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THE ELAPID GENUS OF SNAKES *WALTERINNESIA*

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Through the extensive collecting of the Third United States Naval Medical Research Unit, it has been the good fortune of Chicago Natural History Museum to receive specimens of the rare "cobra," *Walterinnesia aegyptia* Lataste (fig. 38). The first specimen came from Jebel Suez, near Suez, Egypt, and the second came from a rodent burrow in a broad sandy valley in the Eastern Desert, about 20 miles east of Cairo. The latter specimen (C.N.H.M. no. 69240) lived at the Lincoln Park Zoological Gardens, Chicago, for three months. This species has aroused interest because it was for so long one of the rarest of the larger venomous snakes in a region that was well known. In view of this history I have given all discoverable references to *Walterinnesia* in the literature. I wish to thank Mr. Harry Hoogstraal, Field Associate, Chicago Natural History Museum, and a member of the Naval Medical Research Unit, for obtaining these specimens, Dr. Robert E. Kuntz, also of the Naval Medical Research Unit, for his two photographs of a living specimen and its habitat, and Dr. Karl P. Schmidt and Mr. Clifford H. Pope, of Chicago Natural History Museum, for their aid in the preparation of this paper.

Walterinnesia aegyptia Lataste

Walterinnesia aegyptia Lataste, 1887, Le Naturaliste, 1887: 411—Egypt; Boulenger, 1896, Cat. Snakes Brit. Mus., 3: 392; Anderson, 1896, Herp. Arabia, p. 109; 1898, Zool. Egypt, 1: 324, pl. 46; Flower, 1910, Giza Zool. Gard. Spec. Report, 5: 328; Thompson, 1913, Proc. Acad. Nat. Sci. Phila., 65: 509; Boulenger, 1915, Proc. Zool. Soc. Lond., 1915: 656, and (1919), 1919: 306; Flower, 1923, Proc. Zool. Soc. Lond., 1923: 1081; 1924, Rep. Zool. Ser., p. 19; Mertens, 1929, Bull. Antiv. Inst. Amer., 3: 41; Corkill, 1932, Jour. Bombay Nat. Hist. Soc., 35: 567; 1932, Snakes and snake bite in Iraq, p. 27; Flower, 1933, Proc. Zool. Soc. Lond., 1933: 827; Scortecci, 1939, Gli Ofidi Velenosi dell'Africa Italiana, p. 204; Bogert, 1943,

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Bull. Amer. Mus. Nat. Hist., 81: 292; Aharoni, 1944, Bull. Zool. Soc. Egypt, 6: Supp., p. 40; Kauffeld, 1947, Fauna (Philadelphia), 9: 87; Haas, 1951, Bull. Research Council Israel, 1: 90.

Naja morgani Mocquard, 1905, Bull. Mus. Hist. Nat., Paris, 11: 78—Arabistan, Iran; Boulenger, 1920, Jour. Bombay Nat. Hist. Soc., 27: 349; Corkill, 1932, Jour. Bombay Nat. Hist. Soc., 35: 566; 1932, Snakes and snake bite in Iraq, p. 26, pl. 16; Flower, 1933, Proc. Zool. Soc. Lond., 1933: 829; Scortecchi, 1939, Gli Ofidi Velenosi dell'Africa Italiana, p. 204; Bogert, 1943, Bull. Amer. Mus. Nat. Hist., 81: 292; Kauffeld, 1947, Fauna (Philadelphia), 9: 87; Haas, 1951, Bull. Research Council Israel, 1: 90.

Atractaspis wilsoni Wall, 1908, Jour. Bombay Nat. Hist. Soc., 18: 804, fig.—Maidan Mihaftan, 30 miles east of Shushtar, Iran.

Discussion.—Many authors have suggested that *Naja morgani* may be conspecific with *Walterinnesia aegyptia*, for the two were said to agree in the divided anal plate, combination of divided and undivided subcaudals, scale counts, etc. In the most recent discussion of this question, Bogert (1943, p. 297) said: "The genus *Walterinnesia* (specimens not examined) differs from *Naja morgani* in at least two characters, . . ." Bogert also stated (p. 292): "If Boulenger's description of the maxillary dentition of *Walterinnesia* is correct, however, Thompson presents sufficient additional information concerning Mocquard's types to disprove exactly the conclusions which he seeks to draw. He describes one of the cotypes of *Naja morgani* as having two fangs followed by two teeth on the maxilla, thus diagnosing it as a cobra belonging to the African assemblage . . . and in contrast to *Walterinnesia* which possesses no teeth behind the fangs. Thompson fails to mention the fact that *Walterinnesia* is further distinct from *Naja* in having strongly keeled scales on the posterior of the body and on the tail, whereas all true *Naja* are smooth-scaled."

The original description of *Naja morgani* does not mention whether the posterior dorsals are keeled or smooth. When Thompson (1913) synonymized *Naja morgani* with *Walterinnesia aegyptia* he gave a detailed description of Mocquard's types but he did not say whether the posterior dorsal scales were smooth or keeled. In Boulenger's (1920) discussion of *Naja morgani* he synonymized *Atractaspis wilsoni* with *Naja morgani* and also failed to mention whether the posterior dorsal scales were smooth or keeled. But in the original description of *Atractaspis wilsoni*, Wall (1908) stated that the keels were "very obtuse in the basal half of some medium rows posteriorly." Since *Atractaspis wilsoni* is unquestionably synonymous with *Naja morgani*, these supposed forms do not differ from *Walterinnesia aegyptia* in the above character.

