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STUDIES IN AUSTRALIAN REPTILES.

No. 1.

BY

J. ROY KINGHORN,

Assistant in charge of Herpetology, Australian Museum.

(Plate xx., and Figures 1-7.)

The acquisition by the Australian Museum of a specimen of *Denisonia suta*, Peters, bearing six young in an advanced stage of development, enables me to discuss the status of several species of the genus hitherto regarded as distinct. This very interesting specimen was secured by Mr. W. W. Froggatt, Government Entomologist, at Willow Tree, New South Wales, and I have been able to compare it with the holotype of *D. frontalis*, Ogilby, which is preserved in the Australian Museum.

I wish to acknowledge assistance from Mr. H. A. Longman, Director of the Queensland Museum, who has examined the holotype of *D. frontalis* var. *propinqua*, De Vis, for me, and has further supplied valuable information and suggestions concerning the specimens under his charge. I am also very grateful to Mr. A. R. McCulloch of the Australian Museum for his very willing assistance and advice.

DENISONIA SUTA, *Peters.*

(Plate xx., and Figures 1-7.)

Hoplocephalus sutus, Peters, Monatsb. Akad. Berlin, 1863, p. 234.

Hoplocephalus frenatus, Peters, *Loc. cit.*, 1870, p. 646.

Hoplocephalus frontalis, Ogilby, Proc. Linn. Soc. N.S.Wales (2), iv. 3, 1889, p. 1027.

Hoplocephalus stirlingi, Lucas and Frost, Rept. Horn Sci. Exp. Cent. Aust., Zool., ii., 1896, p. 149, pl. xii., fig. 5.

Denisonia suta, Boulenger, Brit. Mus. Cat. Snakes, iii., 1896, p. 339. *Id.*, Waite and Longman, Rec. S.Aust. Mus., i. 3, 1920, p. 176, fig. 34.

Denisonia frenata, Boulenger, Brit. Mus. Cat. Snakes, iii., 1896, p. 338.

Denisonia frontalis, Boulenger, *Loc. cit.*, p. 340.

Denisonia frontalis var. *propinqua*, De Vis, Ann. Queensland Mus., No. 6, 1905, p. 51.

Synonymy.—Having compared the descriptions of the above species, together with thirty representatives of *D. suta*, *D. frontalis* and *D. stirlingi*, I have come to the conclusion that all are referable to the one species. Evidence of the identity of *D. suta* and *D. frontalis* is afforded by a fresh specimen containing six well developed young in its oviducts which exhibit features characteristic of both species, while an analysis of all the specimens labelled as *D. suta* and *D. frontalis* in the Australian Museum collection verifies this evidence.

An authentic specimen, received by the Australian Museum from the Horn Expedition collection labelled *Hoplocephalus stirlingi*, proves to have the same characters as the type of *D. frontalis*. According to Lucas and Frost's description, this species has the temporal shields 1 + 2, but this is evidently erroneous since their figure and the specimen before me show them to be 2 + 2 as in *D. suta* and *D. frontalis*. The identity of *D. stirlingi* and *D. frenata* has already been noted by Boulenger.¹

Finally, it will be shown below that *D. frontalis* var. *propinqua* is based upon an abnormal specimen, and is to be united with *D. suta*.

VARIATION.

The Nasal and Preocular Shields.—Two specimens were collected at Willow Tree, New South Wales, and were found within a few yards of each other. They were of exactly the same size and were marked alike, but one had the nasal separated from the preocular as in *D. frontalis*, while the other, the female carrying the six young, had the extreme point of the nasal in contact with the preocular though not forming quite such a broad suture as in a typical *D. suta*. The six unborn young varied as follows:—Three had a very definite and broad point of contact between the nasal and preocular shields, which is characteristic of *D. suta*; two had the nasal widely separated from the preocular, thereby allowing the prefrontal to form a suture with the second upper labial, the character of *D. frontalis*; while one had the shields in contact on one side of the head and separated on the other, thereby bearing the characters of both *D. suta* and *frontalis*. These facts should prove that this character is no longer of any value to separate the two species.

The same variation may be found in a more or less marked degree throughout the total number of specimens examined; some have the two shields widely separated, thereby allowing the prefrontal to form a suture with the second upper labial; some have them forming a broad suture at their point of contact, while in others there is only the merest point of contact; a few in the Australian Museum and the Queensland Museum collections have the shields in contact on one side of the head and separated on the other, thereby combining the characters hitherto assumed to separate the two species.

