

CONTRIBUTIONS TO A REVIEW OF PHILIPPINE  
SNAKES, XII

THE PHILIPPINE SNAKES OF THE GENUS *DENDRELAPHIS*  
(SERPENTES: COLUBRIDÆ)

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TWO TEXT FIGURES

During the past half century the genus *Dendrelaphis* has been revised by at least five authors, Boulenger (1896), Wall (1921), Meise and Hennig (1932), Mertens (1934), and Smith (1943, in part), who have attempted both to clarify in part a confusing nomenclatural problem (see Opinion 524 of the International Commission on Zoological Nomenclature), and in part to delimit the species taxa. Comparison of the results of their works indicates divergence of opinion regarding both problems.

With respect to the recognition of species of *Dendrelaphis*, Boulenger, Wall, and Smith have tended to be "splitters," Meise, Hennig, and Mertens "lumpers." During the past several years I have had an opportunity to examine a large number of specimens of *Dendrelaphis* from the Philippines and based upon this study find that my results tend to agree with views expressed by the latter authors, at least insofar as Philippine populations are concerned.

Taylor [(1922a) 165-177] recognized four nominal species of *Dendrelaphis* and one of *Dendrophis* (since shown by Smith (1943) to be a synonym of *Dendrelaphis* [= *Ahaetulla* Auct!]) in the Philippine Archipelago. Of these, the eastern Philippine species *D. terrificus* Peters and its junior synonym *D. modestus* (*nec* Boulenger) Taylor, thought to be conspecific with *D. caudolineatus* from Palawan Island in the western Philippines, is recognized as a distinct subspecies of the latter. Further, *D. terrificus* Peters of Taylor is polytypic [see below], the Luzon population differing from populations inhabiting other islands in the Archipelago. Thus, as here conceived, in the Philippines *D. caudolineatus* is represented by three taxonomically distinct geographical populations.

*Dendrelaphis caeruleatus* and *D. fuliginosus*, both described by Griffin in 1909, and *D. philippinensis* Günther are also as-

signed to the synonymy of *D. caudolineatus* since they are thought to be consubspecific with *D. terrificus* Peters.

*Dendrophis boiga* (Lacépède), a strict synonym of *Coluber pictus* Gmelin (International Commission on Zoological Nomenclature, Opinion 525) is very distinct and presents no difficult problems, although studies of this ubiquitous Oriental species remain to be done to determine what, if any, are the geographical variants.

The snakes of the genus *Dendrelaphis* are evidently close to those of the genus *Chrysopelea* [Underwood (1967) 135] from which they have been distinguished by the absence of grooved posterior fangs and of hypapophyses on the posterior dorsal vertebræ. Meise and Hennig [(1935) 138] suggest that the presence or absence of grooved posterior maxillary teeth is of little taxonomic importance [which is also true for the Philippine genera *Holgerrhun* and *Cyclocorus* (Leviton, 1967); see also Duellman's remarks on the American genera *Hypsiglena* and *Leptodeira* (1958)]. In 1938, Brongersma showed that hypapophyses are frequently absent in specimens of *Chrysopelea ornata* which he examined, and Smith (1943) divided *C. ornata* into two species, *C. ornata* and *C. paradisi*, based on the association of presence or absence of hypapophyses with geographically distinct populations. Because species of *Dendrelaphis* are not known to possess hypapophyses, it would seem that the two genera are connected by *C. ornata* (= *C. paradisi* of Smith, 1943 [in part]). Similarities in hemipenes and in the structure of the ventral keels [Wall (1908) 229-230] among species of *Chrysopelea* and of *Dendrelaphis* further suggest a close relationship as do various skull features cited by Underwood [(1967) 135].

Although no modification of the present nomenclatural arrangement for these genera is introduced here, it seems that the close affinity between them could be indicated by assigning them to subgenera, since the sole character differentiating the two groups is the presence or absence of grooved posterior maxillary teeth. In this event, the name *Chrysopelea* Boie would stand for the nominal genus because it antedates *Dendrelaphis* Boulenger.

For the purposes of this report, which concerns itself exclusively with the Philippine species of *Dendrelaphis*, they are referred as members of a distinct genus.

In preparing the following notes I am indebted to several persons who have assisted me through the loan of specimens under their care: Dr. Robert F. Inger, Field Museum of Natural History (FMNH); the late Dr. Doris M. Cochran, United States National Museum (USNM); Dr. George S. Myers, Stanford University (CAS-SU); Dr. Ernest E. Williams, Museum of Comparative Zoology, Harvard University (MCZ); Mr. Neil D. Richmond, Carnegie Museum, Pittsburgh (CM); and Dr. Richard G. Zweifel, American Museum of Natural History (AMNH).

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#### TERMINOLOGY

The following terms require definition:

*Standard length*.—The straight line distance from the tip of the snout and the vent.

*Tail length*.—The straight line distance from the vent to the tip of the tail.

*Scale reductions*.—The formula "13 (5 + 6 [102-113]) 11" indicates that the body scales reduce from 13 to 11 by fusion of the fifth and sixth lateral scale rows between ventral plates 102 and 113 in the series of specimens examined; a similar formula has been used to express caudodorsal scale reductions: 6 (2+3 [2-8]) 4 (1+2 [52-71]) 2.

