

REVIEW OF THE AUSTRALIAN BLIND SNAKES

(FAMILY TYPHLOPIDAE),

By EDGAR R. WAITE, F.L.S., DIRECTOR S.A. MUSEUM.

Plate i; Charts 1-9; Text figs. 1-24.

IN one of my earlier papers on the Typhlopidae I intimated my intention of writing on the distribution of the Family in Australia. This project had to be abandoned on my leaving Sydney for New Zealand; on returning to Australia, however, the study was resumed, and this "Review" is the outcome.

In order to render the result as complete and satisfactory as possible, I have examined the collections preserved in all the principal Museums of the Commonwealth, and for this privilege I desire to express my cordial thanks to the governing bodies and curators of the following institutions, namely:

Queensland Museum, Brisbane.

National Museum, Melbourne.

Australian Museum, Sydney.

Western Australian Museum, Perth.

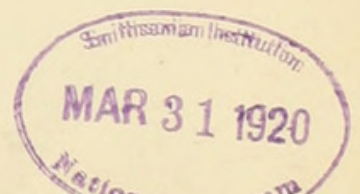
Macleay Museum, Sydney.

The material in our own Museum was, of course, also examined, the total number of specimens studied being 542.

The paper deals critically only with Australian species, but a list of those recorded from the Australian Region, outside the Commonwealth, is furnished as a separate paper.

Habits. The Blind Snakes, or Worm Snakes, as they are also not inaptly called, are widely distributed in tropical and subtropical lands. They are absolutely harmless to man and occur almost throughout Australia, being found even in the dry and arid deserts of the interior. They live underground, in termite mounds, or beneath rotting or termite-riddled logs; also in old saw-dust heaps; they feed largely upon termites or "white ants," also on small worms, the grubs of beetles and on small insects, their eggs, larvae and pupae. Many of them, if not all, emit an objectionable odour when handled or otherwise disturbed, and this faculty may be a protection against enemies, or may provide the means whereby the sexes find each other.

Though it may be presumed that blind snakes cast their skins, I have not seen any indication of sloughing in these reptiles; this may be accounted for on the supposition that the skin is shed underground.



I have before me a live example of *T. bituberculatus*, the most widely distributed and the commonest species in South Australia; placed in a box containing sand it quickly burrows by means of its sharp-edged snout, which is rapidly moved from side to side so as to displace the sand in its passage. This action may also be presupposed in the case of other species having a cutting-edged snout, as, for example, *T. australis*; but blunt-snouted species such as *T. broomi* and *T. ligatus* must burrow in different manner or into soil of different character, presuming that they do actually burrow; while one may fruitlessly speculate as to the use of the extraordinary beak-like snout of *T. grypus*. During progression the tail is curved downwards so as to provide a *point d'appui*, the thorn-like spine at its tip greatly assisting its action. Though I have handled scores of specimens of different species none has ever assumed the position described or illustrated by McCoy. (1) Placed upside down upon a table the snake quickly rights itself, the use of the caudal spine being then very evident. Held in the hand, the pressure of the snout as the snake tries to drive itself through the flesh is surprising, and when applied to the fissure between the closed fingers its efforts can scarcely be resisted; at the same time the application of the caudal thorn against the skin is quite pronounced. It also has considerable constricting powers, and can wind itself tightly round the fingers.

Settling down below the sand the snake may coil itself into a close compact mass, and when discovered in nature, in dormant condition, these reptiles are usually found so coiled. When above ground the blind snakes are so evidently ill at ease that they are in constant movement, endeavouring to burrow, and it is thus difficult to photograph them in life; by placing them on a sanded board, however, they are prevented from burrowing while a natural appearance is maintained. The three photographs on Plate 1 are all of the same specimen, and in all the head is directed towards the left hand.

During the course of its wanderings on the table the snake will sometimes tie itself into a knot by passing its head through a loop of its own body (Pl. I, fig. 2); it is not untied by reverse action, but by continuing the motion, so that the knot is passed backwards along the whole length of the body, when the tail finally emerges from the coil and the knot is undone.

Appearance. Excepting as regards size and comparative proportions, all Australian species are of very similar appearance, having cylindrical bodies of fairly uniform thickness throughout, or somewhat thickened towards the tail, the diameter of which may be greater than that of any other part. The tail terminates abruptly, but in all our species actually ends in a fixed thorn-like point to which the rows of scales converge, and of which it forms a common termina-

(1) McCoy, Prod. Zool. Vict. ii. 1885, pl. 103.

tion: it is usually inclined towards the ground and its function is to assist in the progression of the snake when burrowing. In certain examples of some species, notably *T. polygrammicus*, there is a dark brown or black blotch on each side of the short tail near the vent. Seeing that the eyes are almost indistinguishable and the dark blotches often conspicuous, the tails of these snakes are often mistaken for their heads, whilst some people believe that blind snakes have a head at each end; double-headed snakes are occasionally produced, but such a condition is quite analagous to that of the more familiar double-headed calf.

Scales. The scales overlap and are closely adpressed, broader than long, subequal in size and highly polished, so that little resistance is offered in the passage of the snake through the soil. There are no ventral plates, as with the majority of snakes, the scales on the belly being indistinguishable from those elsewhere; the rows of body scales are so uniformly disposed that their number, normally in an even series, provides a reliable diagnostic character. Owing to their small size and highly-polished surface it is sometimes difficult to count in how many rows the scales are disposed: the process is facilitated by sticking into the body at different parts of the circumference two or perhaps three small entomological pins and counting from pin to pin, when the body may be rotated to include the next pin. A watchmaker's glass used in the eye not only enlarges the apparent size of the scales, but allows both hands free for turning the body of the snake.

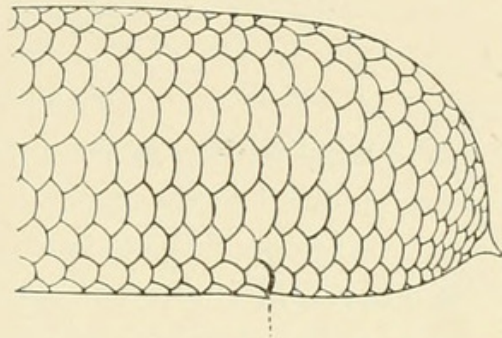


Fig. 1. Tail and hinder portion of body of *T. polygrammicus*.

Head. The diameter of the head is usually less than that of the body into which it emerges without definite constriction or neck; it is covered with enlarged plates, arranged in definite and regular order, but their shape and relative size may differ in the various species, in the determination of which their conformation is utilized.

The arrangement of the head shields differs from that found in the majority of snakes, inasmuch as no two scales form a suture on the mid line, either above or below. The following illustration shows the general arrangement of the shields, and the names by which they are known.

The eyes are rudimentary, but show with greater or less clearness through the ocular scales: it is probable that the visual sensations of the blind snakes are little more than a perception of the difference between darkness and light (the name *Typhlops* is from *τυφλος* blind, *ωψ* eye). The mouth is small, crescent-

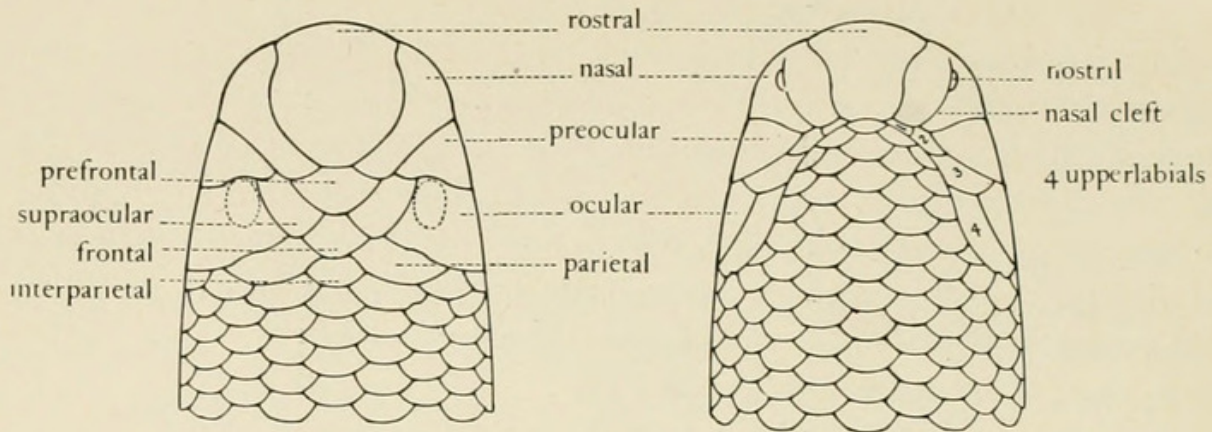


Fig. 2. Terminology of head shields.

shaped, placed wholly on the underside of the head; the teeth are few in number and are confined to the upper jaw, being placed on the maxilla, transversely to the axis of the skull, the tongue is forked and white or pink in colour.

Colour. The different species of blind snakes are generally very similar in colour, being purplish-grey above and flesh-coloured below, the two tints often sharply defined; after preservation in fluid, the colours become leaden above and yellow below. Some of the North Australian species have one or both extremities black; this, and other departures from the usual colouration, will be referred to later.

Reproduction. It is known that some species lay eggs, doubtless all do so; the eggs are of comparatively large size. The sexes cannot be determined without dissection; different examples of the same species sometimes show variation in the respective length of the tail, where such exists the longer tail is generally indicative of the male.

Anatomy. The skull is simpler than in other snakes, having fewer distinct bones, and these solidly united. The skulls of very few species of the Family have been described, and it is more than probable that if those of our blind snakes were examined, considerable differences would be detected. So far I have dissected one species only, namely, *T. australis*, but the shape and proportional size of the cranial bones differ so much from the illustration of those of *T. lumbricalis* (2) and *T. reticulatus* (3) that a tempting subject of research is indicated.

The skin of the snout is closely applied to the bone, and as considerable variation exists in the contour of the head in the different species, the skull will certainly be found to be similarly modified.

Very little original work has been done on the osteology of the Typhlopidae,

(2) Boulenger, Cat. Snakes Brit. Mus. i. 1893, p. 4.

(3) Jan. Icon. Gén., liv. 9, pl. i. fig. 9.

and mistakes made in leading textbooks have been, and will continue to be, perpetuated. Gadow (4) states that: "The pterygoids and maxillaries, connected by the ectopterygoids, are absent, owing to reduction in the Typhlopidae." Seeing that both pterygoids and maxillaries are present, this statement is inexplicable. Parker and Haswell (5) write: "The Typhlopidae differ from the rest of the Ophidia in having the maxillae immobile," and so on.

All writers agree, however, that there is no ectopterygoid in the skull of members of the Typhlopidae, and had we not the assurance of Huxley, Boulenger and other original investigators, I should probably have thought otherwise. I am unaware that any Australian species has been previously examined, and it may be that some of our forms, including *T. australis*, the species now in question, may show some divergence in regard to their cranial features. It is not, at least

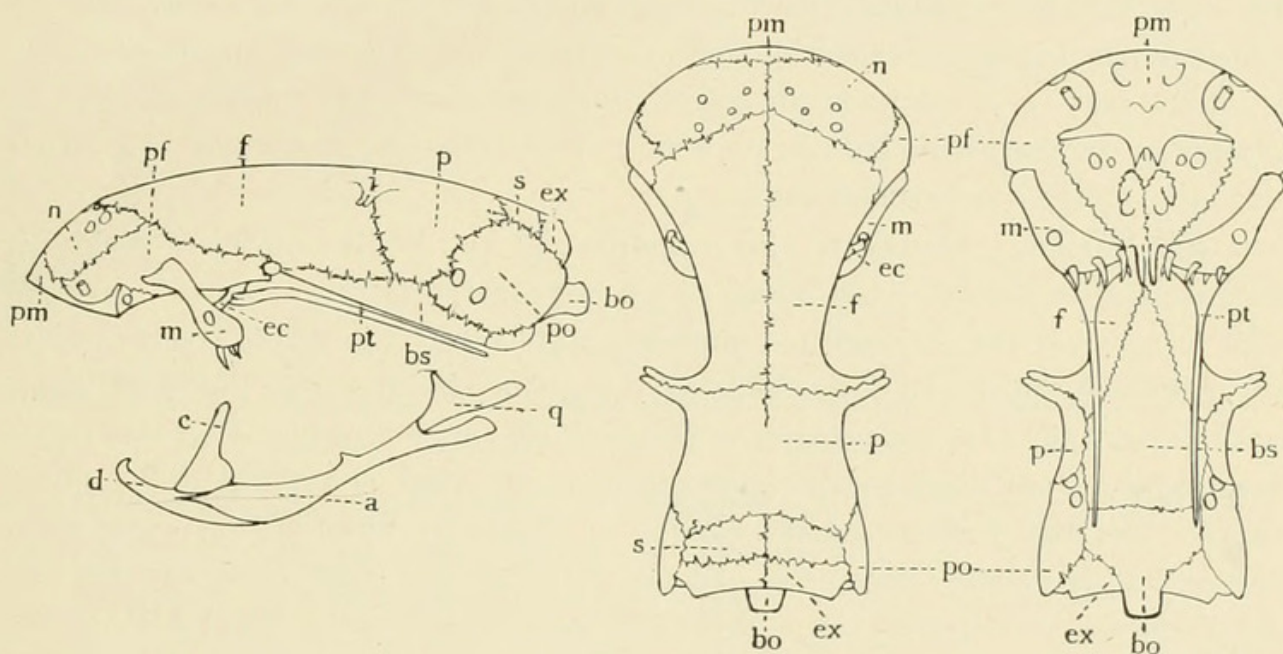


Fig. 3. Skull of *T. australis*.

- | | |
|--------------------|------------------|
| a. articular | m. maxillary |
| bo. basioccipital | n. nasal |
| bs. basisphenoid | p. parietal |
| c. coronoid | pf. prefrontal |
| d. dentary | pm. premaxillary |
| ec. ?ectopterygoid | po. prootic |
| ex. exoccipital | pt. pterygoid |
| f. frontal | q. quadrate |
| s. supraoccipital | |

at present, my purpose to deeply consider osteological characters, but I should like to draw attention to the method of articulation of the pterygoid as found in *T. australis*. This slender bone is not connected directly with the movable

(4) Gadow, Cambridge Nat. Hist. viii. 1901, p. 581.

(5) Parker and Haswell, Text-book of Zool. ii. 1910, p. 349.

maxilla, but by means of its forked proximal end it articulates with a small transverse bone which connects the free portion of the maxilla with the palatine. If this transversely placed bone, marked "ec" in the accompanying diagram, is not homologous with the ectopterygoid of less degraded forms of ophidia, is it to be regarded as a detached, though sutured, portion of the outer extremity of the palatine, or should it be referred to some other bone?

The pelvis is represented by a single small bone on each side. The arrangement of the soft parts generally conforms to the conditions found in other snakes, in which, however, there is considerable diversity, not only in the character and position of the lungs, but in their number also; some snakes have two, one of which, in the majority of forms, is more or less rudimentary, whilst others have but a single lung: the blind snakes have only one true lung; it is placed on the right side and extends from the heart to the liver. Another organ, the so-called tracheal lung, regarded by some as the vestige of a once functional lung, is without cavity, is composed of cells of different sizes, and appears to have no communication with the trachea or lung. It has been suggested that this structure may not be a pulmonary organ.