¹ Boulenger—Zoological Record, xxvii., 1896, Reptilia, p. 27.

The position of the nasal in relation to the preocular in *D. frontalis* in comparison with a specimen which most nearly agrees with the description of *D. suta*, is illustrated in the accompanying figures.

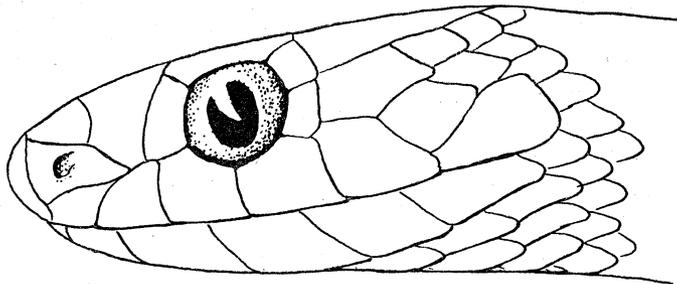


Fig. 1. Showing relationship of nasal to preocular in the type of *Denisonia frontalis*.

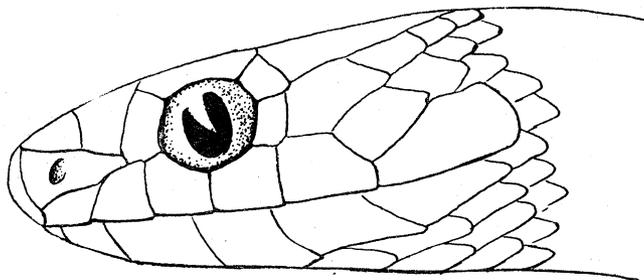


Fig. 2. Showing relationship of nasal to preocular in *Denisonia suta*.

Chin Shields.—Another character formerly used to distinguish the two species is whether the anterior chin shields are as long as (*D. suta*) or larger than (*D. frontalis*) the posterior. This also proves to be of no value, since it is inconstant, and the difference, where it exists, is extremely small; in some specimens the posterior and in others the anterior chin shields are slightly the larger, but they are most often equal in length. In some cases there is a slight difference in the shape of the two shields, and this, unless a measurement be taken, may make one appear to be longer than the other. A very young living specimen², from Willow Tree, New South Wales, which agrees most nearly with *D. suta* in all other respects, has the posterior chin shields longer than the anterior.

² This specimen also was collected by Mr. W. W. Froggatt, Govt. Entomologist, and presented to the Australian Museum on August 14th, 1920. It bears evidence of having been born in midwinter as the umbilicus is very plainly visible to the naked eye.

The Eye.—The original description of *D. suta* states "eye longer than its distance from the mouth" while that of *D. frontalis* describes the eye as small. I find that in Ogilby's holotype of *D. frontalis*, and in all other specimens referable to that form, the diameter of the eye is twice its distance from the mouth, and similar to that of *D. suta*.

The Internasals and Prefrontals.—On comparing the description of *D. frontalis* var. *propinqua*, De Vis, with those of *D. frontalis* and *D. suta*, I failed to find any reason why it should be separated from those species. De Vis states "internasals (semifused with the prefrontals) apparently as large as the prefrontals." Mr. Longman has kindly examined De Vis' holotype in the Queensland Museum for me, however, and he writes "the prefrontals and internasals in De Vis' *propinqua* are certainly abnormal, and should *frontalis* be merged into *suta*, var. *propinqua* should follow."

I have found throughout the series examined that the internasals and prefrontals vary slightly in their relative sizes and are not sufficiently constant to afford a distinguishing character.

The Temporals.—The temporal shields are, with one exception, 2 + 2, and the anterior pair are longer than the posterior, behind which are several enlarged scales. Of the anterior temporals the upper is generally the larger, but in some specimens both shields are about the same size; the lower anterior is always wedged in between the fifth and sixth upper labials.

The specimen which has more than 2 + 2 temporals is figured as Fig. 3 and it will be seen that this superimposed shield takes the place usually occupied by the upper part of the fifth upper labial.

This character is shown on each side of the head, but it is an unusual one.