Localities listed under "Range" which are marked by an asterisk (\*) indicate localities from which specimens were examined.

#### *Key to the Philippine species and subspecies of Dendrelaphis.*

- 1a. Scales in 15 longitudinal rows  $\frac{1}{3}$  of body length behind head; vertebral scales strongly enlarged; tail at least half as long as body ..... *D. p. pictus*
- 1b. Scales in 13 longitudinal rows  $\frac{1}{3}$  of body length behind head; vertebral scales not or barely enlarged; tail less than half as long as body.
  - 2a. Six to eight distinct black stripes on posterior portion of body.
    - 3a. Eight bold black stripes on anterior third of body.
      - 3b. Two or four distinct black stripes on anterior third of body, six (rarely eight) black stripes present on posterior part of body and extending onto tail ..... *D. c. luzonensis*
    - 2b. Narrow ventrolateral stripe usually present (black) along juncture of outer scale row and ventrals on each side, and fre-

quently second black stripe present between scale rows 2 and 3 on anterior  $\frac{1}{2}$  of body; dorsum lacking other black stripes ..... *D. c. terrificus*

**DENDRELAPHIS PICTUS PICTUS (Gmelin).**

*Coluber pictus* GMELIN (1789) 1116 (type locality: Borneo, by subsequent designation by Mertens [see below]; type unknown).

*Dendrophis picta*, DUMÉRIL, BIBRON, and DUMÉRIL (1854) 197 (Luzon [Manila], Mindanao; description); GÜNTHER (1858) 148 (Philippines; synonymy, description, list of material examined); PETERS (1861) 687 (Luzon [Daraga, Albay, Berg Santik, Passino], Samar; listed); BOETTGER (1877) 26 (Luzon [Manila]; listed); FISCHER (1885) 80 (Mindanao; listed); BOETTGER (1886) 111 (Luzon [Manila]; listed); BOULENGER (1894) 78 (in part; specimens from Philippines listed; synonymy, description, counts of material examined); BOETTGER (1895) 3, 5 (Busuanga, Calamian; counts), (1898) 56 (Culion, Luzon [Manila]; listed); GRIFFIN (1909b) 598 (Palawan; listed), (1910) 213 (Polillo; color pattern, common name), (1911) 259 (Luzon [Manila; Tarlac Province], Mindoro, Polillo; distribution otherwise compiled; listed in key); TAYLOR (1917) 359 (Negros [Isabela, Hinigaran, Bacolod, La Carlota]; notes species common in lowlands), (1918) 260 (Lapac, Cagayan Sulu; listed), (1922a) 166 (Busuanga, Cagayan Sulu, Lapac, Luzon, Mindanao, Mindoro, Negros, Palawan, Panay, Polillo, Samar; synonymy, description, counts and measurements of material examined), (1922b) 137 (Luzon [Mt. Makiling]; common at low altitudes).

*Ahaetulla picta*, COPE (1860) 556 (Philippines; synonymy, list of specimens).

*Dendrophis pictus pictus*, MEISE and HENNIG (1932) 289 (Luzon; diagnosis).

*Dendrelaphis pictus pictus*, MERTENS (1934) 198 (general remarks); LEVITON, Proc. California Acad. Sci. ser. 4 31 (1963) 369 ff.

*Range*—(Philippine localities only. Fig. 1.) BOHOL: Sandayong Sitio\*. BUSUANGA: Coron\*. CAGAYAN SULU. CEBU: Basak area\*; Cebu City\*; Tisa area\* CULION: San Pedro\*. GUIMARES: Camp Jossman\*; Jordan River\*. JOLO\*. LAPAC. LUZON: Albay Province (Daraga); Batangas Province (Batangas\*); Laguna Province (Los Baños\*, Mt. Makiling\*); Rizal Province (Manila\*); Tarlac Province; Zambales Province (Olongapo\*, Subic Bay\*); localities which cannot be placed (Berg Santik; Passino). MINDANAO: Bukidnon Province (Del Monte Plantation\*); Davao Province (Madum\*); Lanao Province (Iligan\*, Maigo\*); Misamis Occidental Province (Misamis\*); Misamis Oriental Province (Cagayan\*); Zamboanga Province (Zamboanga City\*). MINDORO. NEG-