Illustrations. Owing to the roundness of the bodies of these snakes it is not possible, from a fixed point, to see quite half the diameter: it was from such view-point that my former drawings were made, the result being that, as regards their upper and lower aspects, the point of contact of the head scales with the margin does not coincide. The new drawings accompanying this paper are slightly more diagrammatic, inasmuch as the view is supposed to subtend exactly half the diameter of the snake, so that the unsatisfactory condition referred to is thereby remedied. All the drawings are larger than life, but are not to the same relative scale. With one exception, namely, that of *T. waitii*, all the admitted species are illustrated, the drawings being prepared under my personal supervision by my assistant, Mr. Herbert M. Hale, to whom I here express my thanks.

Terms used. In describing the head of a snake, or indeed parts of other animals, two distinct contours often require to be defined, namely (a) that seen from the side, and (b) that seen from above or below. The words "view" or "aspect" may be used in explanation of an illustration, but cannot well be applied in descriptions where the external contour alone is to be expressed.

In describing the outline of an object as seen from the side, we have the simple and exact word "profile," but there is, as far as I know, no single word to express the outline as seen from above or below.

It is really the lateral contour that is sought to be defined, but the use of the word "lateral" at once suggests a side view or profile; then the employment

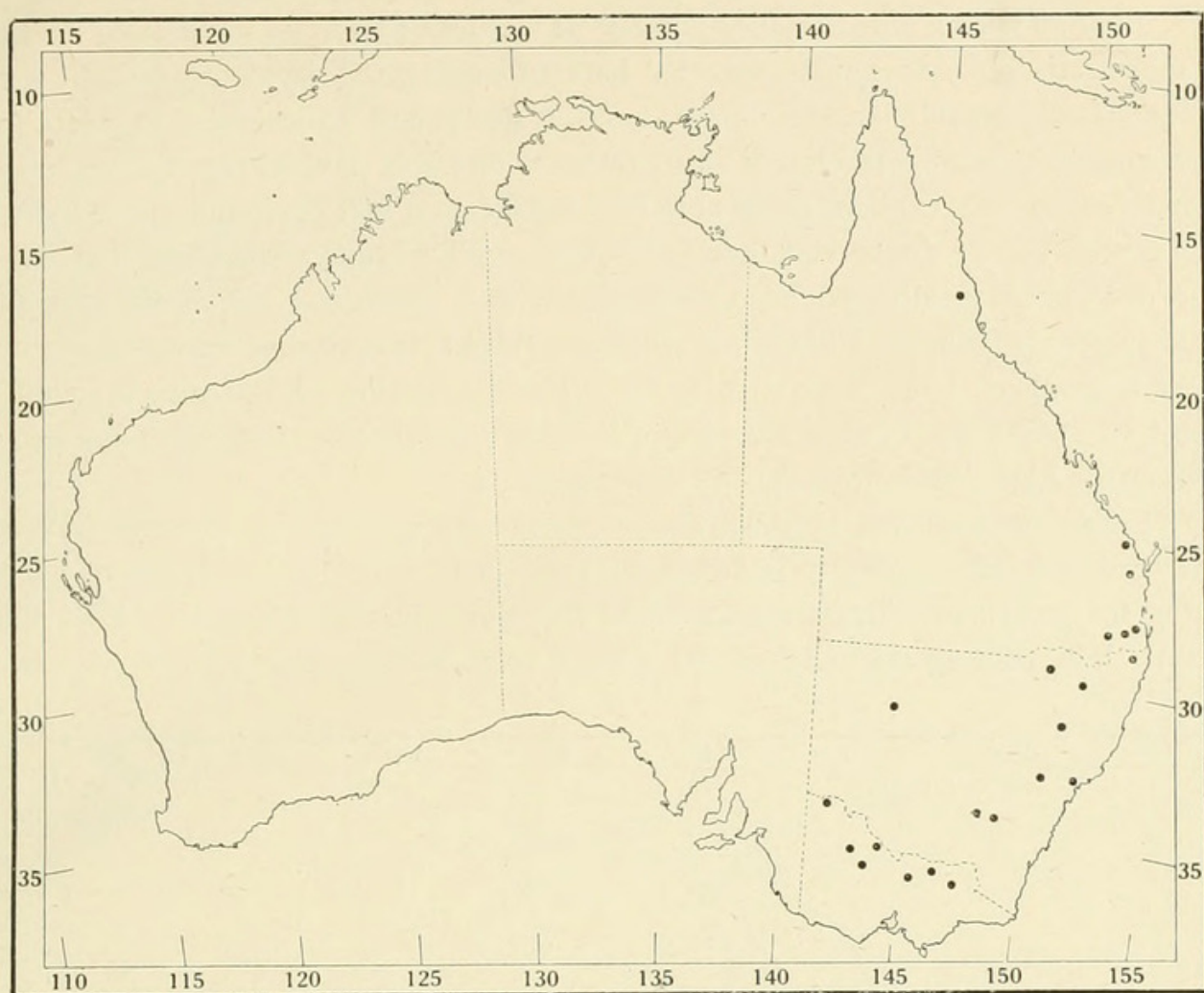


Chart 1. Distribution of ● *T. proximus*.

of the expressions "dorsal profile" or "ventral profile" certainly indicates the upper or lower contours respectively, as seen in profile.

Following custom, the use of the term "head," though admittedly inexact, is hereafter employed to express the lateral contour of the head, while the word "snout" similarly denotes the contour as seen in profile; the mouth, being under-shot, merely completes the lower profile.

Synopsis. In 1893, Boulenger (6) catalogued the Typhlopidae of the world, and it will be conceded that the preparation of a synoptical key of such numerous and generally similar forms presents great difficulties. This difficulty is enhanced when but little material or descriptions only are available, and, in practice, it is found that by the aid of such key alone, the determination of some species is very difficult and unsatisfactory, especially when some of the main divisions, or at any rate subdivisions, are based upon relative and, what prove to be inconstant, characters, to be discovered only when ample material for comparison is available.

(6) Boulenger, Cat. Snakes, Brit. Mus. i. 1893.

Dealing with a much smaller number of species, it becomes possible to devise a more satisfactory synopsis, and that here submitted, together with the illustrations, should enable anyone, after a little study and experience, to identify specimens obtained. In closely allied forms where it is thought that the key may not be sufficiently explicit, some note on identification will be found appended to the description of the species involved. A young *Typhlops* from Champion Bay, North-West Australia, has been associated with *T. olivaceus*, but as the type of that species is from the Philippines, further evidence is desirable before admitting it as a member of the Australian fauna. The description of *T. waitii* is insufficient to enable me to deal satisfactorily with this species, and not possessing specimens I am unable to supply an illustration.

Confining attention to Australian species and seeking for absolute rather than relative differences, it is found that the cleft which proceeds downwards from the nostril provides a constant and therefore reliable character. This, the nasal cleft, runs in the majority of species to either (a) the first, or (b) the

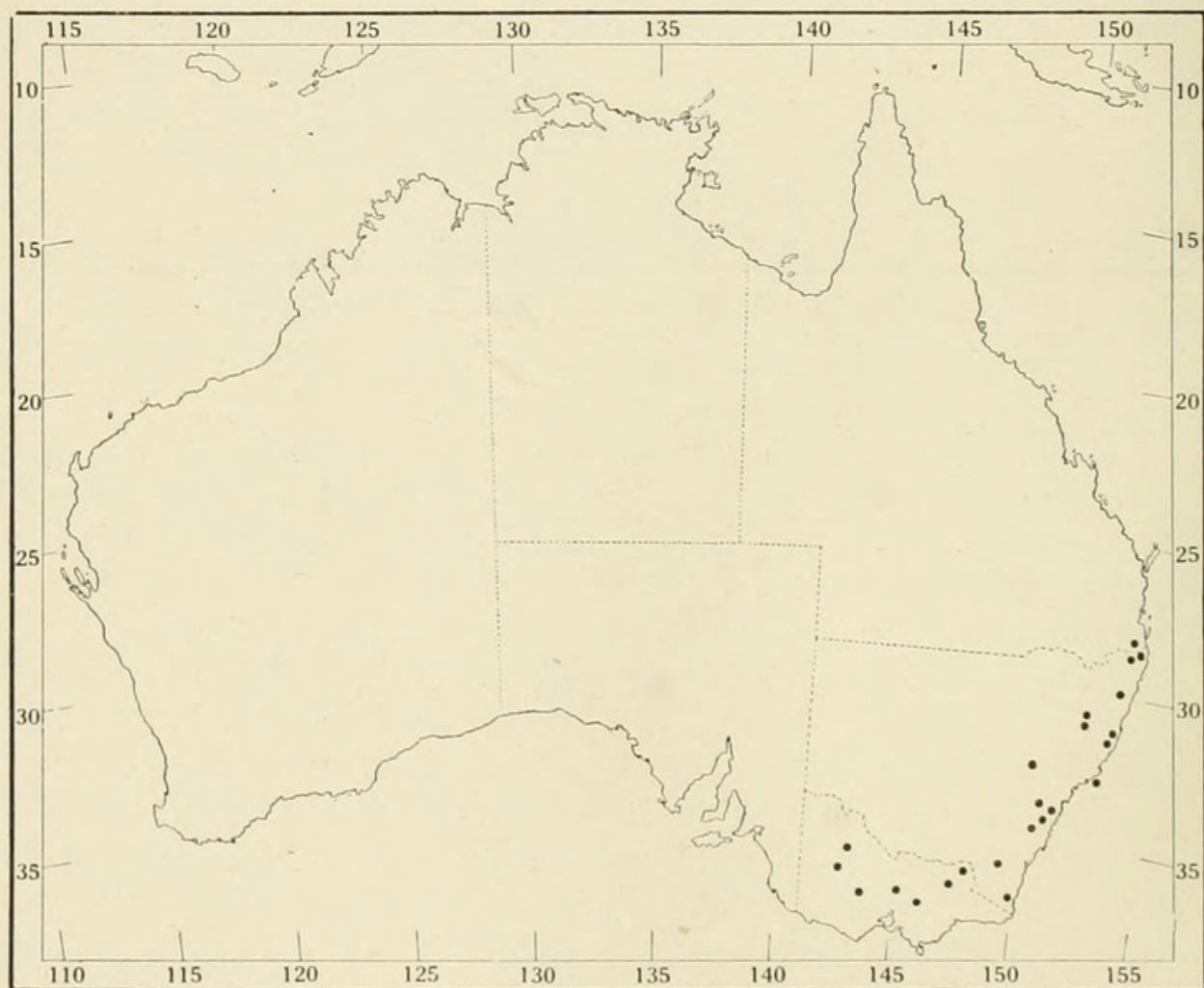


Chart 2. Distribution of ● *T. polygrammicus*.

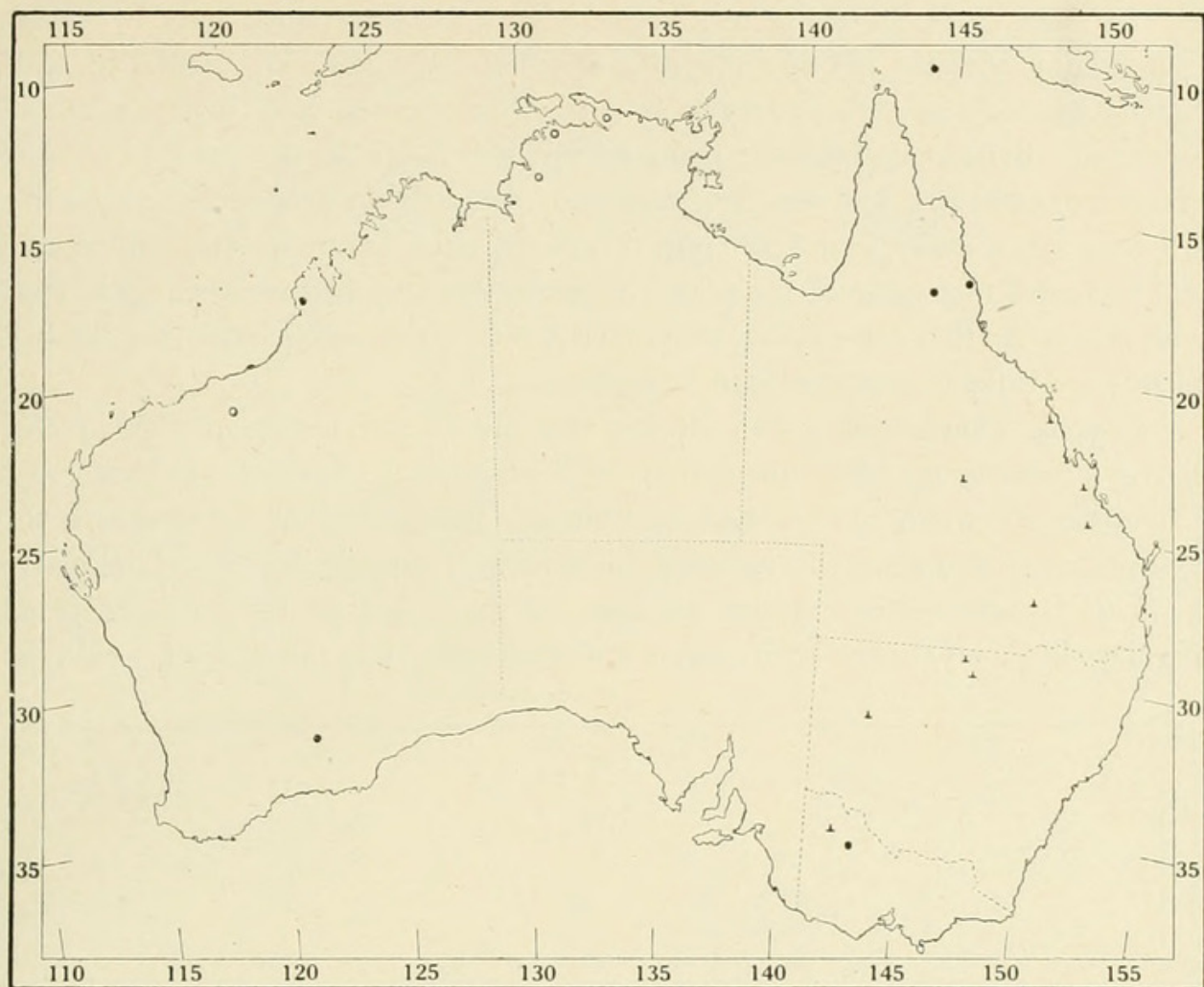


Chart 3. Distribution of ● *T. broomi*, ○ *T. guentheri*, ▲ *T. ligatus*.

second labial, and two main divisions may therefore be recognized. A third main division is formed for those species in which the cleft does not run directly to either the first or second labial, but first makes contact with (c) the preocular shield. The following illustrations show the three conditions here emphasized.

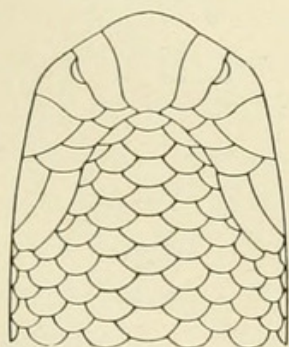


Fig. 4.

T. proximus.

Nasal cleft to first labial.

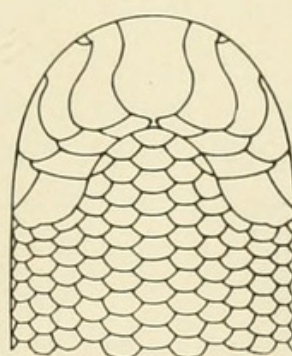


Fig. 5.

T. labialis.

Nasal cleft to second labial.