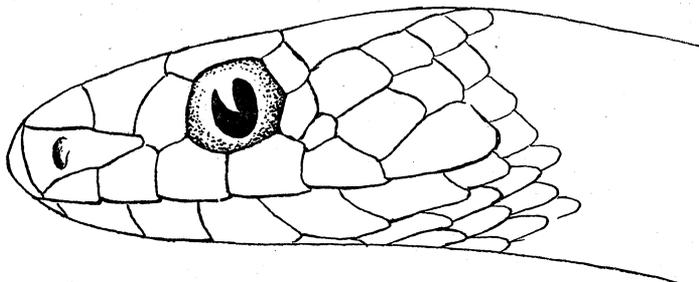


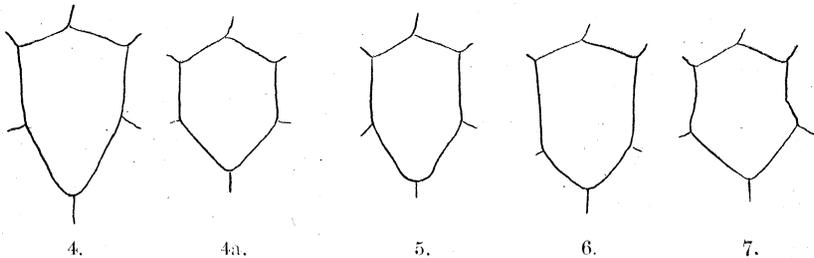
Fig. 3.

Frontal Shield.—In his key to the species of the genus *Denisonia*³ Boulenger indicates that *D. frenata* has the frontal nearly twice as long as

³ Boulenger—Brit. Mus. Cat. Snakes, iii., 1896, p. 333.

broad, and not much broader than the supra-ocular; Peters' original description however, gives the measurement as "frontal $4\frac{2}{5}$," which means that it is once and three-fifths as long as broad. In my specimen of *H. stirlingi*, which species is considered synonymous with *H. frenata* by Boulenger, the frontal is once and a third as long as broad.

Examination of all the other specimens on hand shows that the frontal varies in being from one and one-fifth to one-and-a-half times as long as broad, and it is nearly always twice as broad as the supra-ocular. An extraordinary range of variation in the shape of the frontal shield is illustrated in the accompanying figures; the difference between that of the female as compared with one of its young is especially notable.



Variations in the shape of the frontal shield.

Fig. 4. The female from Willow Tree, N.S.W.

Fig. 4a. An embryo from the above.

Fig. 5. A variety intermediate between 4 and 6.

Fig. 6. Normal variety possessed by the majority of specimens examined.

Fig. 7. An abnormal variety.

The Ventral and Subcaudal Shields.—In the description of *D. suta* the number of ventral shields is stated to be 157-164, and the sub-caudals 25-30; *D. frontalis* is described as having ventrals 154, sub-caudals 30. In my series the specimens which agree with *D. suta* have the ventrals 144-160 and the sub-caudals 27-35, a total of 175-193; while those of *D. frontalis* form have the ventrals 147-172 and the sub-caudals 26-39, a total of 174-207.

Tabulation of Main Characters.—The specimens referred to in the following table are selected as being representative of the thirty-six examined by me; the characters of the remainder vary slightly in intermediate stages between these. For convenience of comparison I have added the corresponding characters from the descriptions of the types of the various species.

According to the several descriptions, the characters listed in the table were the main features used to separate the various species, but it will be seen that none are sufficiently constant to maintain the species they have been supposed to characterise.