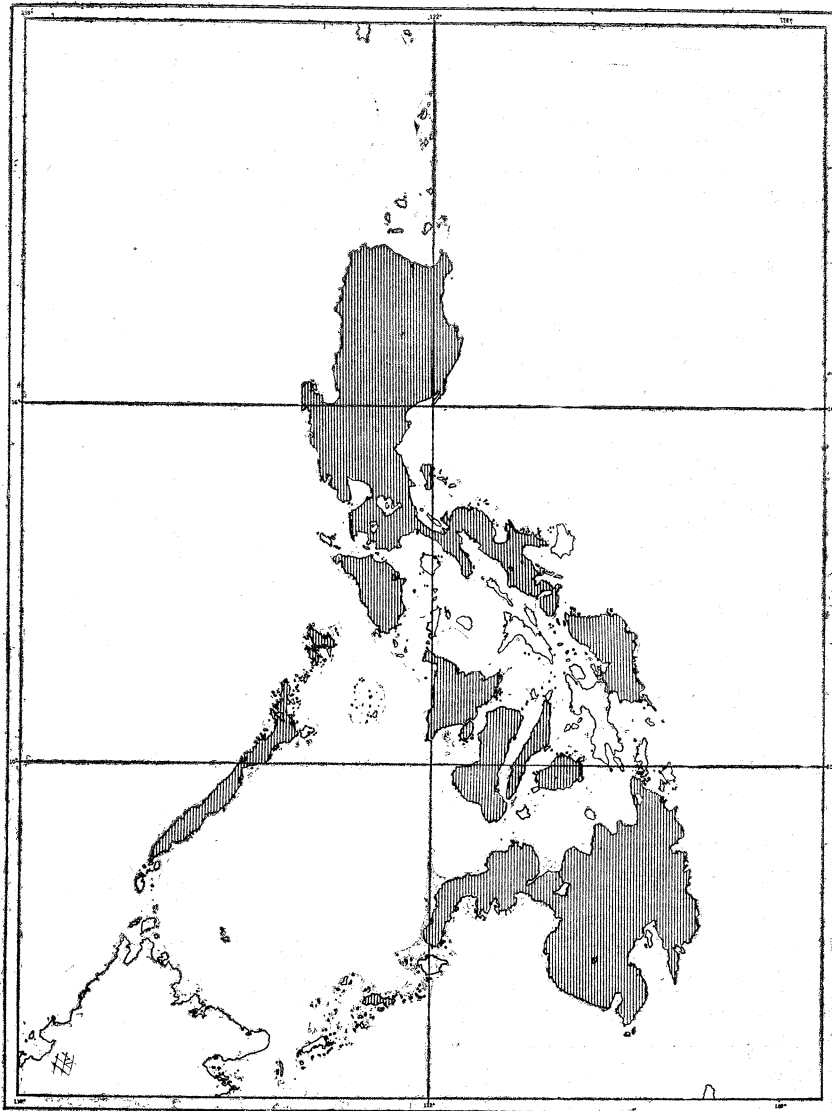


FIG. 1. Known distribution of *Dendrelaphis pictus pictus* in the Philippines.

ROS: Negros Occidental Province (Bacolod, Cabagnaan area \*, Isabela, Hingaran, La Carlota, Silay \*, Victorias \*); Negros Oriental Province (Dumaguete \*, Banika River area \*, Ocoy River valley \*, near Siaton \*, Mayaposi \*, Paggabunan \*, Camp

Lookout\*. PALAWAN: Puerto Princesa\*. PANAY: Estancia\*; Iloilo\*. POLILLO\*. SAMAR\*

Material examined (120).—BOHOL: Sandayong Sitio (CAS-SU 18898). BUSUANGA: Coron (CAS 73772; MCZ 25744). CEBU: Basak area (CAS-SU 18456, 20723); Cebu City (CAS-SU 14949-14957, 20714); Tisa area (CAS-SU 18454-18455, 18459, 20700). CULION: San Pedro (FMNH 53422). GUIMARES (near Panay): Camp Jossman (USNM 38984-38985); Jordan River (USNM 38983); without exact data (USNM 73111). JOLO: (CAS 60900; CAS-SU 14979). LUZON: Batangas Province: Batangas (CAS 15798); Laguna Province: Los Baños (CAS 61150-61152); Mt. Makiling (CAS 61313); Rizal Province: Manila (CAS 14948, 15268, 61760; CAS-SU 7272, 7348-7351); Zambales Province: Olongapo (CAS 15265-15266, 15287); vicinity of Subic Bay (CAS 15264). MINDANAO: Bukidnon Province: Del Monte Plantation (CAS-SU 14940-14942, 14980); Davao Province: Madum (FMNH 53413); Lanao Province: Iligan (USNM 31003); Maigo (CAS-SU 18452); Misamis Oriental Province: Cagayan (CAS-SU 14935); Zamboanga Province: Zamboanga City (CAS 62042; CAS-SU 14930, 14938-14939); without exact data (ANSP 2834-2835). MINDORO: San Jose (AMNH 73412, 73416-73417). NEGROS: Negros Occidental Province: Silay (USNM 78149-78151, 78153-78156); Victorias (USNM 78119-78121, 78167, 80580-80581); Cabagnaan area (CAS-SU 19525); Negros Oriental Province: Dumaguete (CAS-SU 14927, 15980-15981); Daro Barro, Dumaguete (CAS-SU 18457-18458); beach, 2 km S. Dumaguete (CAS-SU 17923); Banika River area, 5-6 km W. Dumaguete (CAS-SU 18449-18450); Ocoy River valley, 3 km W. Palimpinon (CAS-SU 17927); 7 km N.W. Siaton (CAS-SU 18796); Mayaposi (CAS-SU 18755); Paggabunan (FMNH 61416); Camp Lookout (CAS-SU 17924); southern Negros (USNM 29666). PALAWAN: Puerto Princesa (CAS 15806). PANAY: Estancia (CAS-SU 14931); Iloilo (CAS-SU 8660-8668, 8670, 8698-8699, 8708-8711, 8718, 8778-8780, 14932, 14936-14937). POLILLO: (CAS 62416-62417, 73754). SAMAR: (USNM 122209).