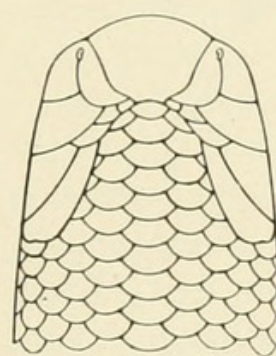


Fig. 6.

T. endoterus.

Nasal cleft to the preocular.

In most cases the characters indicated can be ascertained only by careful examination with the aid of a magnifying glass. The number of rows of scales round the body is very constant in Australian species, and forms a reliable secondary division under each main group: the range in the number of rows varies from 18 to 24, and they are, normally, always in an even series. Examples are very occasionally found wherein this is departed from; in such, however, it will be found that some of the scales in one or more rows have been split, fused with others, or that some other abnormality exists; the scales bordering the head shields are rather subject to such irregularities.

Specific characters. The lateral contour of the head, as viewed from above, is usually rounded, but it may be blunt as in *T. broomi*, sub-acute as in *T. batillus*, or markedly trilobed, a condition found only in *T. bituberculatus*. The profile is also generally rounded, but provides varying degrees of angularity, *T. kenti* furnishing the extreme instance, in which species the snout is acutely angular; in *T. grypus* the snout forms a distinct hook, like the beak of a cockatoo.

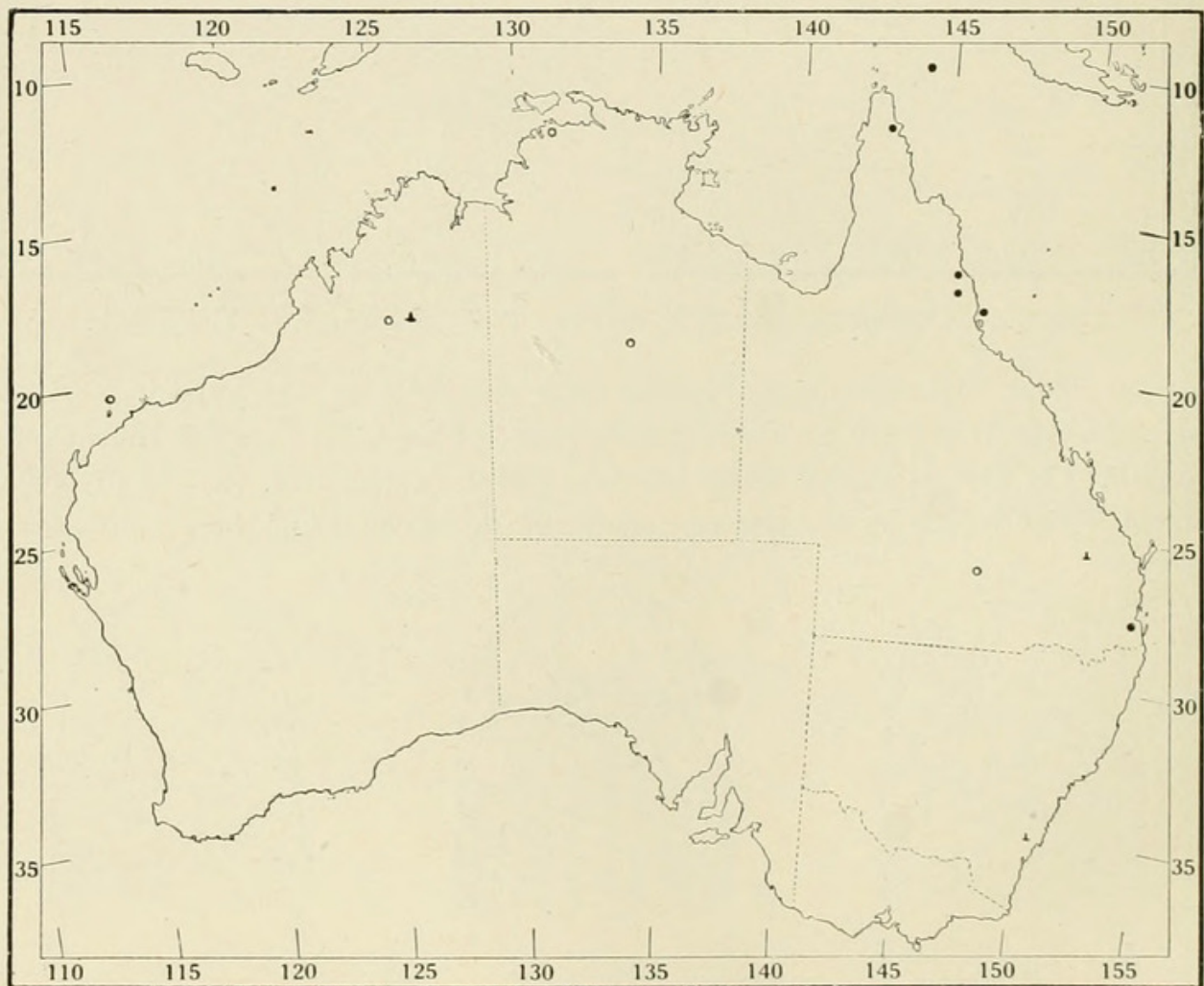


Chart 4. Distribution of ● *T. torresianus*, ○ *T. diversus*, ▲ *T. affinis*.

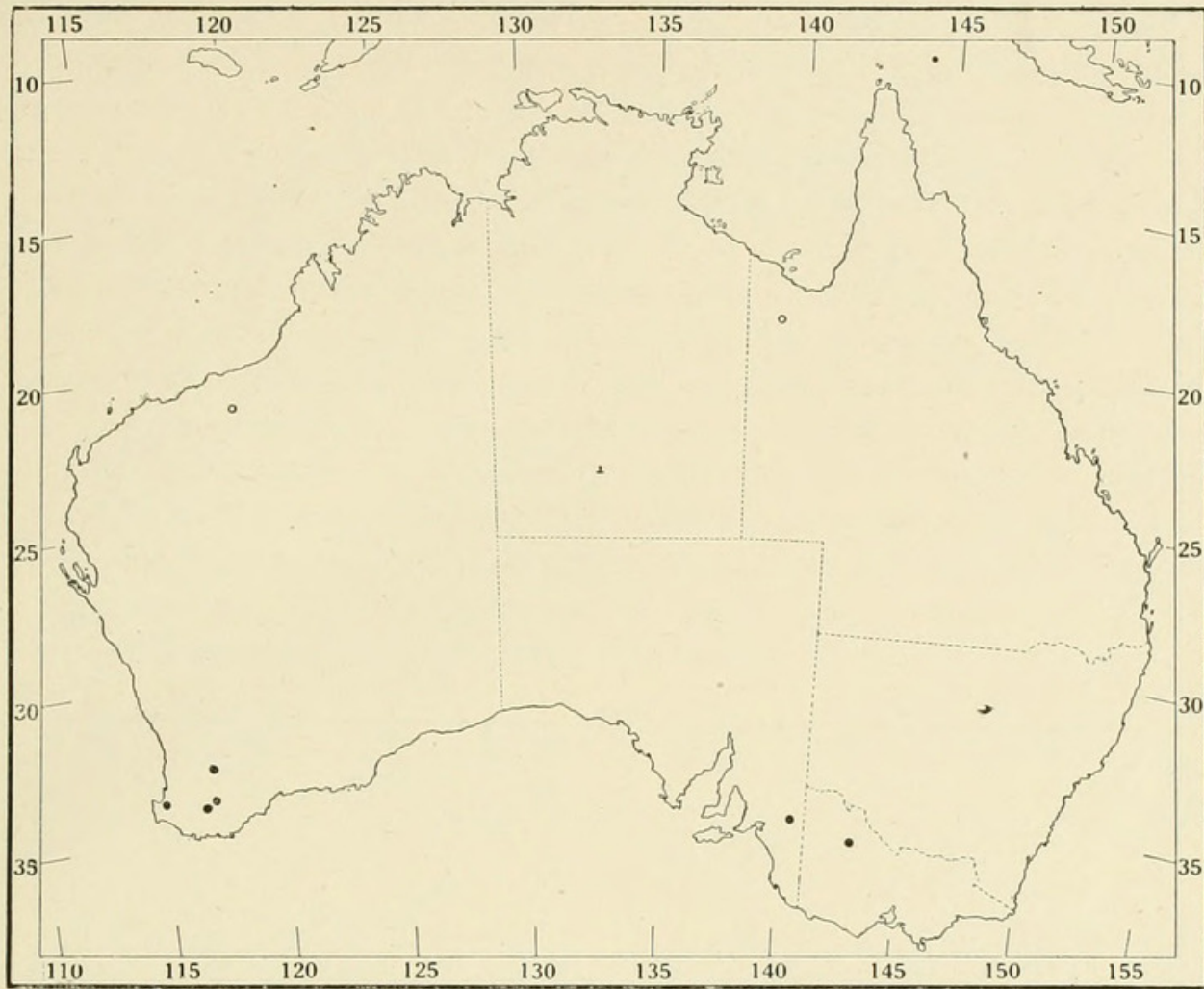


Chart 5. Distribution of ● *T. pinguis*, ○ *T. grypus*, ▲ *T. endoterus*.

The rostral shield extends from or nearly from the level of the eyes to above, to the mouth below, of which it forms the anterior border; it varies greatly in shape, as will be seen by consulting the illustrations, and as regards size may be but a narrow band, as in *T. ligatus*, or fully half the width of the head as in *T. australis*. The nasals (and following shields) do not reach the mouth; it is their extreme tumidity in *T. bituberculatus* that produces the condition already referred to in this species. The nostril, situated in the nasal, is unmistakably inferior in the species named; in most others it occupies a sublateral position; in one only, namely, *T. labialis*, is it truly lateral, appearing on both upper and lower aspects. The nostril may lie close to the rostral, as in *T. affinis*, or be removed considerably therefrom as in *T. polygrammicus*. In *T. endoterus* the cleft is arrested at the nostril; in several species, as in *T. broomi*, it divides the nasal; whilst in *T. torresianus*, instancing an extreme case, it is projected far on to the upper surface of the head. The preocular is present in all Australian species, and in contact with the second and third labials; in all excepting *T. labialis* it is narrower than

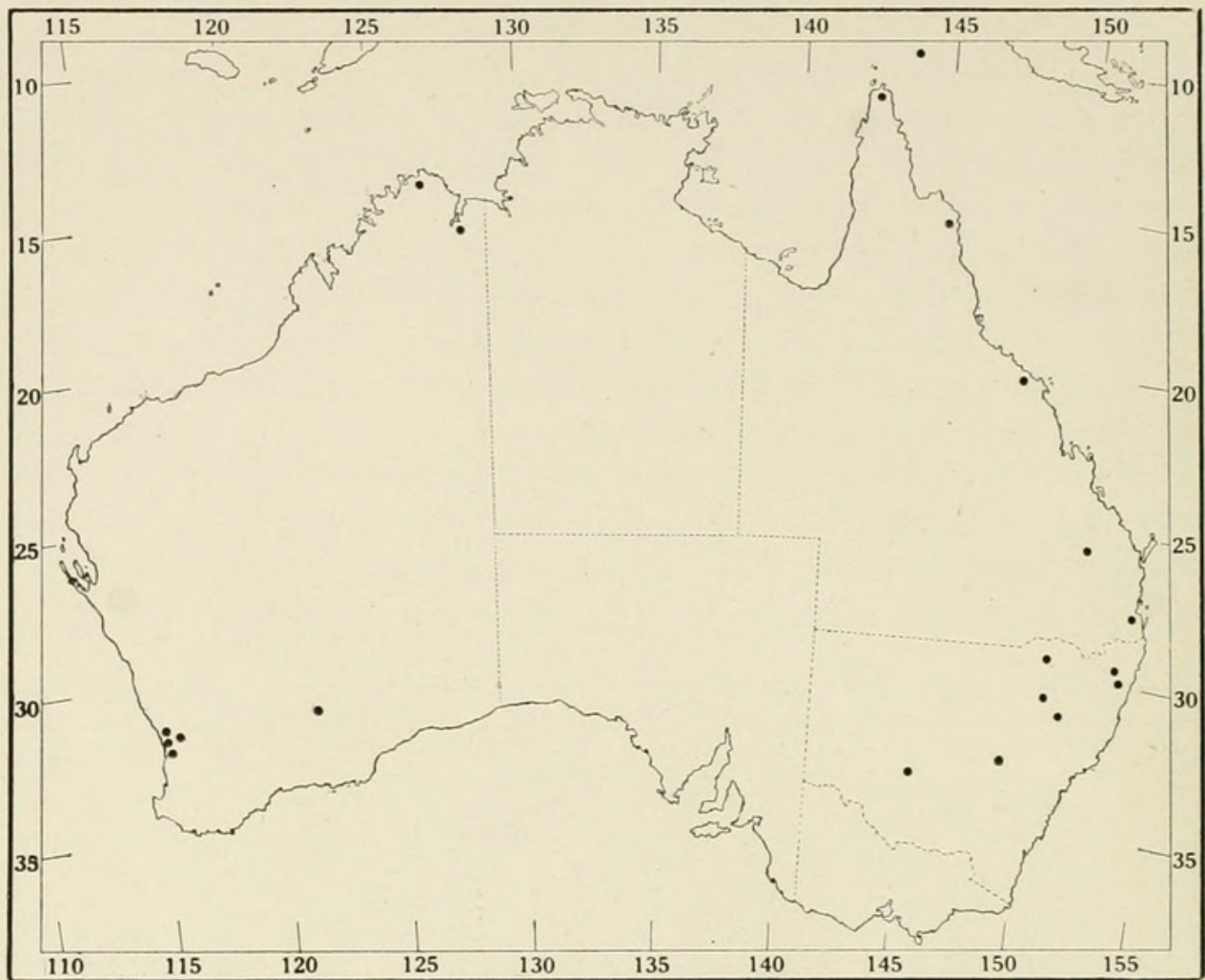


Chart 6. Distribution of • *T. wiedii*.

the ocular; the last-named similarly makes contact with the third and fourth labials. Four upper labials are present in all Australian species; they are usually longer than broad, *T. labialis* providing a noticeable exception. There are no distinct lower labials, the margin of the jaw being formed by the anterior body scales.

Size. Young examples are usually of greater relative thickness than the adults, and the latter often exhibit considerable variation in this respect. Some species apparently remain small, others attain to considerable length, thus *T. polygrammicus* grows to 717 mm. *T. grypus* is an extremely slender form, its length may be 122 times its diameter. *T. pinguis* is, on the other hand, very stout, the length of the type being but 22 times its diameter.

Distribution. Our knowledge of the geographical distribution of the blind snakes is adversely affected by several conditions: owing to their usually small size, subterranean habits, their superficial resemblance to worms, and the slight interest they evoke, comparatively few specimens are taken; nearly all

known examples are from settled areas; fewer specimens are naturally unearthed in remote districts, and, owing to lack of proper facilities, fewer still are preserved.

It is unfortunate also that precise localities are not always available; in earlier days "New Holland" was considered to be sufficiently exact, providing, as it did, a habitat distinct from India, China or Africa. Collectors operating over wide areas are apt to lose labels, camel transit being notoriously bad, and the name of the State, say, "Western Australia," whose borders extend a distance equal to that separating London and Morocco, may be the only indication of the locality of a specimen. Then, again, the seaport of a State may stand for an inland locality, as in Peters' record of "Melburn," for *T. bicolor* (*T. australis*). Though, as elsewhere mentioned, the examples preserved in all the Australian Museums have been critically examined for the purposes of this paper, quite a large proportion of the specimens are imperfectly localized, and cannot, therefore, be used in assigning the exact range of the species.

