper row, *jamaicensis*, Jamaica, Mus. Zool. No. 73931; middle row, *platycephalus*, Puerto Rico, Mus. Zool. No. 76658; and lower row, *richardii*, St. Thomas, Mus. Zool. No. 76668.

Other investigators have pointed out that there is a gradual reduction in the number of mid-dorsal scales from Jamaica to St. Thomas. This is also shown by our counts of these scales

on the specimens studied, which were: Jamaica, 373-436; Puerto Rico, 335-405; Caja de Muertos, 386; Cayo Luis Peña, 377; Vieques, 379; Culebra, 354-398; St. Thomas, 322-336; St. John, 329-350; and Tortola, 306-369. The extremes overlap,⁴ but when we consider the averages of these counts, the specimens arrange themselves into three groups: Jamaica, average, 402.5; Puerto Rico, Caja de Muertos, Cayo Luis Peña, Vieques, and Culebra, average, 377.98; and St. Thomas, St. John, and Tortola, 336.78. To test the value of the averages, made on such a diverse number of specimens, sixteen specimens were selected at random from various localities in Puerto Rico, and their mid-dorsal scale counts averaged. The result obtained was 378.25 (377.82 for sixty-four specimens). The same number selected at random from the Tortolan series gave us 341.68 (340.8 in thirty-one specimens). Thus we feel that the average count as given here is of definite diagnostic value and separates this group into three recognizable forms.

The only marked difference in head scutellation of the three series is in the shape and size of the rostral, as shown by the figures. In ventral view this scute in the Jamaican form has a lateral concave curve, and expands widely on the tip of the snout; in the Puerto Rican group it has a slighter lateral concave curve, with less expansion on the tip of the snout; the St. Thomas group has a narrower rostral, with straight, or almost straight lateral outline, and with no expansion on the tip of the snout. In dorsal view the rostral of the Jamaican form is a half of a broad oval, widest at the tip of the snout, the sides converge posteriorly gradually, and are slightly convex; the rostral of the Puerto Rican form is narrower, with the width at the tip of the snout not appreciably greater than the greatest dorsal width, and the sides have a marked anterior concavity; the St. Thomas group has a narrower rostral, without expansion at the tip of the snout and with straight or almost straight lateral outline.

⁴ Only two specimens of the Puerto Rican group had mid-dorsal counts under 350, and only three of the St. Thomas group over 350.

The ocular shields seem most subject to variation in this group. One Jamaican specimen has but one postocular. In three Puerto Rican specimens the supraocular is fused with the praeocular on both sides of the head, and in two these scales are fused on one side only. The same abnormality occurs in two Tortolan specimens, one with the fusion complete on both sides, and the other on one side only. One Puerto Rican specimen has but one postocular on the right side of the head.

There is some variation in the number of parietals, noticeable especially on younger specimens, whose parietals are not always clearly differentiated from the surrounding scales. Three specimens from Tortola have the nasals in contact behind the rostral.

The color scheme of the three series is about the same, varying mainly in the intensity of the ground color. The head scales are edged with white, the dorsal body scales have a light base and a straight-edged brown tip, giving a general grayish brown hue to the body. The dark tips are wider on the posterior scales and toward the tail tend to overlap, forming under the lens a somewhat confusing reticulate pattern, which adds to the hazard of scale counting. The specimens from Tortola are a richer brown, but we can distinguish no other differences. The greatest differentiation in color appears in Puerto Rico, where specimens may have a light dorsal tail ring of varying width, or a light anal notch of varying height. The tail rings do not seem to occur on specimens from other islands, but these appear always to have some irregularities in color on the sides in the vicinity of the vent.

The Lesser Antillean specimens of this group form a puzzle which cannot be solved until more specimens are available for study. Parker (1933) gives the mid-dorsal scale counts of five specimens from Montserrat as 370-397, and of five from Antigua as 346-368. We have three specimens from Antigua with a range of 331-342 mid-dorsal scales, and the ventral view of the rostral is quite different from those of the Jamaican, Puerto Rican and St. Thomas groups.

SUMMARY.—A study of the *jamaicensis* group of *Typhlops* shows that it may be separated into three series from :

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Jamaica, for which the name *jamaicensis* is available, with no posterior reduction in the number of scales around the body, a greater average number of mid-dorsal scales, and a wider rostral with marked expansion at the tip of the snout and a somewhat convex lateral outline dorsally;

Puerto Rico, Caja de Muertos, Cayo Luis Peña, Vieques, and Culebra, for which the name *platycephalus* is available, with a posterior reduction in the number of scales around the body, a lesser average number of mid-dorsal scales, and a narrower rostral with less expansion on the tip of the snout and a concave lateral outline dorsally; and

St. Thomas, St. John, and Tortola, for which the name *richardii* is available, with a posterior reduction in the number of scales around the body, a still smaller average number of mid-dorsal scales, and a narrower rostral with no expansion on the tip of the snout and straight or almost straight lateral outline dorsally.

TYPHLOPS ROSTELLATUS STEJNEGER⁵

This species is represented in the Grant Collection by eighty-nine specimens, all from Puerto Rico. They were taken in the following localities: vicinity of Canovenas (81); Mameyes River (2); Camp Buchanan (1); Río Piedras (2); El Yunque (2); and Cayey (1). The species has formerly been reported from Lares, Aibonito, and Bayamon.

In the seventy-eight specimens available for study the total lengths are 104–227 mm.; the scale rows around the body are 20–20–20 (7), 20–20–19 (2), 20–20–18 (64), 20–19–18 (1), 20–18–18 (4); the mid-dorsal scales number about 321–353, average, 337.71. There appears to be a tendency toward variation in the ocular scales. Six specimens have a third post-ocular on one side of the head, a subocular, apparently formed of a part of the ocular and the upper part of the fourth supra-labial, is present on both sides of the head in one specimen and on one side of the head of another.

⁵ "The Herpetology of Porto Rico," *Rept. of the U. S. Nat. Mus. for 1902*, No. 129, 1904: 686–7, figs. 145–147.

TYPHLOPS MONENSIS SCHMIDT⁶

The Grant Collection, containing fourteen specimens of *T. monensis*, makes possible further observations on this interesting species. In the thirteen uninjured specimens the total sizes are 96–203 mm., the mid-dorsal scales number about 299–339, average, 325.23.⁷

Schmidt has pointed out the fact that this species is allied to *lumbricalis*. Additional characters separating the species are: the number of parietals, one in *lumbricalis* and two in *monensis*, although the parietals are not always clearly differentiated in young specimens; the shape of the rostral; the more acute anterior angle of the praeocular, the narrower ocular, and the lower third and fourth supralabials in *monensis*.

The nasals are apparently only rarely in contact behind the rostral in *monensis*.

⁶ "The Amphibians and Reptiles of Mona Island, West Indies," *Publ. Field Mus. Nat. Hist., Zool.*, 12, 1926: 157, fig. 1.

⁷ Combining with our mid-dorsal scale counts on *monensis* those of the type and paratype, 321 and 313, the average for fifteen specimens is 324.13. The mid-dorsal scale counts on fifteen specimens of Cuban *lumbricalis* are about 265–297, average, 282.