Taxonomic notes.—Meise and Hennig, Mertens, and Smith recognize several subspecies of *D. pictus*: The subspecies, other than the nominate form, have been proposed for populations which occupy peripheral and isolated islands. These include *D. p. andamanensis*, from the Andaman and Nicobar

islands, *D. p. intermedius*, from Sumbawa, Flores, and Komodo, *D. p. inornatus* [including *D. p. timorensis* Smith, *vide* Mertens (1934) 199] from Sumba, Savu, Samoa, and Timor. *Dendrelaphis p. bifrenalis*, recognized as a subspecies of *D. pictus* by Meise and Hennig and by Mertens, was distinguished as a full species by Smith [(1943) 246]. This form is restricted to Ceylon and perhaps Travancore, on the Indian coast. In a like manner the Ceylonese *D. p. cyanochloris* Wall, recognized as a subspecies by Meise and Hennig, was raised to the rank of a full species by Smith.

Other than the exceptions noted above, *Dendrelaphis pictus* appears to be undifferentiated throughout the rest of its range. The species is widely distributed throughout the Philippines. Insular isolation has not resulted in marked interisland differences among Philippine populations, although the Mindanao sample seems to average a somewhat lower ventral count in both males and females than do other island samples and the few specimens from the Palawan and Calamianes islands are substantially higher in those counts. Unfortunately the available samples are too few and too small to evaluate these differences further (Table 1). A single taxon is recognized here for these populations.

TABLE 1.—Summary of variation between sexes in *Dendrelaphis pictus pictus*.

Character	Male			Female		
	N	Mean *	Range	N	Mean	Range
Ventrals.....	38	174.6 ± 0.82	166-188	43	176.2 ± 0.67	169-189
Subcaudals.....	29	152.1 ± 1.33	139-169	31	145.9 ± 1.20	134-166
Ventrals plus subcaudals.....	29	326.8 ± 1.74	313-348	31	322.6 ± 2.03	306-347
Tail length/standard length.....	20	0.578 ± 0.0047	0.511-0.626	25	0.563 ± 0.0056	0.518-0.646

\* Mean ± standard error.

Regarding the use of the name "*pictus*" Gmelin rather than "*boiga*" Lacépède, I have followed Opinion 525 of the International Commission on Zoological Nomenclature.

Both Meise and Hennig (1932) and Mertens (1934) have designated type localities for *Coluber pictus* Gmelin; the former selected Java, the latter Borneo. In an earlier paper Mertens [(1930) 302] designated Borneo as "Terra typica restr." Consequently Borneo must stand as type locality for Gmelin's nominal species.

*Diagnosis.*—Scales in 15 longitudinal rows at midbody; vertebral scales strongly enlarged but not larger than scales of outer row; diameter of eye not more than distance to snout; posterior maxillary teeth slightly enlarged.

*Supplemental description.*—Maxillary teeth 22 to 28, last 2 or 3 slightly larger than rest; snout truncate; nasal shield divided, nostril large; elongate loreal, longer than deep; 1 preocular, rarely 2; eye large, its horizontal diameter less than distance to snout, about equal to distance to nostril; 2 postoculars, rarely 1 or 3; temporals various, 1 + 1, 1 + 2, 2 + 2; 9 upper labials, rarely 8 or 10, fourth, fifth and sixth shields usually bordering orbit; usually 10 lower labials, first 5 in contact with anterior chin shields; vertebral scales enlarged, about as large as scales of outer row, at least twice as large as paravertebral scales; body scales reduce 15 (—6 [111–112]) 13 (3 + 4 [114–116]) 11; caudodorsal scales reduce 6 (2 + 3 [5–6]) 4 (1 + 2 [79–81]) 2; ventrals 168 to 189 (Philippines only); subcaudals 134 to 169 (Philippines only); anal plate divided.

Color (in alcohol) variable, depending in part on initial preservation. Usually light yellowish green to dark bronze-brown above; narrow yellowish stripe present along outer scale row, bordered below by narrow black stripe and occasionally above by black stripe which is extension of black temporal stripe; below cream, yellow, or green to bluish green, usually without markings, but occasionally edges of ventrals with narrow dark borders; no dark stripe on underside of tail.

*Sexual dimorphism.*—Slight differences in the averages of ventrals, subcaudals, and tail length/standard length ratio suggest that there is sexual dimorphism in some characteristics, but at best it is slight (Table 2). Males seem to average slightly fewer ventrals and more subcaudals than females, which is to be expected. However, the ranges for each of those counts is similar. Unfortunately data drawn from the entire series of specimens could not be used; many specimens are damaged and certain measurements and counts could not be made. This is particularly true for counts and measurements of the tail, the tip of which is frequently missing.

*Ecological notes.*—This snake appears to be both arboreal and terrestrial. It is found usually in low bushes and trees [Taylor (1922a) 168; Mertens (1930) 303; Smith (1943) 244].