	Relationship of Nasal to Preocular.	Anal.	Rows of Scales	Ventrals	Sub-caudal	Total V. and S.C.	Chin Shields	Frontal
Specimens in the collection that were labelled as <i>D. suta</i> and <i>D. frontalis</i> .	Broad contact.	Entire	19	144	31	175	Posterior longer	1½ as long as broad, twice as broad as supra ocular
	Slight contact.	..	19	158	28	186	Anterior longer	1½
	Broad contact.	..	19	160	33	193	Equal length	1¼
	Contact on left side, no contact on right side.	..	19	155	31	186	Equal length	1¼
	No contact.	..	19	172	35	207	Equal length	1½
	Very slight contact.	..	19	153	27	180	Anterior longer	1½
	No contact.	..	19	147	27	174	Equal length	1½
	No contact right side, contact left side.	..	19	165	33	198	Posterior longer	1½
Young living specimen with super imposed temporal.	No contact.	..	19	164	39	203	Posterior longer	1½ .. almost ..
<i>D. frontalis</i> from type.	Contact.	..	19	154	33	187	Posterior longer	1¼ .. twice ..
<i>D. frontalis</i> var. <i>propinqua</i> from description.	No contact.	..	19	154	30	184	Anterior longer	1¼
<i>H. stirlingi</i> from specimen.	No contact.	..	19	161	30	191	Equal length	1½
<i>H. stirlingi</i> from description.	No contact, but nearer than in <i>D. frontalis</i> .	..	19	163	33	196	Equal length	1½
<i>D. frenata</i> , from description	No contact.	..	19	158-176	31-35	—	—	1½
<i>D. suta</i> , from description	No contact.	..	19	167	35	202	—	1½
<i>D. suta</i> , from description	Contact.	..	19	157-164	25-30	—	Equal length	1½

Colour markings.—The colour marking of the ventral shields was originally described as yellowish or white in *D. suta*, and pearly-white with a broad bronze-coloured median band in *D. frontalis*. The following analysis will show, however, that this colour marking has no value as a specific character.

Of thirty specimens examined (not counting the six embryos) sixteen agreed most nearly with *D. frontalis*. Three of these, including the type, have a distinct median band; three have very slight traces of a median band; one has the ventrals darkly blotched transversely, while nine have clear ventrals as in *D. suta*.

Of six specimens which agree most nearly with *D. suta*, three have clear ventrals, one has a distinct median band, and two have slight traces of the median band.

The remaining eight specimens I regard as intermediate forms; three of them have the nasal and preocular in contact on one side of the head and separated on the other; these all have clear ventrals. Five specimens show a very slight contact between the two shields, and of these, two have clear ventrals, two have a slight trace of a median band, while one has the ventrals darkly blotched transversely.

The six embryos also have the ventrals darkly blotched transversely, like their mother.

The colour markings on the head and nape are fairly constant, and full details of them will be found on the last page.

Definition of Denisonia suta based upon the specimens and descriptions referred to in the preceding pages:—

Diameter of the eye twice its distance from the mouth. Pupil vertically elliptic or round. Rostral much broader than deep, just visible from above. Internasals about half the size of and shorter than the prefrontals; both shields are broader than long. Frontal once and four-fifths to twice as broad as the supra-ocular, and once and one fifth to once and three fifths as long as broad, a little longer than its distance from the end of the snout, shorter than the parietals. Nasal entire; either in contact with the preocular, or separated from it by the junction of the second upper labial with the prefrontal. Two post oculars; temporals 2 + 2, the lower anterior of which is wedged in between the fifth and sixth upper labials. Six upper labials, the third and fourth entering the eye. Three lower labials are in contact with the anterior chin shield, which is about equal in length to the posterior. Scales in 19 rows. Ventrals 144-172. Total ventrals and sub-caudals 174-207. Anal entire, sub-caudals single, 26-39.

Colour.—Light brown above, scales narrowly margined with black or dark brown. A broad dark nuchal collar extending onto the head; top of head dark brown, merging into yellow or white on the sides. Side of the head with a black irregular band which arises on the rostral shield and passes through the nostril and lower half of the eye to the lower post

ocular, thence it extends to the mouth at the junction of the fifth and sixth upper labials where it rises again till it joins and forms the lower border of the nuchal collar. A dark vertebral line is often present, but it may be rather feebly marked. Lower parts yellowish or white, with or without a broad bronze-coloured median line; occasionally the inner edge of the ventral shields are darkly blotched transversely.

Localities.—The localities of the various types are as follows:—
Denisonia suta, Peters, Southern Australia.

Denisonia frenata, Peters, Lake Elphinstone, Queensland.

Hoplocephalus stirlingi, Lucas and Frost, Central Australia.

Denisonia frontalis, Ogilby, Narrabri, New South Wales.

Denisonia frontalis var. *propinqua*, De Vis, Queensland.