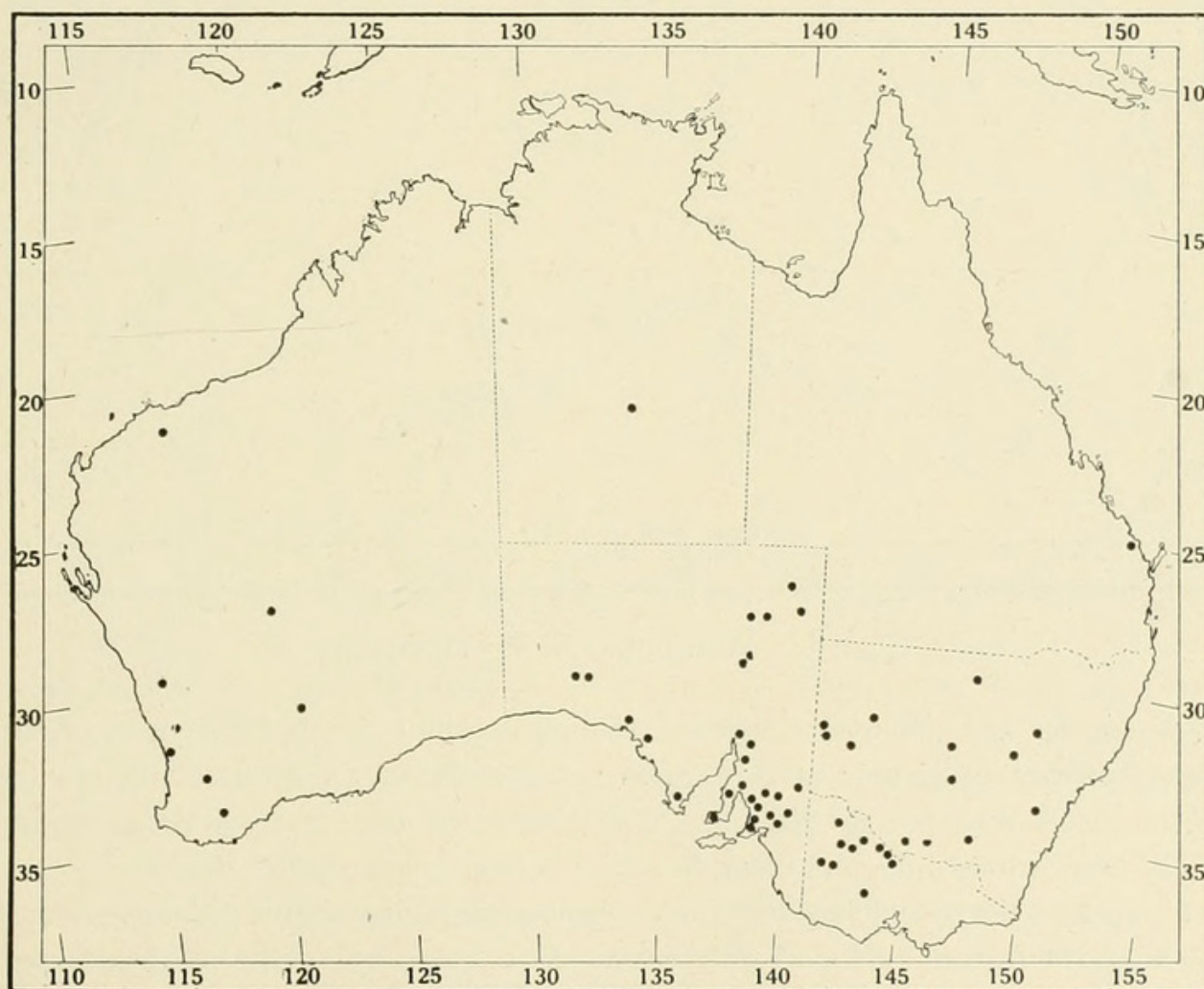


Chart 7. Distribution of ● *T. bituberculatus*.

The accompanying charts represent our present knowledge of the range of the several species included. The position marks, taken individually, do not represent areas of occurrence, but express definite localities, though in Metropolitan districts a single mark may stand for and cover several adjacent productive localities, as, for example, those marking the occurrences of *T. australis* in the neighbourhood of Adelaide. Such "locality" as North-Western Australia,

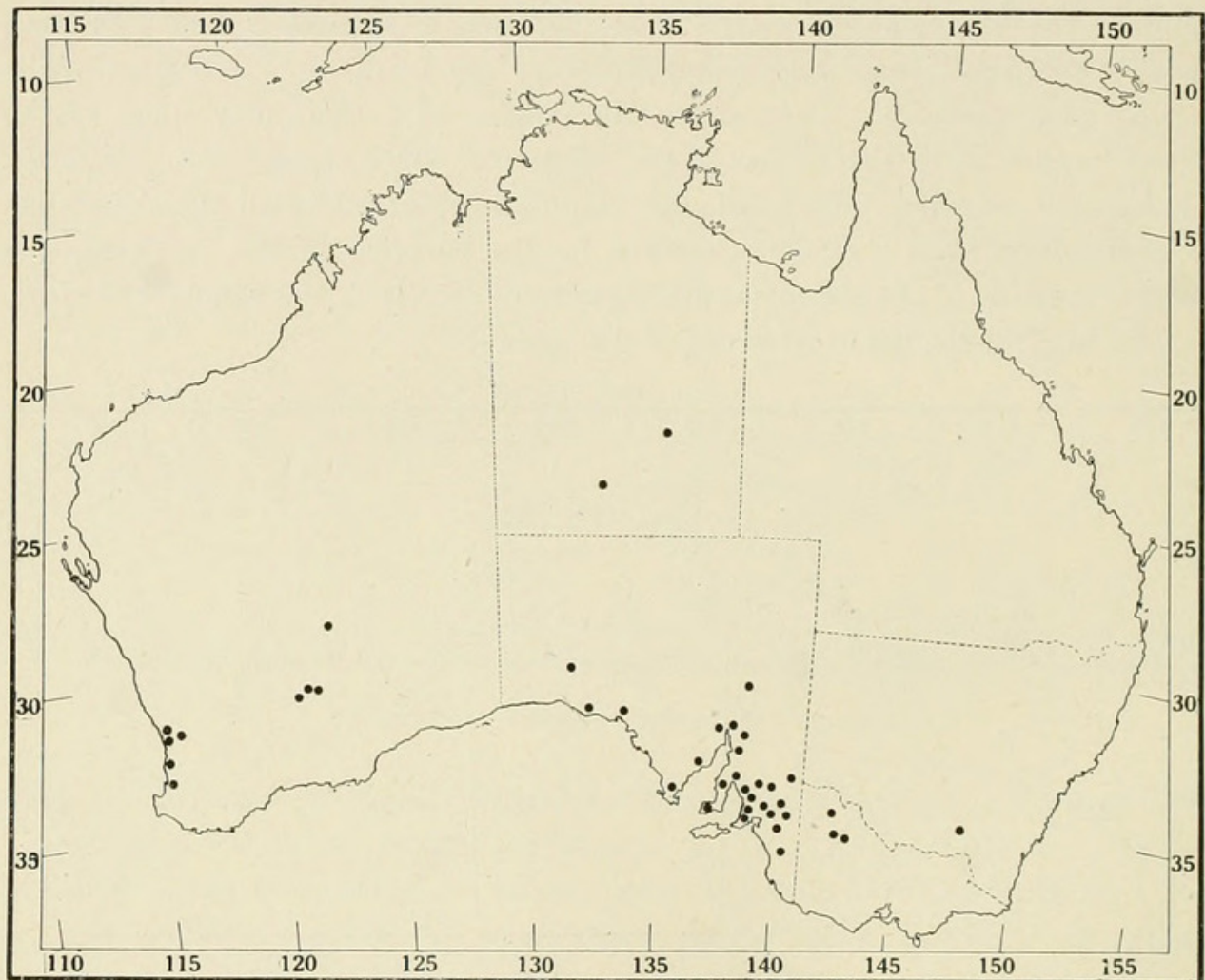


Chart 8. Distribution of ● *T. australis*.

representing, say, a single occurrence, though readily expressed in words, cannot be conveniently charted; in such cases position marks are omitted, though the reference is recorded in the text. The habitat of two species, *T. waitii* and *T. labialis*, is indefinite, and these do not therefore appear on the charts.

Though the available data is very incomplete, some useful conclusions may be made therefrom. *T. polygrammicus* and *T. proximus* occur in Queensland, New South Wales, and Victoria. *T. bituberculatus* and *T. australis* are found throughout the southern half of the Continent; *T. pinguis* is also a southern.

though less extensively distributed, species. *T. wiedii* occurs in Western Australia and the Eastern States. *T. diversus*, *T. grypus*, *T. guentheri*, *T. kenti*, and *T. waitii* are generally northern forms. *T. torresianus* is from the coast of Queensland, *T. endoterus* from the middle of the Continent, *T. batillus* from New South Wales, and its ally, *T. labialis*, from Western Australia, without precise locality. The range of *T. broomi* is peculiar, examples being known only

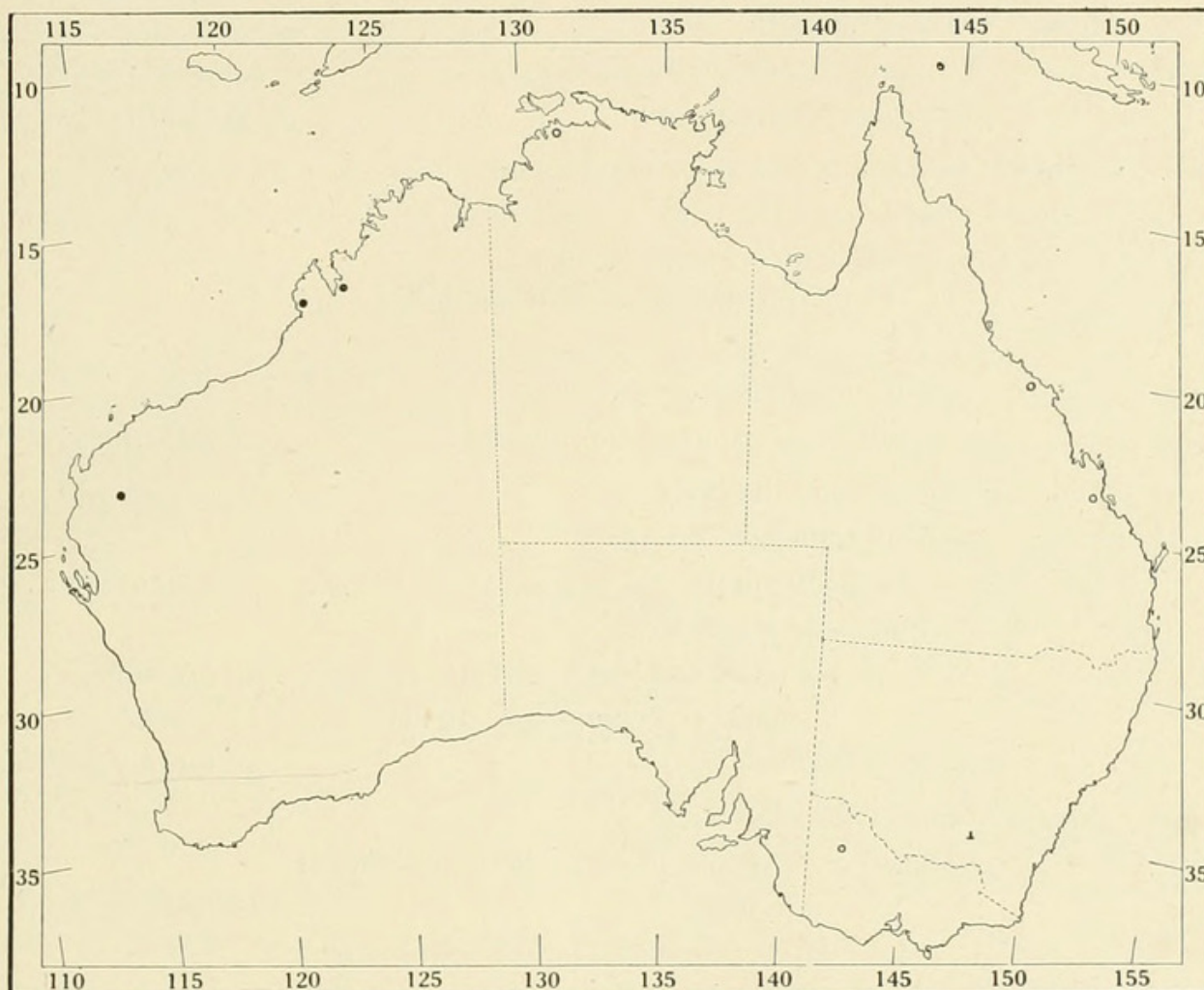


Chart 9. Distribution of ● *T. kenti*, ○ *T. unguirostris*, ▲ *T. batillus*.

from four widely separated localities, the exact positions being shown on Chart No. 3.

It was hoped that a study of the range of the blind snakes would reveal some conformity to the zoological areas as mapped out by various writers, but the result is not convincing.

In point of numbers *T. bituberculatus* is the commonest Australian species; it is followed by *T. polygrammicus*, *T. australis*, *T. proximus*, and *T. wiedii*, all of which appear to be plentiful in the respective areas in which they occur.

KEY TO THE AUSTRALIAN SPECIES (7).

- a. Nasal cleft in contact with the first labial
 - b. 18 scales round the body ... 1 *grypus*
 - bb. 20 scales round the body ... 2 *proximus*
 - bbb. 22 scales round the body ... 3 *polygrammicus*
 - bbbb. 24 scales round the body
 - c. rostral nearly as broad as long ... 4 *unguirostris*
 - cc. rostral a narrow band ... 5 *ligatus*
- aa. Nasal cleft in contact with the second labial
 - d. 18 scales round the body
 - e. snout angular, nasal divided
 - f. rostral produced in front, snout very acute ... 6 *kenti*
 - ff. rostral not produced ... 7 *affinis*
 - ee. snout rounded, nasal not divided ... 8 *guentheri*
 - dd. 20 scales round the body
 - g. head rounded
 - h. body stout ... 9 *punguis*
 - hh. body slender
 - i. nasal completely divided ... 10 *broomi*
 - ii. nasal not completely divided ... 11 *wiedii*
 - gg. head trilobed ... 12 *bituberculatus*
 - ddd. 22 scales round the body
 - j. nasal cleft produced on to the upper part of the head ... 13 *torresianus*
 - jj. nasal cleft not produced on to the upper part of the head
 - k. ... 14 *australis*
 - kk. (see note under the species) ... 15 *waitii*
 - dddd. 24 scales round the body
 - l. preocular narrower than the ocular ... 16 *batillus*
 - ll. preocular wider than the ocular ... 17 *labialis*
- aaa. Nasal cleft in contact with the preocular
 - m. 20 scales round the body ... 18 *diversus*
 - mm. 22 scales round the body ... 19 *endoterus*

(7) Boulenger has identified with *T. olivaceus* Gray, from the Philippines, a young specimen taken at Champion Bay, N.W. Australia.

Family TYPHLOPIDAE.

Cranial bones solidly united; (no ectopterygoid=transpalatine, see p. 6); pterygoid not extending to the quadrate or the mandible; no supratemporal (squamosal); prefrontal forming a suture with the nasal; maxillary loosely attached, movable; with a few teeth disposed transversely to the axis of the skull; no teeth on the palate or mandible; coronoid bone present; vestiges of pelvis, reduced to a single bone on each side. Body covered with uniform cycloid scales; eyes beneath the translucent ocular shields. Tail short, ending in a thorn; Oviparous.