TABLE 2.—Summary of the variation in the numbers of ventral shields in *Dendrelaphis caudolineatus*.

Island	Male			Female		
	N	Mean	Range	N	Mean	Range
Balabae	1	178.0				
Bantayan	1	186.0				
Basilan	1	163.0				
Bohol				1	165.0	
Busuanga	1	176.0				
Camiguin *	2	181.0	178-184			
Candaranan				4	187.9	185-190
Cebu	1	172.0		1	174.0	
Kalotkot				2	172.5	171-174
Leyte	1	164.0		1	169.5	171
Luzon	11	177.6	175-181	12	180.7	176-184
Mindanao	8	165.6	164-168	20	167.8	159-173
Mindoro	1	177.0		1	179.0	
Negros	3	172.3	169-176	7	176.0	173-178
North Borneo	2	173.5	168-179			
Palawan	10	177.9	174-184	10	184.0	181-187
Panay				3	175.3	172-179
Polillo	2	170.5	170-171	4	* 170.3	167-174
Samar	2	164.0	163-165	3	164.3	162-167
Siquijor	1	173.0				
Sulu Islands	1	172.0		1	178.0	

\* Includes literature records.

However, Mertens notes seeing individuals on the ground, and both Mertens and Smith indicate that the snake subsists mostly on semiaquatic frogs (*Rana cancrivora*, *R. cyanophlyctis*, *R. limnocharis*) which would necessitate it foraging on the ground. I can confirm the food habits, for only frog remains were found in the stomachs of specimens examined here.

Philippine locality records suggest that the snake inhabits the lower altitudes, at least on the islands. It is said to reach elevations of about 4,500 feet in Burma [Wall (1925) 813] and at least 5,200 feet in Yunnan, western China [Pope (1935) 280]. Smith [(1943) 244] states that the species inhabits the plains and hill districts at low altitudes throughout the Indo-Chinese region.

Kopstein [(1930) 302, (1932) 81, (1938) 118] records at least 16 separate observations on the egg-laying habits of *D. pictus*. Individuals from central Java were observed depositing eggs from June through December, those from western Java from January through May. The number of eggs in a clutch varied from three to eight, but five seems to be the most frequent number. In central Java Kopstein records an incubation period of 93 to 126 days, but only 85 to 86 days in western Java. The length of newly hatched young varied between 202 and 303 mm ( $\delta$ , 239 to 303 mm;  $\text{♀}$ , 220 to 292 mm).

Only three of the specimens examined here contained eggs. Two of these individuals had been collected between April 12 and July, 1920, at Los Baños and one specimen was taken September 1, 1907, at Olongapo, Luzon.

**DENDRELAPHIS CAUDOLINEATUS (Gray).**

*Ahaetulla caudolineata* GRAY (1834) pl. 81

*Taxonomic notes.*—There have been few problems related to the recognition of this species of *Dendrelaphis*, although the lack of distinctive morphological characters among species and the extensive intraspecific variation in color pattern have led to the proposal of a superfluous number of synonyms. The absence of enlarged vertebral scales and the short posterior maxillary teeth led some authors to place it in a genus apart from *D. pictus*, but the trend during recent years has been to combine the two [Meise and Hennig (1932); Mertens (1934); Smith (1943)].

Meise and Hennig [(1934) 279–282] recognized four subspecies of *D. caudolineatus*, only two of which were recorded in the Philippines (*D. c. caudolineatus* and *D. c. terrificus*). Their treatment differed considerably from Taylor's [(1922a) 169–177] in which he recognized three species in the islands, *D. caudolineatus*, *D. modestus*, and *D. terrificus*.

I agree in part with the treatment accorded the Philippine forms by Meise and Hennig. Consequently, *D. caudolineatus* is treated here as a polytypic species in the Philippines, and all the nominal species of *Dendrelaphis* heretofore recorded from the Philippines, excepting *D. pictus*, which Taylor recognized, are placed in its synonymy.

In addition to the typical color pattern found among specimens of *D. caudolineatus* from Busuanga, Palawan, and Borneo, two other color variants may be recognized in the Philippines. In one, a black stripe is usually present on the side of the body between the ventrals and the outer scale row and a second stripe may be present on the posterior portion of the body between the second and third scale rows. This stripe is usually bordered above by a narrow yellowish green stripe, especially evident in specimens initially preserved in alcohol but not in formalin-prepared specimens. The scales of the dorsum are frequently edged with black. Occasionally, all blackmarkings are absent. In the other, there are two black stripes on the anterior portion of the body. However, pos-

teriorly there are six to eight stripes present, including at least two paravertebral, two lateral, and two ventrolateral stripes. A light lateral stripe is occasionally present. This latter pattern is characteristic of the Luzon population, the former of populations inhabiting all of the southern islands (excepting Palawan) and Polillo.