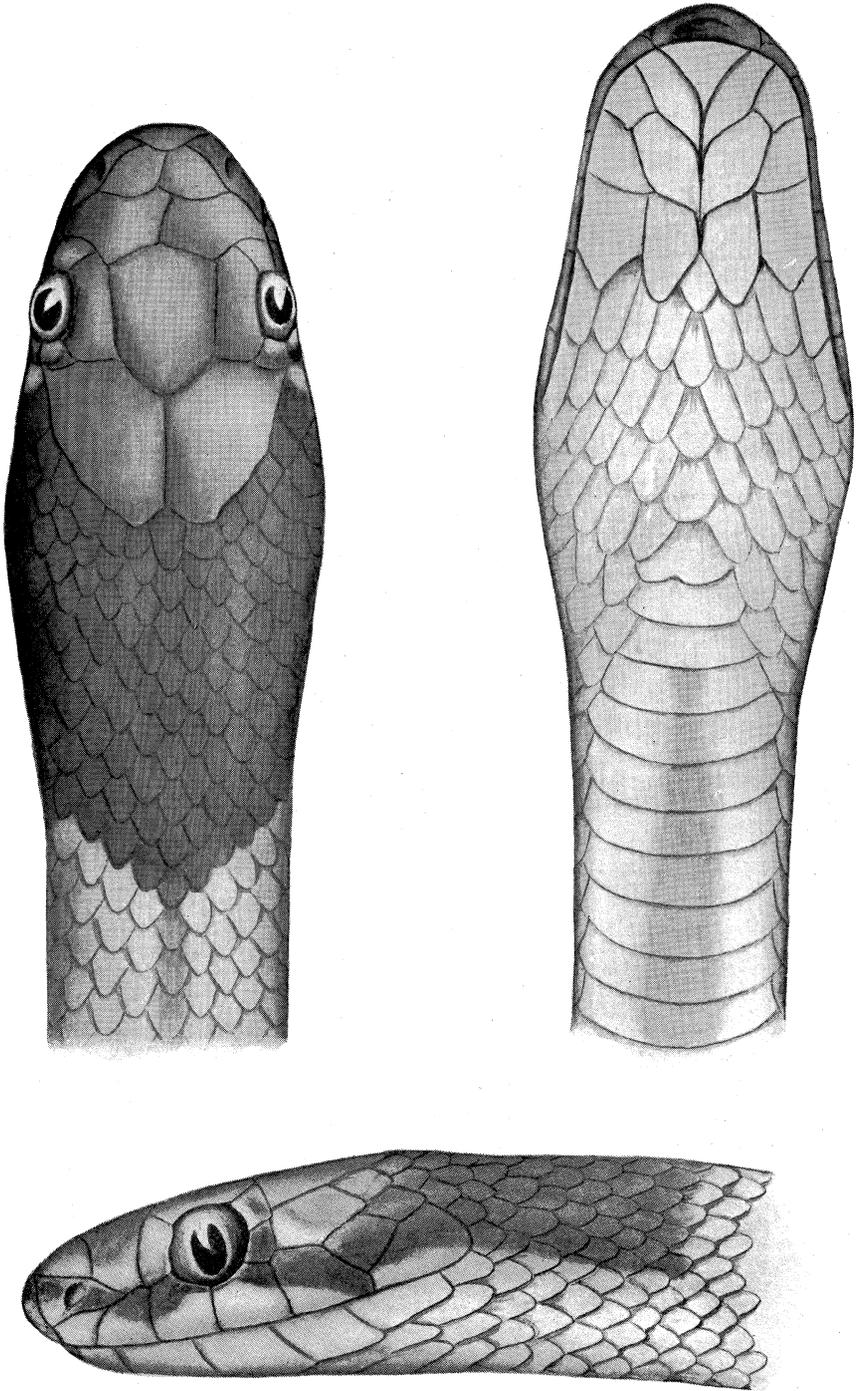
The localities of all the specimens in the Australian Museum are widely separated, the majority being from North-Western New South Wales; one is from Forbes, Western New South Wales; and three are from Sylvania, Queensland. A specimen has lately been recorded from Moolooloo, South Australia.⁴

⁴ Waite & Longman—Rec. South Aust. Mus., i., 3, 1920, p. 176.

EXPLANATION OF PLATE XX.

Denisonia suta, Peters.

Drawn from the type specimen of *Denisonia frontalis*, Ogilby. Narrabri,
New South Wales.



J. ROY KINGHORN, del.