(The family includes the genera *Helminthophis*, *Typhlops* and *Typhlops*. The last-named only occurs in Australia.)

TYPHLOPS Schneider.

Typhlops (in part.) Schneid. Hist. Amphib. ii, 1801, p. 339.

Typhlops Oppel, Ordnung. Rept. 1811, p. 54 (*lumbricalis*). (For synonymy see Boulenger, Cat. Snakes Brit. Mus. i, 1893, p. 7, and Stejneger, Bull. U.S. Nat. Mus. 58, 1907, p. 260).

Range. South-Eastern Europe, South Asia, South Africa, Inter-tropical America, Australia and Polynesia; not found in Tasmania or New Zealand.

TYPHLOPS GRYPUS sp. nov.

Chart No. 5 and fig. 7.

Nasal cleft to first labial; scales in 18 rows.

Head sub-acute, much produced; snout very prominent, strongly hooked, the extreme tip recurved, forming a distinct beak; nostrils inferior, the cleft close to the rostral which it touches in front of the nostril, dividing the nasal;

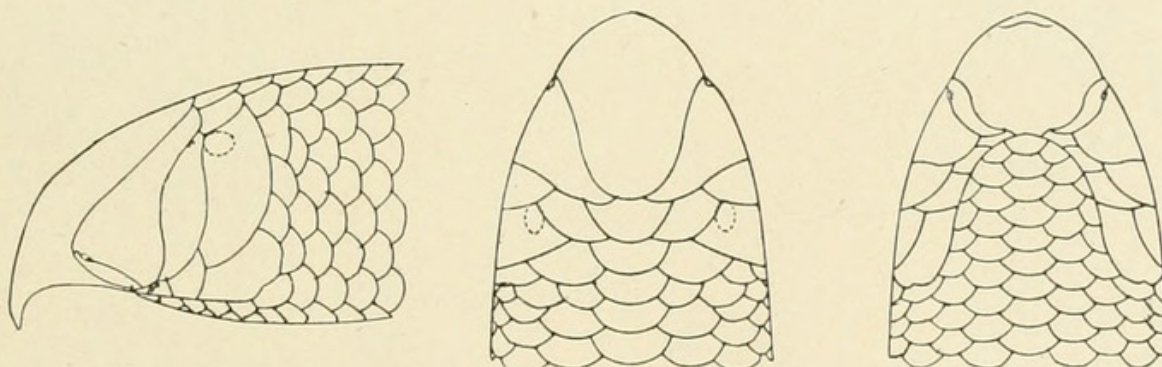


Fig. 7. Head of *T. grypus*.

rostral slightly more than half the width of the head, widest in its front half, reaching to the level of the eyes, the lower part much broader than long; preocular

very narrow, only half of the width of the nasal; diameter of body 63 to 122 times in its length.

Colours. Ivory, tinged with brown above, beak yellow, head, foreneck and tail brown, the last black in some specimens.

Length. 335 mm., longest seen 405 mm.

Type. In the National Museum, Melbourne, No. R. 7102. Specimens also in the Queensland and South Australian Museums.

Range. Of the four examples known, one is from Marble Bar, North-Western Australia, and a second from Gregory Downs, Queensland; the localities of the other two are unknown.

Remarks. This extraordinary snake exhibits some characters of *T. kenti*, but differs from that species in having the nasal cleft in contact with the first labial, and its consequent contiguity to the rostral, by the strongly hooked beak, and in having the rostral below broader than long.

TYPHLOPS PROXIMUS Waite.

Typhlops proximus Waite, Rec. Aust. Mus. ii, 1893, p. 60, pl. xv, figs. 3 and 4; and Australian Snakes, 1898, pl. i. Bouleng. Cat. Snakes Brit. Mus. iii, 1896, p. 588. Lönnb. and Anders. Vet. Akad. Handl. lii, 1915, p. 7.

Typhlops nigrescens McCoy, Prod. Zool. Vict. dec. xi, 1885, pl. 103 (not Gray).

Chart No. 1 and fig. 8.

Nasal cleft to first labial; scales in 20 rows.

Head somewhat produced, tumid at the nasals; snout prominent, obtusely angular; nostrils inferior, the cleft a little nearer to the rostral than to the

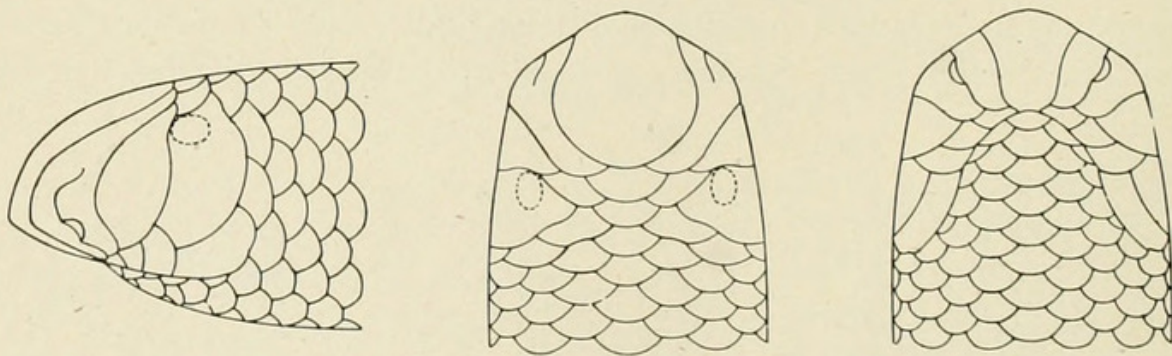


Fig. 8. Head of *T. proximus*.

preocular, extending well on to the upper surface; rostral markedly swollen, more than half the width of the head, reaching to, or nearly to, the level of the eyes, the lower part as broad as long. Diameter of body 25 to 40 times in its length.

Colours. Occasional examples show indication of a dark mark on each side of the vent, as in *T. polygrammicus*.

Length. 700 mm.

Type. In the Australian Museum, Sydney, No. 6411.

Range. Queensland, southward from Lat. 17 deg. 5 min. S. Common in New South Wales and Northern Victoria.

Remarks. Under the name "*T. nigrescens*" McCoy writes of this species: "These specimens were dug out of an ant-hill in which they dwelt in the midst of the abundant insect food suited to them." Lönnberg and Andersson remark of a specimen taken at Malanda, near Cairns, that it "lives below rotten stumps in the jungle."

TYPHLOPS POLYGRAMMICUS Schlegel.

Typhlops polygrammicus Schleg. Abbild. Amphib. 1844, p. 40, pl. xxxii, figs. 35-38. Dum. et Bib. Erpét. Gén. vi. 1844, p. 302. Jan. Icon. Gén. 1864, p. 13, liv. 3, pls. iv and v, fig. 9. Peters, Mon. Akad. Berl. 1865, p. 262. Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 34, and iii, 1896, p. 586. Waite, Proc. Linn. Soc., N.S. Wales (2), ix, 1894, p. 13.

Anilius nigrescens Gray, Cat. Lizards Brit. Mus., 1845, p. 135.

Argyrophis polygrammicus Gray, *loc. cit.* p. 138.

Typhlops nigrescens Jan, *op. cit.* p. 13, liv. 9, pl. i, fig. 1. Waite, Rec. Aust. Mus. ii, 1893, pl. xv, figs. 1, 2, 5.

Typhlops ruppelli Jan, *op. cit.* p. 14, liv. 14, pl. i, fig. 2. Waite, Rec. Aust. Mus. *loc. cit.* p. 59, pl. xv, fig. 6 (tail).

Typhlops temminckii Jan, *op. cit.* p. 14, liv. 3, pl. iii and iv, fig. 6. Bouleng. *op. cit.* i, 1893, p. 29.

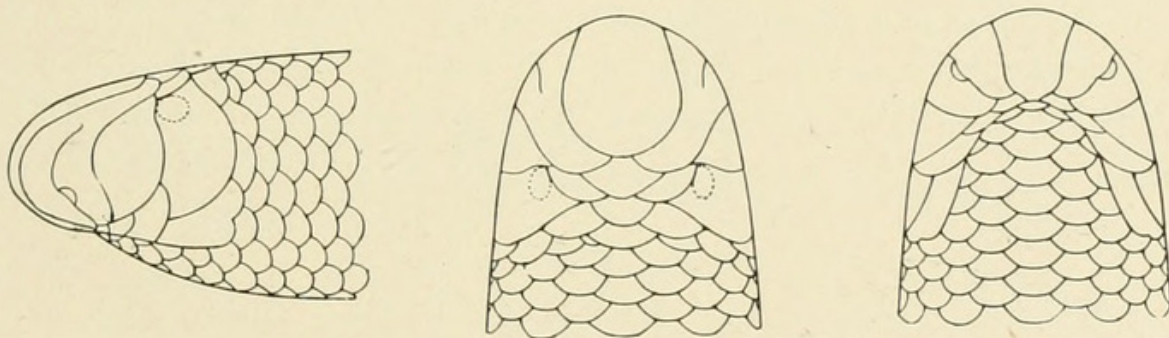


Fig. 9. Head of *T. polygrammicus*.

Typhlops reginae Bouleng. Ann. Mag. Nat. Hist. (6), iv, 1889, p. 362, and Cat. Snakes, Brit. Mus. i, 1893, p. 35, pl. iii, fig. 1.

Chart No. 2 and fig. 9.

Nasal cleft to first labial; scales in 22 rows.

Head rounded; snout rounded; nostrils inferior, the cleft median, extending on to the upper surface; rostral nearly half the width of the head, reaching nearly to the level of the eyes, or not so far, the lower part a little longer than broad; diameter of body 36 to 59 times in its length.

Colours. A brown or black blotch is frequently present on each side of the tail, above and behind the vent.

Length. 717 mm.

Type. In the Leyden Museum, from Timor.

Range. Queensland, common in New South Wales and Victoria.

Remarks. The type of *T. polygrammicus* was taken in Timor. I am not fully satisfied that Australian examples are of the same species, if otherwise the name *T. nigrescens* should be used. Our specimens from Queensland are, with one exception, unlocalized, and their geographical position cannot therefore be charted. The characters assigned to *T. reginae* come well within the variations to which our examples are subject.

TYPHLOPS UNGUIROSTRIS Peters.

Typhlops (Onychocephalus) unguirostris Peters, Mon. Akad. Berl. 1867, p. 708, fig. 3.

Typhlops curvirostris Peters, *op. cit.* 1879, p. 776, fig. 5. Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 48.

Typhlops unguirostris Bouleng. (in part), *op. cit.* p. 49 and (*emend.*), iii, 1896, p. 589, also Proc. Linn. Soc. N.S. Wales (2), ix, 1894, p. 718. Waite, Proc. Linn. Soc. N.S. Wales (2), ix, 1894, p. 11.

Chart No. 9 and fig. 10.

Nasal cleft to first labial; scales in 24 rows.

Head long, narrowed in front; snout very acute, the lower edge sub-horizontal; nostrils inferior, the cleft nearer to the rostral than to the preocular, pro-

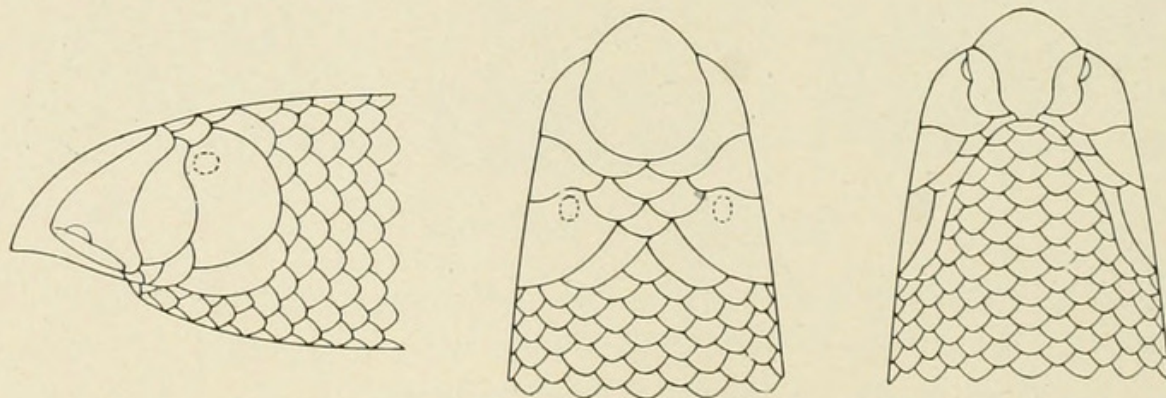


Fig. 13. Head of *T. unguirostris*.

duced slightly beyond the nostril, but not dividing the nasal; rostral half the width of the head, projecting and narrowed in front, not reaching to the level of the eyes, the lower part a little longer than broad, contracted between the nostrils; diameter of body 42 to 61 times in its length.

Length. 610 mm.

Type. In the Berlin Museum, from Rockhampton, Queensland.

Range. Specimens examined from the type locality and Darwin, Northern Territory; examples labelled Mallee, Victoria, and Lyndoch Valley, South Australia, are indistinguishable from the northern forms.

Remarks. It is to be noted that the description in the British Museum Catalogue (i, p. 49), under the name *T. unguirostris*, is a composite one and is emended in a succeeding volume (iii, p. 589).

TYPHLOPS LIGATUS Peters.

Typhlops ligatus Peters, Mon. Akad. Berl. 1879, p. 775, fig. 3. Waite, Rec. Aust. Mus. ii, 1893, p. 57. Bouleng. Cat. Snakes Brit. Mus. i, 1893, p. 34.

Typhlops curtus Ogilby, Rec. Aust. Mus. ii, 1892, p. 23.

Chart No. 3 and fig. 11.

Nasal cleft to first labial; scales in 24 rows.

Head rounded; snout evenly and bluntly rounded; nostrils inferior, the cleft median, produced beyond the nostril far on to the upper surface of the snout, nearly dividing the nasal; rostral very narrow, forming a band at least twice as

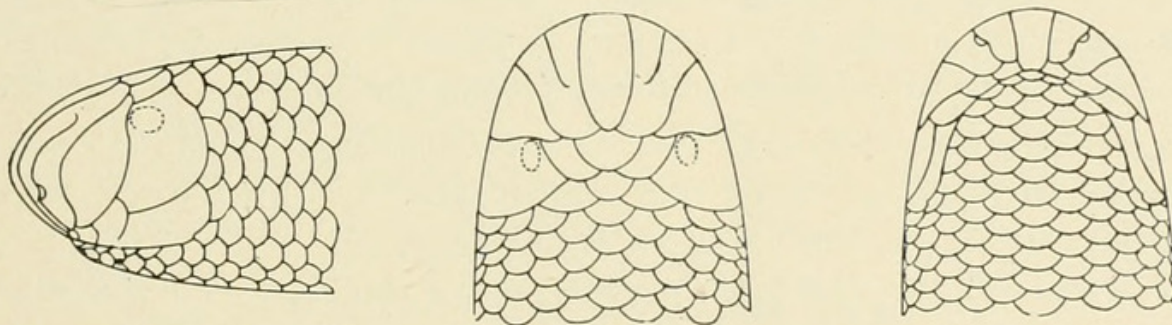


Fig. 11. Head of *T. ligatus*.

long as broad, a fourth, more or less, the width of the head, reaching to the level of the eyes, the lower part also longer than broad; diameter of body 23 to 37 times in its length.

Length. 485 mm.