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FIG. 38. *Wallerinnesia aegyptia*. Photograph from life by Robert E. Kuntz.



FIG. 39. Habitat of *Wallerinnesia aegyptia*. Desert between Cairo and Suez. Photograph by Robert E. Kuntz.

The second character said to differentiate *Walterinnesia* from *Naja* is the lack of maxillary teeth posterior to the grooved fangs. In the original description of *Walterinnesia aegyptia* Lataste stated in a footnote that there are no maxillary teeth posterior to the grooved fangs "as far as I can be assured by dissecting this bone in place without damaging my only specimen of the genus." Boulenger (1896), who had seen Lataste's type, apparently followed the same procedure. Thompson (1913) and Corkill (1932) did observe the presence of maxillary teeth in *Naja morgani*. Even though this character did differentiate the two forms, Thompson synonymized *Naja morgani* with *Walterinnesia aegyptia*, without examining a specimen of *Walterinnesia aegyptia*. As stated above, Bogert (1943), with no authentic specimens of *Walterinnesia* available, reinstated *Naja morgani* as a valid species. With two specimens of *Walterinnesia* at hand, the maxillae were examined and there proved to be two distinct teeth posterior to the grooved fang.

These two characters—keeled posterior dorsal scales and two maxillary teeth posterior to the fang—are present in the two forms, and *Naja morgani* is clearly a synonym of *Walterinnesia aegyptia*.

Diagnosis.—Characters differentiating *Walterinnesia* from *Naja* are as follows:

1. Anal plate divided in *Walterinnesia*, entire in *Naja*.
2. Subcaudals divided and entire in *Walterinnesia*, all divided in *Naja*.
3. Posterior dorsal scales of body and tail distinctly keeled in *Walterinnesia*, smooth in *Naja*.

Distribution.—There is not enough material available to evaluate the distribution of this species. The known locality data are as follows:

IRAN: Arabistan Province and Maidan Mihaftan (30 miles east of Shushtar), Arabistan.

IRAQ: Shaiba, Baqubah, Mandali, Mosul, and Rutba.

PALESTINE: Bir Asluj (Negev, south of Beersheba) and Judean desert.

EGYPT: Jebel Suez (near Suez); 20–21 miles east of Cairo on Cairo-Suez Road; $31\frac{1}{4}$ miles east of Cairo on Cairo-Suez Road.

Scortecchi (1939, p. 204) comments on a dubious record from Cyrenaica (Libya) by R. Ribolla. This must be disregarded until confirmed.



A



B

FIG. 40. A, Hemipenes of *Waltherinnesia aegyptia*, C.N.H.M. no. 68810. B, Left hemipenis of same specimen.

Description.—The accumulated data may be analyzed as follows: dorsal scale rows at mid-body 21–23; ventrals (sex data not available) 180–197; subcaudals (total) 40–53; and entire subcaudals 1–13. A male, the largest specimen recorded (Mertens, 1929) has a total length of 1280 mm. (tail length 180 mm.).

The following data are given for the two specimens collected by Mr. Hoogstraal. C.N.H.M. no. 68810 (male), 27–23–17 scale rows, 189 ventrals, anal divided, 53 subcaudals (2–6 and 50–53 entire), total length 1042 mm., and tail length 159 mm. C.N.H.M. no. 69240 (male), 27–23–17 scale rows, 186 ventrals, anal divided, and 51 subcaudals (2–11 and 46–48 entire).

In attempting to apply Dowling's (1951) dorsal scale row formula to C.N.H.M. no. 68810 I find that the dorsal scale rows are added and dropped at irregular intervals. The range of scale rows for this specimen is given above. Flower (1923) reports a specimen with 29 scale rows on the neck.

The anal plate is divided in all specimens except two reported by Corkill (1932) as single; I feel that these specimens should be re-examined. Corkill also records four of the five specimens he collected in Iraq as having 21 scale rows in the middle of the body. This count may prove to be in error, for he may have counted too far posteriorly.

The proportion of single subcaudals varies; in the extremes, one of Mocquard's cotypes of *morgani* has the third subcaudal undivided, whereas C.N.H.M. no. 69240 has the second to eleventh and forty-sixth to forty-eighth undivided. The number of subcaudals differs somewhat in the eastern and western specimens, ranging from 40 to 47 in the east and 45 to 53 in the west. Whether this reflects lack of specimens or is of subspecific significance, further investigation will reveal. This difference appears to be the only character tending to separate the populations within the wide range from Suez to Iran.

Hemipenes.—C.N.H.M. no. 68810 (fig. 40) has the hemipenes almost fully everted. They are bifurcated, a branch of the sulcus extending to the apex of each lobe. The length of the sulcus from the base to the point of bifurcation is about 16 mm.; 9 mm. are exposed from the point of bifurcation to the apex. The lips of the sulcus are fleshy except in the calyculate area, where there are medium-sized spines on the lip fringes.

Each lobe is calyculate distally for about one-third of its exposed length, the calyces with very small spines on the fringes. Proximal

to these calyces the organ is spinous, the spines increasing in size to a little beyond the point of branching of the sulcus. There are a few small spines on the conspicuous lip in the fork of the sulcus and the largest spines of all are found just lateral to the lips. Proximal to the spines the stem is fleshy, with minute spicules becoming very sparse at the base of the stem.

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