*Dendrelaphis terrificus* Peters was based on a single specimen said to have come from Gorontalo, Celebes. Meise and Hennig [(1932) 280] question this locality and presume that the type came from Borongan, Samar Island (for a specimen recorded by Peters in a later paper), instead. I have not seen any specimens of *Dendrelaphis* from Celebes and doubt that the type originated there.<sup>1</sup>

*Dendrelaphis philippinensis* Günther and *D. caeruleatus* Griffin are both based on specimens from the southern Philippines which lack the several dark stripes on the dorsum. The specimens which Taylor referred to *D. modestus* have been re-examined and are believed to be aberrantly colored individuals of the southeastern color phase of *D. caudolineatus*. These specimens lack both ventrolateral and dorsal black stripes, agreeing with *D. modestus* from eastern Indonesia. However, the dentition, ventral counts, and the presence of a dark line beneath the tail clearly associate them with *D. caudolineatus*. Several aberrantly colored individuals have been collected at scattered localities throughout the southern Philippines. Wherever they occur, in characters other than those of the dorsal color pattern they agree with the local population of *D. caudolineatus*. Griffin's nominal species, *D. fuliginosus* from Negros Island, was based on one such individual.

I believe that the differences in color pattern pointed out above, which can be correlated with geographic distribution, justify the recognition of three subspecifically distinct populations in the Philippines (Fig. 2). Of these, the nominate form occurs in the Palawan Archipelago and the islands of western Indonesia. The eastern Philippines, excluding Luzon but including Polillo and Kalotkot islands, are inhabited by a second subspecies to which Peters' name *Dendrelaphis terrificus* must apply. The nominal species proposed by Günther (*D. philip-*

<sup>1</sup> See: Fauna Malesiana, vol. 1, Cyclopaedia of collectors, A. B. Meyer, pp. 358-359. Locality data for A. B. Meyer collections are thought to be unreliable.

*pinensis*) and Griffin (*D. caeruleatus* and *D. fuliginosus*) must be placed in the synonymy of *D. c. terrificus* Peters. The Luzon-Camiguin population is referred to a third subspecies for which the name *D. caudolineatus luzonensis* was provided several years ago [Leviton (1961) 1].

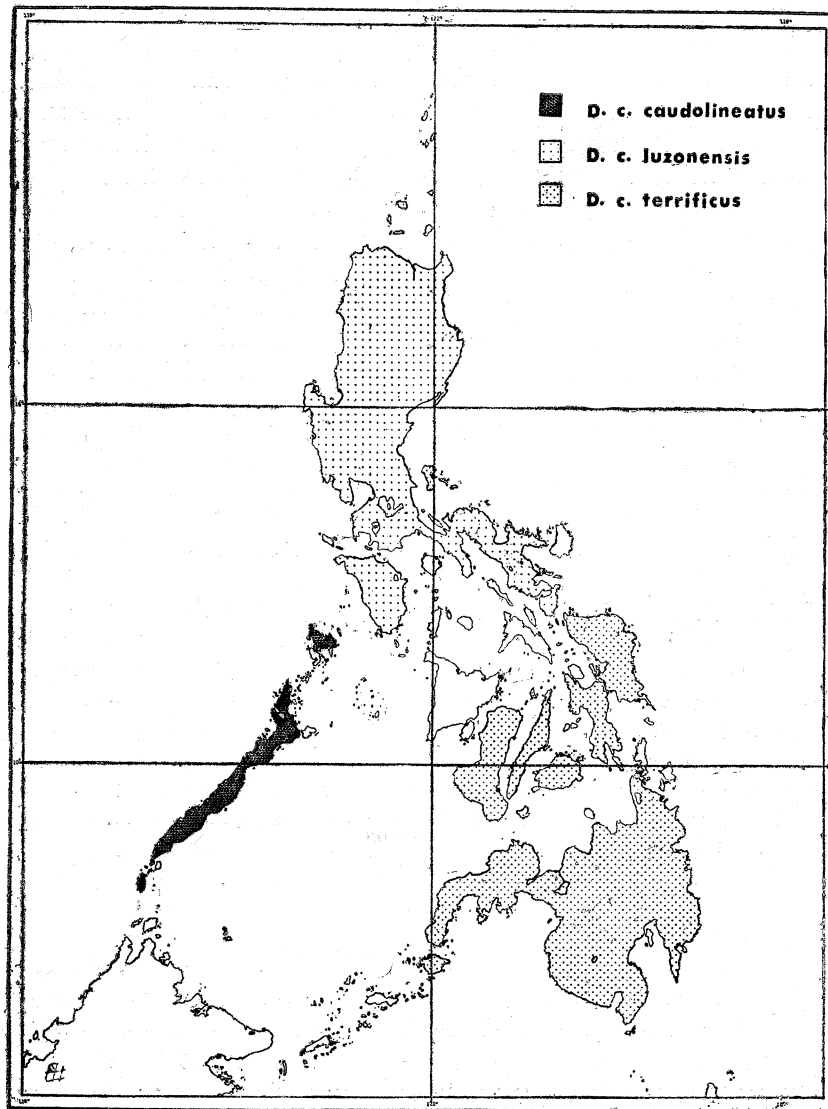


FIG. 2. Known distribution of the subspecies of *Dendrelaphis caudolineatus* in the Philippines.