Type. In the Berlin Museum, from Mackay, Queensland.

Range. Queensland, New South Wales, Victoria.

Remarks. The rostral is narrower than in any other Australian species.

TYPHLOPS KENTI Boulenger.

Typhlops kenti Bouleng., Ann. Mag. Nat. Hist. (8), xiv, 1914, p. 482.

Chart No. 9 and fig. 12.

Nasal cleft to second labial; scales in 18 rows.

Head greatly produced, sub-acute; snout acute, with lower edge horizontal; nostrils inferior, the cleft nearer to the preocular than to the rostral which it touches in front of the nostril, dividing the nasal; rostral a little more than half

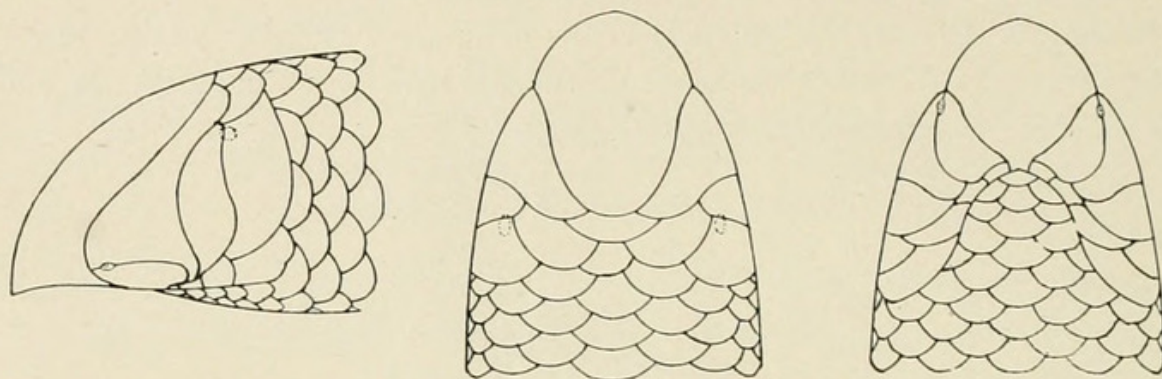


Fig. 12. Head of *T. kenti*.

the width of the head, widest in its front half, extending to the level of the eyes, the lower part as broad as long, preocular narrower than the nasal or the ocular; diameter of body 55 to 102 times in its length.

Colours. Pale brown above, yellow beneath; in three specimens the tail is black, in one other the head is also black.

Length. 275 mm.

Type. In the British Museum, from Northern Queensland.

Range. Four specimens examined, one each from King's Sound and Broome, Kimberley Division, and Yanyeredy Station, near Ashburton River, North-western Australia; one from "Western Australia."

Remarks. A note on the differences between *T. kenti* and *T. grypus* will be found under the entry of the latter species.

TYPHLOPS AFFINIS Boulenger.

Typhlops affinis Bouleng., Ann. Mag. Nat. Hist. (6) iv, 1889, p. 363, Cat. Snakes Brit. Mus. i, 1893, p. 49, pl. iii, fig. 3, and Proc. Linn. Soc. N.S. Wales, (2) ix, 1894, p. 719. Waite, Proc. Linn. Soc. N.S. Wales, (2) ix, 1894, p. 11.

Chart No. 4 and fig. 13.

Nasal cleft to second labial; scales in 18 rows.

Head blunt; snout obtusely angular, lower edge sub-horizontal; nostrils inferior, the cleft a little nearer to the rostral than to the preocular, produced to the rostral, dividing the nasal; rostral slightly more than half the width of the head, contracted behind, reaching to the level of the eyes, the lower part much broader than long; diameter of body 48 to 57 times in its length.

Length. 206 mm.

Type. In the British Museum, from Queensland.

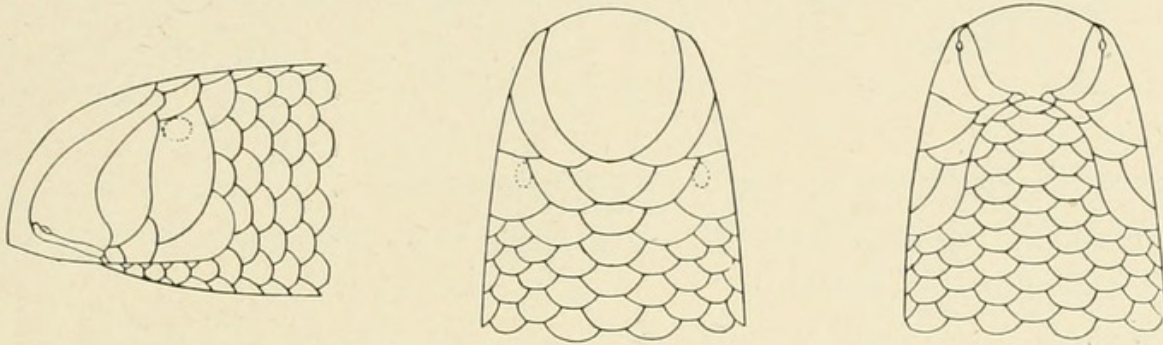


Fig. 13. Head of *T. affinis*.

Range. The three examples examined are labelled respectively: "North Queensland," "Eidsvold, nr. Gayndah, Queensland," and "Campbelltown, New South Wales." Lönnberg and Andersson identified a specimen from Mallallah, interior of Kimberley, North-west Australia, found in the interior of a termites' hill.

Remarks. The original description of this species is unsatisfactory, being mainly comparative: the diagnosis of *T. unguirostris*, with which species it was compared, was afterwards found to include two species. *T. affinis* is intermedius between *T. guentheri* and *T. kenti*, differing from the former in its completely divided nasal, angular snout and heart-shaped rostral, and from the latter in its blunt head, with less produced rostral and less acute snout. All three species are of slender habit with small heads.

TYPHLOPS GUENTHERI Peters.

Typhlops (Onychocephalus) guentheri Peters, Mon. Akad. Berl. 1865, p. 259, fig. 1. Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 20.

Typhlops nigricauda Bouleng. Proc. Zool. Soc. 1895, p. 867, pl. xlix, fig. 1, and Cat. Snakes, Brit. Mus. iii, 1896, p. 586.

Chart No. 3 and fig. 14.

Nasal cleft to second labial; scales in 18 rows.

Head blunt; snout rounded; nostrils inferior, the cleft median, terminating at the nostril; rostral half, or rather more than half the width of the head,

reaching to the level of the eyes, sides sub-parallel, the lower part broader than long; diameter of body 46 to 80 times in its length.

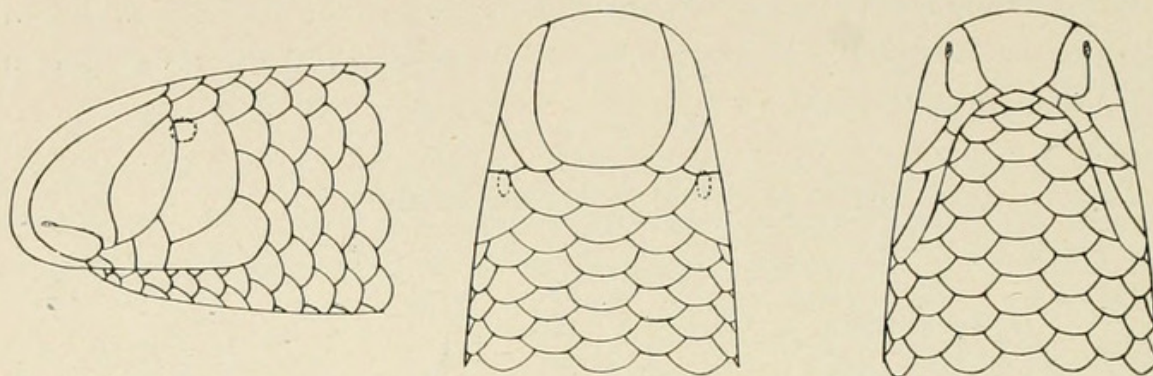


Fig. 14. Head of *T. guentheri*.

Colours. Head and tail, brown or black, the colour, especially that on the head, absent in some specimens.

Length. 315 mm.

Type. In the British Museum, from North Australia.

Range. Known from Daly River (British Museum), Port Darwin, East Alligator River, all in the Northern Territory; and Marble Bar, North-western Australia.

Remarks. From the other two species of this division with 18 rows of scales, namely *T. affinis* and *T. kenti*, this species may be recognized by the rounded snout, the incompletely divided nasal and the quadrangular-shaped rostral.

TYPHLOPS PINGUIS Waite.

Typhlops pinguis Waite, Trans. Roy. Soc. S. Aust. xxi, 1897, p. 25, pl. iii.

Chart No. 5 and fig. 15.

Nasal cleft to second labial; scales in 20 rows.

Head rounded, the nasals slightly tumid; snout obtusely angular; nostrils inferior, median, the cleft produced, but not on to the upper surface of the head;

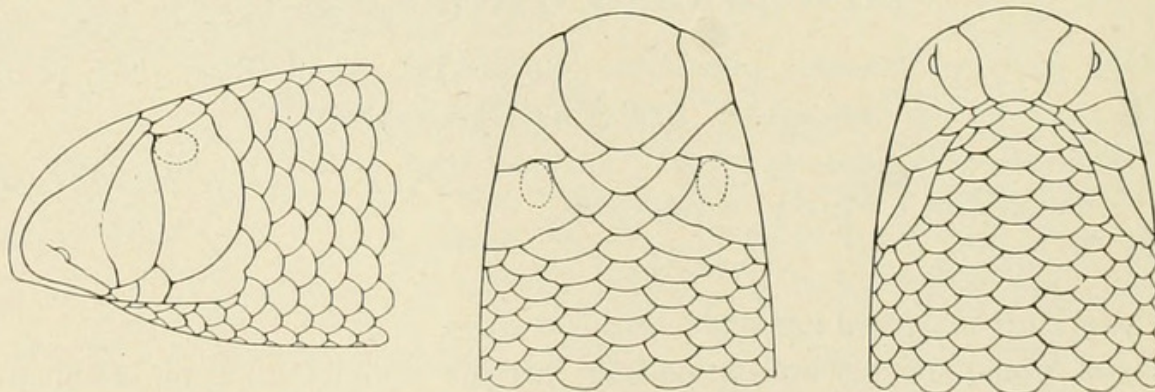


Fig. 15. Head of *T. pinguis*.

rostral about half the width of the head, widest medially, extending nearly to the level of the eyes, the lower part broader than long; diameter of body 22 to 32 times in its length.

Length. 485 mm.

Type. In the South Australian Museum, from South Australia.

Range. The headquarters of the species appears to be the extreme southwestern corner of the Continent, whence I have examined many specimens. One example (the type) is from South Australia and one from the Mallee district of Victoria.

Remarks. The very stout habit is almost characteristic of *T. pinguis*; from its allies, *T. broomi* and *T. wiedii*, it differs also in its large size and angular snout; further, the former has distinct colour stripes and a completely divided nasal, and in the latter the nasal cleft extends on to the upper surface of the snout.

TYPHLOPS BROOMI Boulenger.

Typhlops broomi Bouleng. Ann. Mag. Nat. Hist. (7), ii, 1898, p. 414.

Chart No. 3 and fig. 16.

Nasal cleft to second labial; scales in 20 rows.

Head rounded, snout evenly rounded, very blunt; nostrils inferior; nearer to the rostral than to the preocular, the cleft just visible from above, where it joins the rostral, dividing the nasal; rostral subcircular, a little longer than broad, reaching to the level of the middle of the eyes, the lower part quadrangular, wider than long. Diameter of body 38 to 55 times in its length.

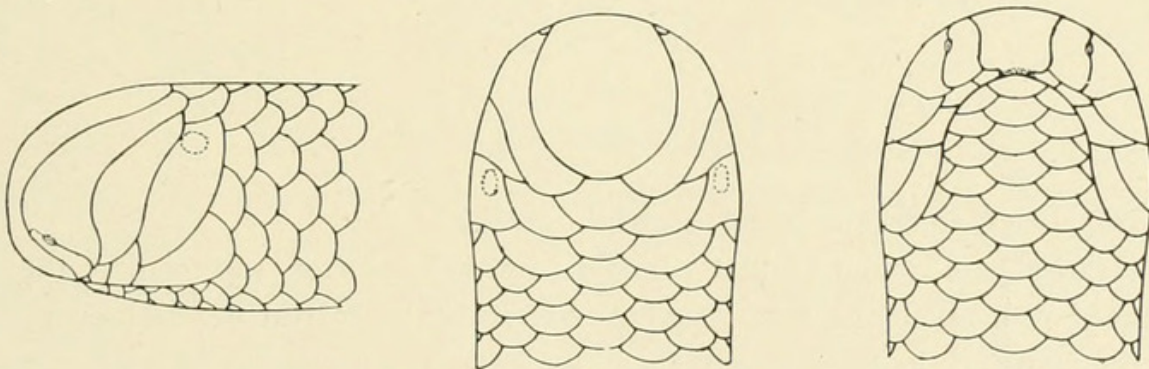


Fig. 16. Head of *T. broomi*.

Colours. Yellow, with eleven reddish-brown streaks on the upper surface.

Length. 192 mm.

Type. In the British Museum, from Muldiva, near Cairns, Queensland.

Range. Of five specimens examined, one is from Cairns, close to the type

locality; another from "North Queensland"; one from Broome, Kimberley Division, North-western Australia; another from Norseman, inland from Esperance Bay, Southern-western Australia; and the fifth from the Mallee districts of Victoria.

Remarks. The colour markings are quite characteristic, and the snout is blunter than in any other Australian species. The completely divided nasal distinguishes it from *T. wiedii*.

TYPHLOPS WIEDII Peters.

Typhlops wiedii Peters, Mon. Akad. Berl. 1867, p. 24. Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 36. Waite, Proc. Linn. Soc. N.S. Wales, (2), ix, 1894, p. 13, pl. i, figs. 7-9. Boettg. in Semon, Zool. Forsch. v, 1894, p. 117. Garman, Bull. Mus. Comp. Zool. xxxix, 1901, p. 11.

Typhlops leucoproctus Bouleng. Ann. Mag. Nat. Hist. (6), iv, 1889, p. 361, and Cat. Snakes, Brit. Mus. i, 1893, p. 20, pl. i, fig. 6.

Chart No. 6 and fig. 17.

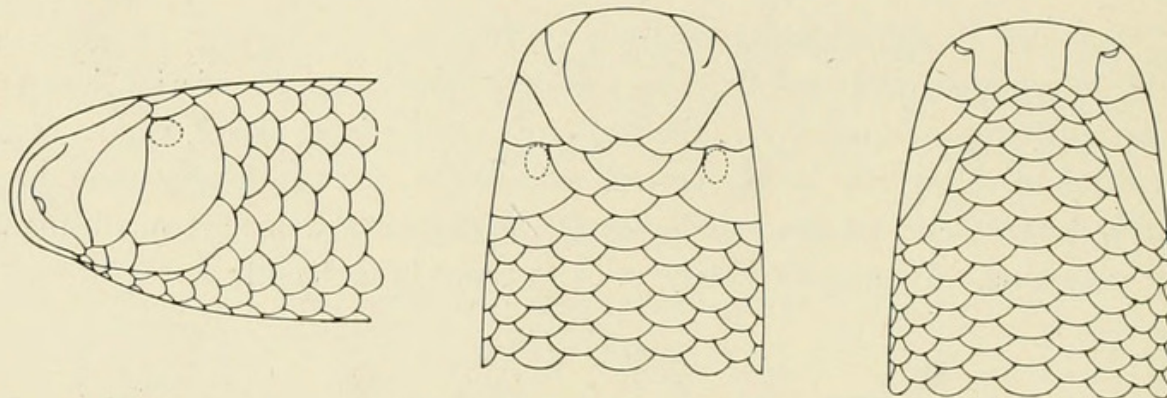


Fig. 17. Head of *T. wiedii*.

Nasal cleft to second labial; scales in 20 rows.

Head obtuse; snout bluntly rounded; nostrils inferior, sub-median, the cleft produced well on to the upper surface of the head; rostral heart-shaped, about half the width of the head, widest medially, extending to the level of the eyes; the lower part broader than long; diameter of body 33 to 76 times in its length.

Length. 295 mm.

Type. In the Berlin Museum, from Brisbane, Queensland.

Range. New Guinea, Torres Strait (Murray and Darnley Islands), Queensland, New South Wales, Victoria, Northern and South-western parts of Western Australia; not yet known from the Northern Territory or South Australia.

TYPHLOPS BITUBERCULATUS Peters.

Onychocephalus bituberculatus Peters, Mon. Akad. Berl. 1863, p. 233, and 1867, p. 708, fig. 4.

Typhlops bituberculatus Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 48. Werner, Fauna Südwest-Aust. ii, 1909, p. 256. Waite, Trans. Roy. Soc. S. Aust. xli, 1917, p. 435, figs. 1-3.

Plate i, chart No. 7, and fig. 18.

Nasal cleft to second labial; scales in 20 rows.

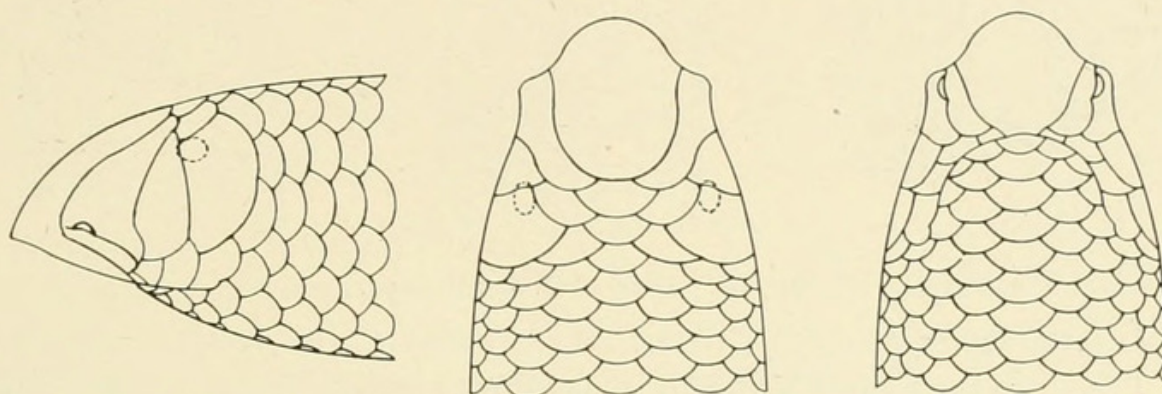


Fig. 18. Head of *T. bituberculatus*.

Head trilobed, the rostral and bulging nasals forming the lobes; snout acutely angular, the lower edge sub-horizontal; nostrils inferior, nearer to the rostral than to the preocular, the cleft produced slightly beyond the nostril; rostral produced in front, half the width of the head, extending nearly to the level of the eyes, the lower part slightly broader than long; diameter of body 42 to 82 times in its length.

Length. 450 mm.

Type. In the Berlin Museum, from Adelaide, South Australia.

Range. The whole of Australia, the northern parts excepted, the most northern localities being Bundaberg, Queensland; Barrow's Creek, Central Australia, and the Fortescue River, Western Australia. It is one of the commonest species, occurring plentifully throughout the southern parts of the Continent.

Remarks.—*T. bituberculatus* is quite unmistakable, even when young, and is the Australian example best illustrating "inferior" nostrils.

TYPHLOPS TORRESIANUS Boulenger.

Typhlops torresianus Bouleng. Ann. Mag. Nat. Hist. (6), iv, 1889, p. 362, and Cat. Snakes, Brit. Mus. i, 1893, p. 34, pl. ii, fig. 4.

Chart No. 4 and fig. 19.

Nasal cleft to second labial; scales in 22 rows.

Head rounded; snout rounded; nostrils inferior, the cleft a little nearer to the rostral than to the preocular, produced far on to the upper surface of the head; rostral narrow, one-third the width of the head, extending almost to the level of the eyes; the lower part as broad as long; diameter of body 34 to 43 times in its length.

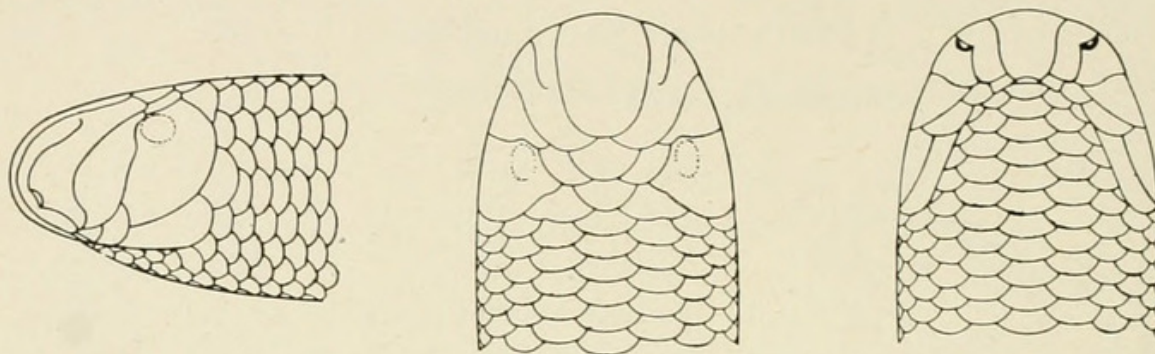


Fig. 19. Head of *T. torresianus*.

Length. 400 mm.

Type. In the British Museum, from Murray Island, Torres Strait.

Range. Torres Strait, east coast of Queensland, Dunk Island.

Remarks. This species differs from *T. australis* by its rounded snout and narrow rostral, and the condition of the nasal cleft which is projected far on to the upper part of the head. Boulenger states that the portion of the rostral visible from below is "half as broad as long"; none of our specimens exhibits this proportion, nor indeed does the original figure agree with the description in this respect.

TYPHLOPS AUSTRALIS Gray.

Anilius australis Gray, Cat. Lizards, Brit. Mus. 1845, p. 135.

Typhlops preissi Jan, Icon. Gén. 1860, p. 15, liv. 1, pl. v, fig. 2.

Onychocephalus bicolor Peters, Mon. Akad. Berl. 1860, p. 81.

Typhlops bicolor Jan, *op. cit.* 1864, p. 31, liv. 4, pl. iv and v, fig. 3. Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 48.

Typhlops australis Peters, *op. cit.* 1865, p. 262, fig. 3. Bouleng. *op. cit.* p. 35. Waite, Trans. Roy. Soc. S. Aust. xxi, 1897, p. 26. Werner, Fauna Südwest-Aust. ii, 1909, p. 256.

Typhlops sp. Lönnberg and Andersson, Vet. Akad. Handl. lii, No. 3, 1913, p. 12.

Chart No. 8, and fig. 20.

Nasal cleft to second labial; scales in 22 rows.

Head rounded, with slightly tumid nasals; snout sub-angular; nostrils inferior, the cleft median, scarcely produced beyond the nostril; rostral large, heart-

shaped, about half the width of the head, reaching to the level of the eyes, the lower part broader than long; diameter of body 24 to 49 times in its length.

Length. 460 mm.

Type. In the British Museum, from Western Australia.

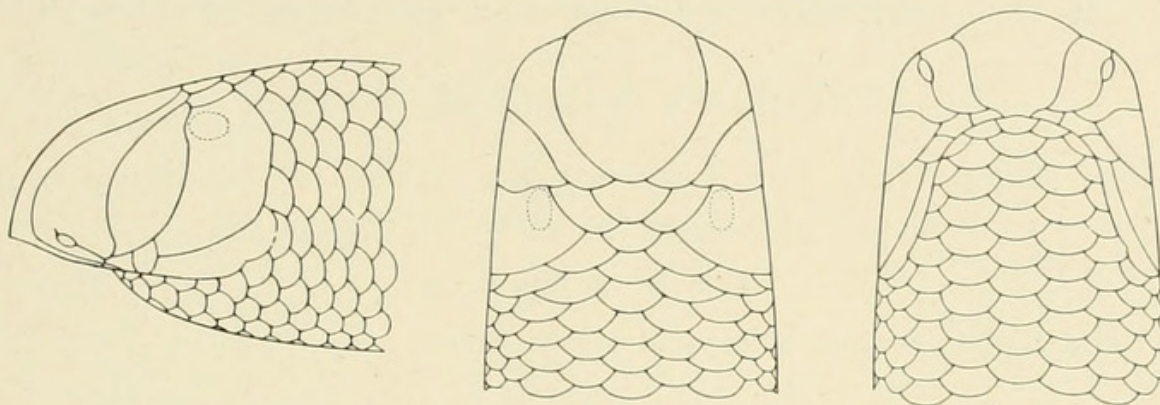


Fig. 20. Head of *T. australis*.

Range. Southern Australia, absent from the coastal districts of New South Wales and Victoria (8), common in South and Western Australia, and found at Fraser Range and McMinns Creek, Central Australia.

Remarks. Lönnberg and Andersson describe a specimen from Perth, Western Australia, remarking that it resembles *T. australis* very much, but that "the long tail prohibits the identification with that form." As previously stated in this paper the length of the tail in the Typhlopidae is subject to considerable variation within the limits of a species. In their description "prefrontal" should be read for "preocular."

TYPHLOPS WAITII Boulenger.

Typhlops unguirostris (in part) Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 49.

Typhlops waitii Bouleng. Proc. Linn. Soc. N.S. Wales, (2) ix, 1894, p. 718, and Cat. Snakes, Brit. Mus. iii, 1896, p. 589.

Not charted.

Nasal cleft to second labial; scales in 22 rows.

"Nasal cleft proceeding from the second labial (from the first in *T. unguirostris*); 22 scales round the body (24 in *T. unguirostris*). Tail nearly as long as broad."—Boulenger.

Length. 500 mm.

Type. In the British Museum, from N.W. Australia.

Remarks. The original description, above quoted, is insufficient to enable me to publish the further essential characters of the species, or to ascertain in

(8) Peters' record of "Melburn" is doubtless inexact.

what respects it differs from *T. australis*, with which it is associated in the scheme here adopted, nor can I identify with the description, any specimen I have handled. In order to remedy this deficiency I wrote to Dr. Boulenger on November 22 last, but I greatly fear that either my letter or his reply has been lost as the result of sinking, by our enemies, of one of the vessels carrying homeward or outward mails.

TYPHLOPS BATILLUS Waite.

Typhlops batillus Waite, Proc. Linn. Soc. N.S. Wales, (2) ix, 1894, p. 9, pl. i, figs. 1-3. Bouleng. Cat. Snakes, Brit. Mus. iii, 1896, p. 585.

Chart No. 9, and fig. 21.

Nasal cleft to second labial; scales in 24 rows.

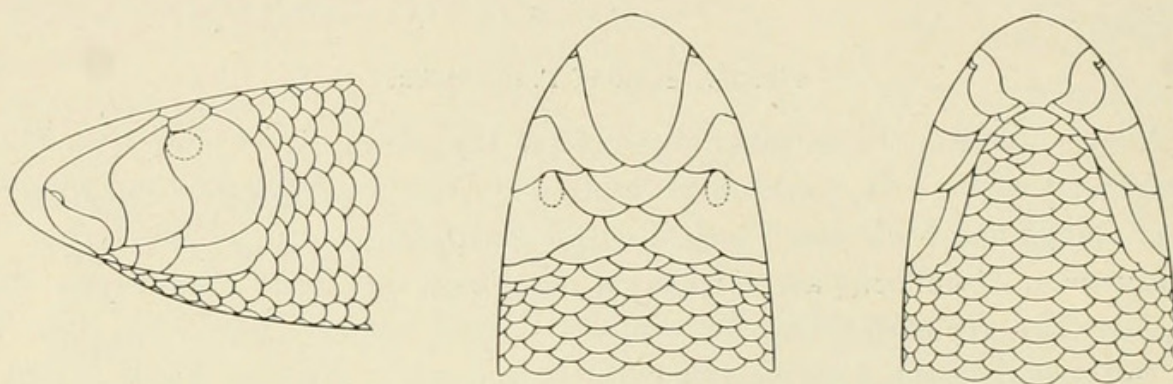


Fig. 21. Head of *T. batillus*.

Head sub-acute, much produced; snout acutely rounded; nostrils lateral, close to the rostral to which the cleft is continued, dividing the nasal; rostral very long, one-third longer than broad, extending to the level of the eyes, widest in front, its width nearly half that of the head, the lower part broader than long; diameter of body 53 times in its length.

Length. 320 mm.

Type. In the Macleay Museum, Sydney, from Wagga Wagga, New South Wales.

Remarks. The type is still the only specimen known, and this is the only species having the peculiar shovel-shaped head.

TYPHLOPS LABIALIS sp. nov.

Not charted, fig. 22.

Nasal cleft to second labial; scales in 24 rows.

Head very flat, rounded; snout evenly rounded; nostrils lateral, the cleft sub-median, completely dividing the nasal; rostral ovate, rather narrow, a little

more than one-third the width of the head, reaching to the level of the eyes, the lower part thistle-shaped, much longer than broad; preocular very wide, wider than the ocular; labials large, wider than long; diameter of body 35 times in its length.

Colours. In spirits: pale olive above and yellow below, the two areas sharply defined.

Length. 340 mm.

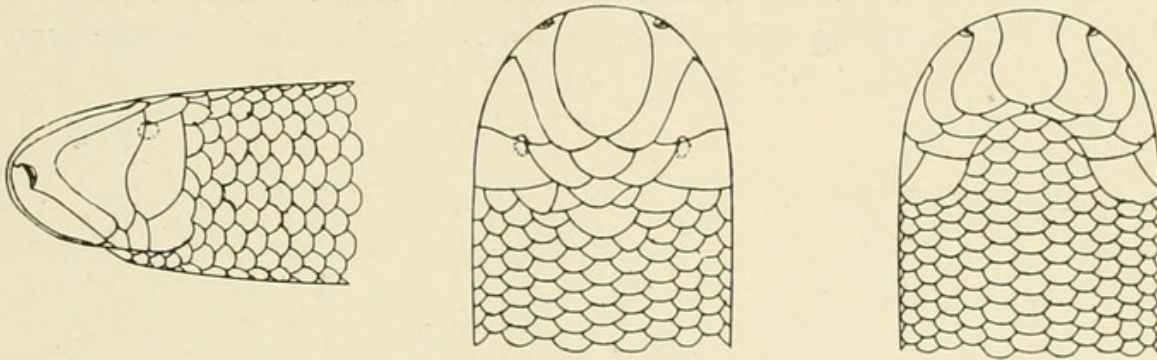


Fig. 22. Head of *T. labialis*.

Type. In the Western Australian Museum; one specimen, No. R. 630, from "Western Australia."

Remarks. Most nearly allied to *T. batillus*, but differs in the flat rounded head (see definition p. 7), the shape of the rostral and its relative proportions above and below; the preocular is wider than the ocular; the labials are wider than long; in both characters *T. labialis* differs from all other Australian species.