*Diagnosis.*—Posterior maxillary teeth shorter than anterior series, 18 to 24 on each maxilla; scales in 13 longitudinal rows at midbody; black stripe almost always present on underside of tail; ventrals less than 190; subcaudals less than 120.

*Description.*—Maxillary teeth 18 to 24,, posterior teeth slightly smaller than rest; snout longer than horizontal diameter of eye (diameter of eye/snout length, 0.6 to 0.78 [mean, 0.707]), which is about equal to distance to nostril; head only slightly distinct from neck; canthus rostralis poorly defined, especially in young individuals; rostral broader than deep; internasals truncate in front, half as large as prefrontals; frontal more than 1.5 times longer than wide, less than 1.5 times as wide as supraocular, shorter than parietals; nasal shield rectangular, divided, with large nostril; loreal small, rectangular, longer than deep, one-third as large as nasal; 1 preocular, reaching dorsum of head but not in contact with frontal; 2 postoculars; temporals 2 + 2, rarely 3 + 2; 9 upper labials, fifth and sixth and occasionally fourth shields bordering orbit; 9 or 10 lower labials, first pair in contact behind mental, first 5 in contact with anterior chin shields; posterior chin shields longer and narrower than anterior pair; vertebral scales not or but slightly enlarged, never more than 1.5 times as large as paravertebral scales; dorsal scales reduce 13 (5 + 6 [102–113]) 11; caudo-dorsal scales reduce 6 (2+3 [2–8] 4 (1+2) [52 – 71]) 2; ventrals 163 to 187; subcaudals 94 to 118; anal plate divided.

Hemipenes extending to tenth subcaudal plate, unforked; sulcus spermaticus unforked; proximal third with series of longitudinal ridges beset with minute spines which increase in size to middle of organ; at end of seventh subcaudal plate there is transverse fold followed by slight constriction of hemipeneal walls and smooth chamber which extends to 10th subcaudal plate; retractor muscle extends into this chamber as short papilla; sulcus prominent, narrowing just before entering distal chamber.

Color (in alcohol) various, yellow-green, blue-green, bronze, or slate above, usually yellow-green or blue green below; several black stripes (including between ventrals and outer scale row, second and third, third and fourth, and fifth and sixth scale rows) or only a single ventrolateral black stripe may be present, rarely absent; light yellow-green stripe usually present between first and second scale rows; below immaculate yellow-green or blue-green; black stripe present on underside of tail.

*Interisland variation.*—I have already discussed the variation in color pattern (see above).

TABLE 3.—Summary of the variation in the number of subcaudal shields in *Dendrelaphis caudolineatus*.

Island	Male			Female		
	N	Mean	Range	N	Mean	Range
Balabac	1	106.0				
Bantayan	1	105.0				
Basilan	1	101.0				
Bohol				1	100.0	
Busuanga	1	111.0				
Camiguin	2	107.0	102-112			
Candaranan				3	109.4	106-112
Cebu	1	109.0		1	100.0	
Kalotkot				2	108.5	108-109
Levte	1	106.0		2	97.5	96-99
Luzon	8	110.0	105-118	7	104.7	97-117
Mindanao	7	103.0	98-107	15	100.1	91-106
Negros	3	106.0	103-108	6	107.2	103-110
North Borneo	2	107.5	107-108			
Palawan	8	111.0	106-114	8	108.4	103-112
Panay				2	104.0	102-106
Polillo	2	106.5	104-109	4	107.3	105-109
Samar	1	102.0		3	97.0	95-104
Siquijor	1	104.0				
Sulu Islands	1	110.0		1	107.0	

There is evidence to suggest that the population of *D. caudolineatus* from the southern Philippines island group (excluding Palawan) averages fewer ventrals and subcaudals than either Palawan or Luzon populations. The differences are not marked, however, and more adequate sampling will be required before the extent and significance of those differences can be evaluated. The variations in ventral and subcaudal counts are summarized in Tables 2 and 3 respectively.

**DONDRELAPHIS CAUDOLINEATUS CAUDOLINEATUS (Gray).**

*Ahaetula caudolineata* GRAY (1834) pl. 81 (type locality: not given, subsequently designated as Malay Peninsula by Meise and Hennig (1932) 281 [see below]; type unknown; original figure).

*Dendrelaphis caudolineatus*, BOULENGER (1894) 89 (in part; Palawan [Puerto Princesa]; -synonymy, description, counts of material examined); GRIFFIN (1909b) 598 (Balabac, Palawan; listed), (1911) 261 (Palawan [Iwahig, Puerto Princesa]; listed in Key); TAYLOR (1922a) 169, pl. 21 (Balabac, Palawan; synonymy, description, variation, counts and measurements of material examined).

*Dendrelaphis caudolineatus caudolineatus*, MEISE and HENNIG (1932) 281 (distribution compiled; synonymy, descriptive notes); LEVITON, Proc. California Acad. Sci., ser. 4 31 (1963) 378, 382, 401 (Balabac, Busuanga, Palawan; listed).

*Ahaetulla caudolineata caudolineata*, HAAS (1950) 534 (distribution compiled; synonymy).

*Leptophis caudolineatus* CANTOR (1847) 932 (type locality: restricted to Penang, Malay Peninsula by Meise and Hennig (1932) 281; type in Calcutta [?]).