TYPHLOPS DIVERSUS Waite.

Typhlops diversus Waite, Proc. Linn. Soc. N.S. Wales, (2) ix, 1894, p. 10, pl. i, figs. 4-6. Bouleng. Cat. Snakes, Brit. Mus. iii, 1896, p. 584. Lönnberg and Andersson, Vet. Akad. Handl. lii, No. 3, 1913, p. 12.

Typhlops ammodytes Montague, Proc. Zool. Soc. 1914, p. 642, pl. i, figs. 8-10.

Chart No. 4, and fig. 23.

Nasal cleft to the preocular; scales in 20 rows.

Head rounded; snout evenly rounded; nostrils lateral, far removed from the rostral, the cleft produced beyond the nostril, just on to the upper surface of the head; rostral rather narrow, much longer than broad, one-third the width of the head, extending almost to the level of the eyes, lower part as long as broad; diameter of body 41 to 67 times in its length.

Length. 300 mm.

Type. In the Queensland Museum, from Morven, Queensland.

Range. Southern Queensland, Northern Territory, Central Australia, Kimberley District, and Montebello Island, North-western Australia (*T. ammodytes*).

Remarks. Four specimens examined. The type specimen was from Morven, Central Railway, Queensland; not Mowen, as originally stated. A re-examination shows that the rostral shield is unsymmetrical, though unfortunately not so figured, the bulging, or abnormal side, having been duplicated. Examination of further material shows that the actual condition is as now illustrated. Lönnberg and Andersson identified two examples from the interior of the Kimberley district, remarking that they agreed with the description of the type, but

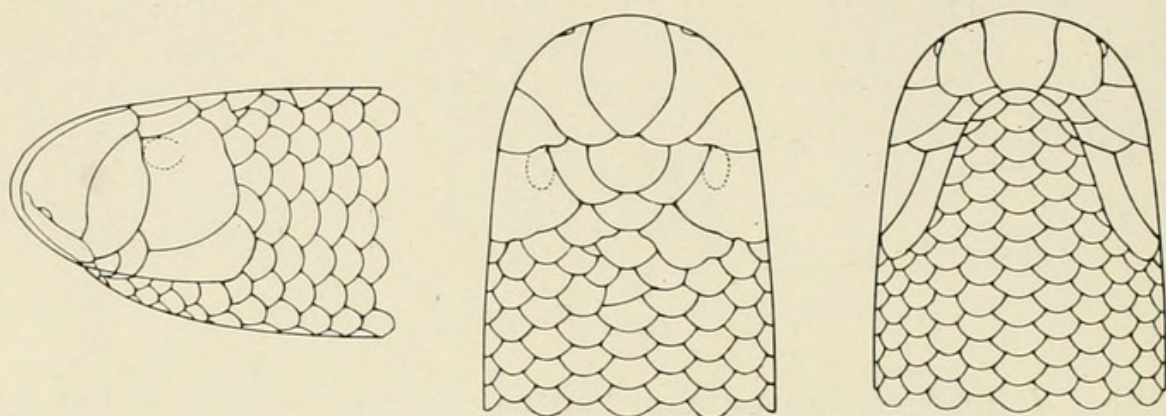


Fig. 23. Head of *T. diversus*.

that the rostral appeared to be narrower. "Nostril between two nasals" is apparently the only distinguishing feature of *T. ammodytes*, and, as the author was evidently unaware of the description of *T. diversus*, I have considered that the specimen obtained should be referred to this species.

In November last I wrote to Mr. Montague in respect to the status of this species. In reply Dr. Hugh K. Anderson informs me that he was killed on active service whilst flying in Palestine. My informant adds that Montague was a delightful man, and had shown great promise as a naturalist and anthropologist.

TYPHLOPS ENDOTERUS sp. nov.

Chart No. 5, and fig. 24.

Nasal cleft to the preocular; scales in 22 rows.

Head rounded, nasals slightly tumid; snout angular, the lower edge not horizontal; nostrils inferior, the cleft terminating at the nostril, which is close to the rostral; the latter widest in front, a little wider than long, forming a triangle with curved sides, not reaching to the level of the eyes, the lower part one-third broader than long; diameter of body 47 times in its length.

Length. 235 mm.

Type. In the South Australian Museum, Adelaide, No. R. 88, from Hermannsburg, Central Australia; three specimens.

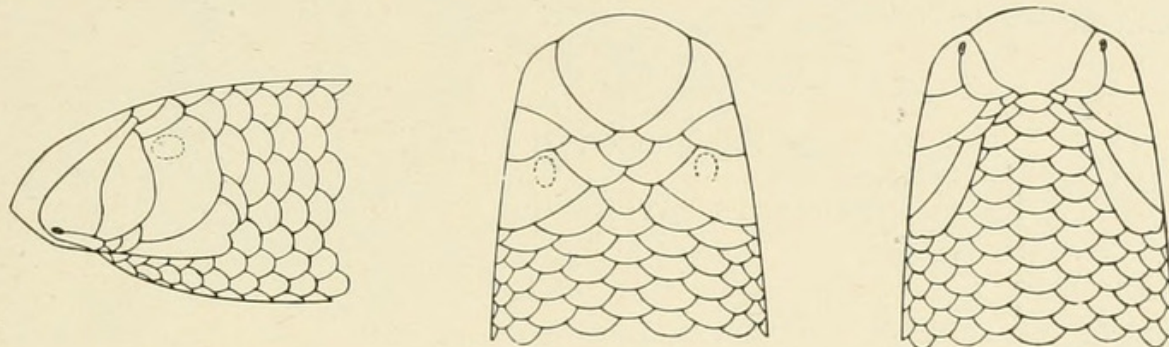


Fig. 24. Head of *T. endoterus*.

Remarks. Differs from *T. diversus*, its nearest ally, in having 22 in place of 20 rows of scales, the snout angular instead of rounded, the rostral much wider and of different shape, above and below; the nostrils inferior and much nearer to the rostral, and the nasal cleft arrested at the nostril.

BIBLIOGRAPHY of AUSTRALIAN TYPHLOPIDAE.

- Schlegel, Abbild. neuer oder unvollst. bekannt. Amphibien, 1844.
 Duméril et Bibron, Erpét. gén. vi, 1844.
 Gray, Cat. Lizards, Brit. Mus., 1845.
 Jan, Iconogr. gén. des Ophidiens, 1860, 1864.
 Peters, Monatsb. Akad. Wissen. Berlin, 1860, 1861, 1863, 1865, 1867, 1877, 1878, 1879.
 Krefft, Snakes of Australia, 1879. (9)
 McCoy, Prodromus Zoology, Victoria, 1885.
 Boulenger, Annals and Magazine, Nat. Hist., 1889, 1898, 1914.
 „ Cat. Snakes, Brit. Museum, i, 1893, iii, 1896.
 „ Proc. Linn. Soc. N.S. Wales, 1894.
 „ Proc. Zool. Soc., 1895.
 Ogilby, Rec. Aust. Mus., ii, 1892.
 Waite, Rec. Aust. Mus., ii, 1893.
 „ Proc. Linn. Soc. N.S. Wales, 1894.
 „ Trans. Roy. Soc. S. Aust., 1897, 1917.
 „ Australian Snakes, 1898.
 Boettger in Semon, Zool. Forsch. v, 1894.

(9) This work is not quoted in the text as the descriptions are copied and the figures are indefinite.

Garman, Bull. Mus. Comp. Zool., 1901.

Werner, Fauna Südwest Aust. ii, 1909.

Lönnberg and Andersson, Vetens. Akad. Handl. lii, 1913, 1915.

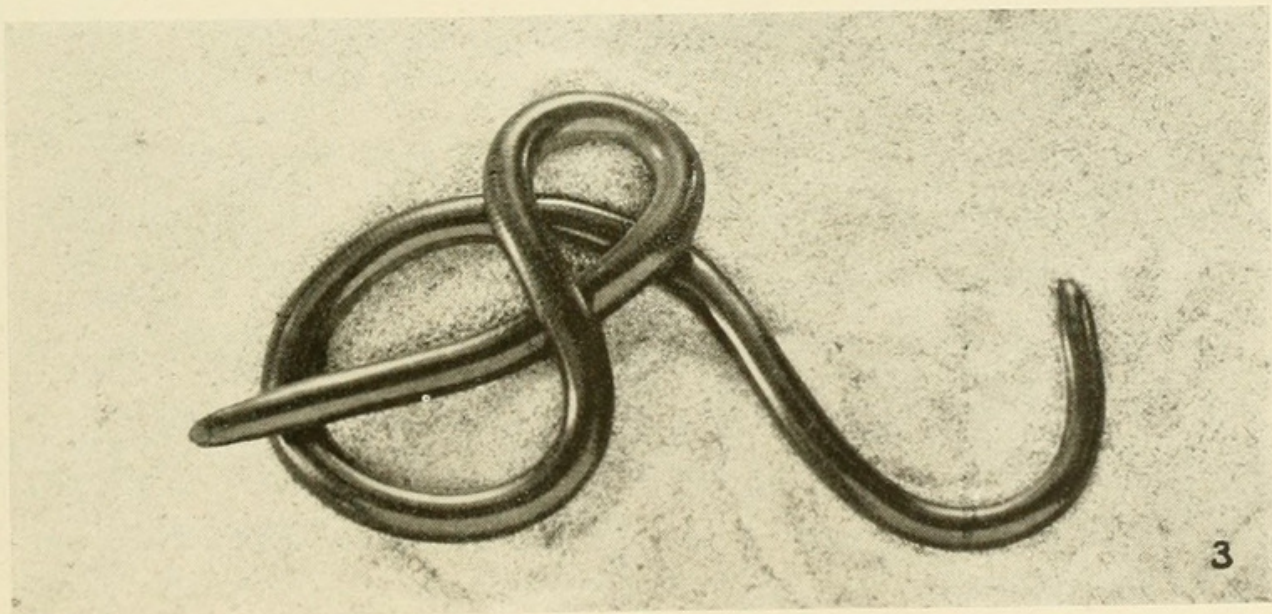
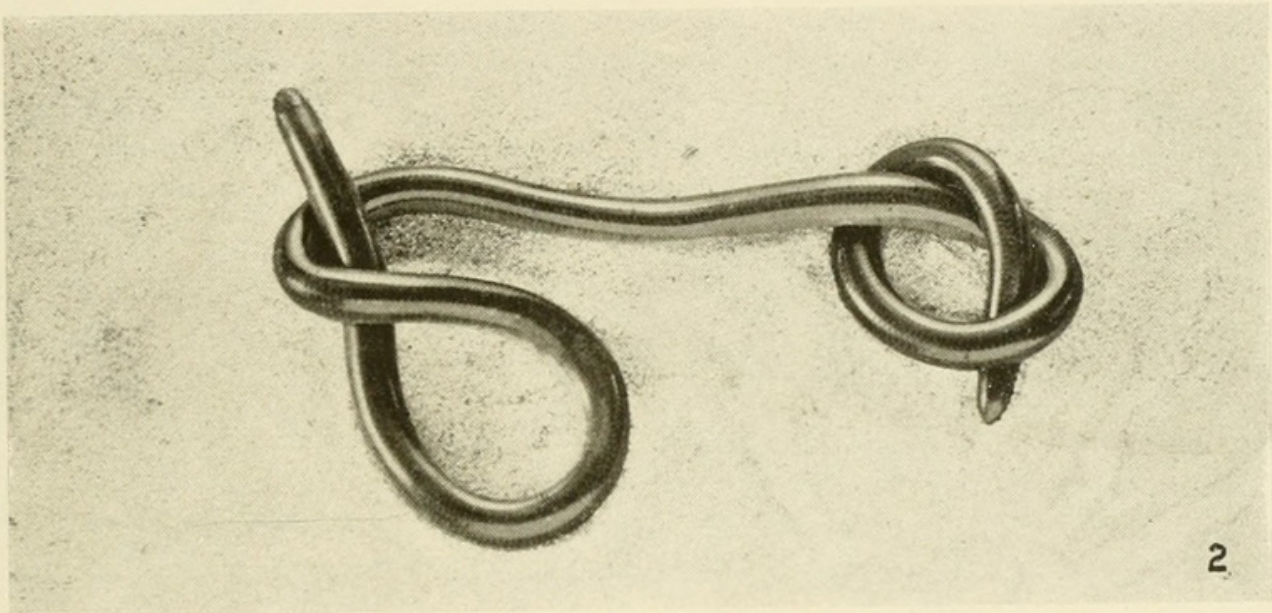
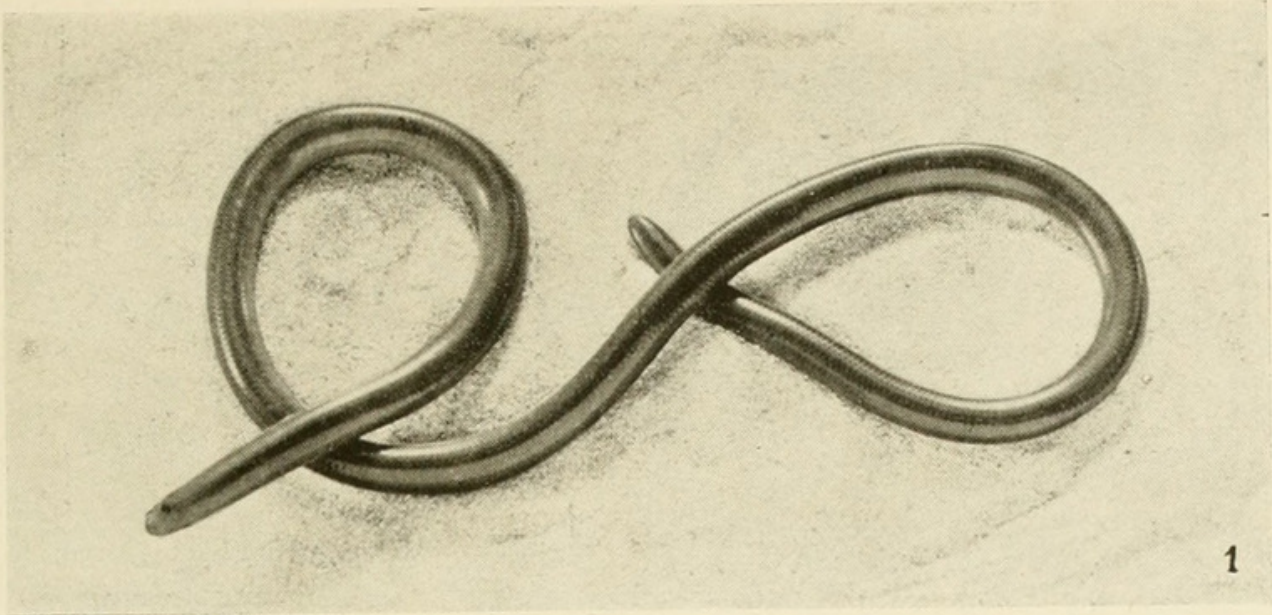
Montague, Proc. Zool. Soc., 1914.

Explanation of Plate i.

TYPHLOPS BITUBERCULATUS Peters.

In all the figures the head of the snake is directed towards the left hand, and in fig 2 the reptile is represented in the act of untying the knot into which it had coiled itself (see p. 2).

The striped appearance of the body is due to reflection of light from the highly-polished rows of scales.



TYPHLOPS BITUBERCULATUS Peters.



Waite, Edgar R. 1918. "Review of the Australian blind snakes (family Typhlopidae)." *Records of the South Australian Museum* 1, 1–34.

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