*Dendrophis octolineata* DUMÉRIL, BIBRON, and DUMÉRIL (1854) 201 (type locality: restricted to Sumatra by Meise and Hennig (1932) 281; type in Paris Museum).

*Range*.—(Philippine localities only). (?) BALABAC\*. BUSUANGA\*. CANDARAMAN\*. PALAWAN: Brooke's Point\*; Iwahig\*; Puerto Princesa\*.

*Material examined* (42).—BALABAC: (CAS 15269, CM 2146-2162, 2167-2172, 2630). BUSUANGA: (MCZ 25743). CANDARAMAN: (USNM 39953-39956). NORTH BORNEO: (CAS-SU 7277, 7341). PALAWAN: Brooke's Point (MCZ 25739-25741, CAS-SU 14924); Iwahig (MCZ 25742); Puerto Princesa (CAS 15803-15805); without exact locality (CAS 62156-62160).

*Taxonomic notes*.—Meise and Hennig restricted the type locality of Gray's nominal species *Ahaetulla caudolineata* to the "Malayische Halbinsel." This stands as the type locality. Those authors also restricted the type localities of each of the nominal species they assigned to the synonymy of *A. caudolineata*. The type locality of *Leptophis caudolineatus* Cantor was restricted to Penang, and Sumatra was designated type locality for *Dendrophis octolineata* Duméril, Bibron, and Duméril.

*Diagnosis*.—Eight distinct black lines on dorsum, visible on both anterior and posterior parts of body; ventrals 175 to 187.

*Original description*.—Based on figure, without description.

*Description*.—Maxillary teeth 18 to 22; snout rounded; 1 loreal; 1 preocular, not in contact with frontal; 2 postoculars; temporals 2 + 2 or 1 + 2; 9 upper labials, fourth, fifth, and sixth or fifth and sixth bordering orbit; 9 or 10 lower labials, first 5 in contact with anterior chin shields; ventrals 175 to 187; subcaudals 105 to 114; anal plate divided.

Color (in alcohol) above yellowish green or green with series of eight black stripes which extend length of body; on anterior portion of body black stripes frequently coalesce leaving entire anterior portion of dorsum black; posteriorly stripes become distinct and separate into eight lines; below uniform yellowish to bluish green; narrow black stripe present on underside of tail.

*Sexual dimorphism*.—The sexes seem to differ only in ventral counts for which males average slightly fewer than females (Table 4). In the number of subcaudal shields and in the

tail length/standard length ratio both the means and range are similar. There are certainly no striking differences between sexes in this subspecies.

TABLE 4.—Summary of variation between sexes in *Dendrelaphis caudolineatus caudolineatus*.

Character	Male			Female		
	N	Mean	Range	N	Mean	Range
Ventrals.....	12	178.7	168-185	10	183.9	181-187
Subcaudals.....	10	109.1	105-114	7	109.6	106-112
Tail length/standard length ..	10	0.365	0.332-0.397	7	0.373	0.338-393

*Ecological notes.*—Little is known about these arboreal snakes. Two young specimens (less than 300 mm in standard length), presumably about five to six months old, were taken in January and February 1908 (CAS 15840-15805). Together with information on other forms given by Kopstein [(1938) 118-120], this would suggest that the eggs from which these individuals hatched were laid the previous March or April, allowing 60 to 90 days for incubation.

**DENDRELAPHIS CAUDOLINEATUS LUZONENSIS** Leviton.

*Dendrophis caudolineatus*, PETERS (1861) 688 (in part; Luzon [Albay]; listed).

*Dendrophis terrificus* (nec Peters), BOETTGER (1886) 111 (in part; distribution compiled).

*Dendrelaphis terrificus*, BOETTGER (1898) 57 (in part; central Luzon; listed); GRIFFIN (1911) 261 (in part; Camiguin; distribution compiled); TAYLOR (1922a) 174, pl. 22 (in part; Camiguin, Luzon [Manila]; description, counts and measurements of material examined, variation), (1922b) 137 ([Luzon Mt. Makiling]; listed).

*Dendrophis octolineatus* (nec Duméril, Bibron, and Duméril), PARENTI and PICAGLIA (1886) 50 (Ticao; not seen).

*Dendrophis punctulatus* (nec Gray), PARENTI and PICAGLIA (1886) 50 (not seen; Ticao); GRIFFIN (1911) 260 (after Parenti and Picaglia listed).

*Dendrelaphis modestus* (nec Boulenger), GRIFFIN (1911) 261 (Mindoro [Bongabon]; listed in key); TAYLOR (1922a) 172 (in part; Mindoro; counts and measurements of specimens examined).

*Dendrelaphis caudolineatus luzonensis* LEVITON, Occ. Pap. Nat. Hist. Mus. Stanford Univ., No. 9 (1961) 1 (type locality: Los Baños, Luzon Id.; type in California Academy of Sciences).

*Range.*—CAMIGUIN: Calayan Island\*. LUZON: Albay Province (without exact locality); Batangas Province (Bilibid



Prison\*, Camp McGrath\*); Laguna Province (Los Baños\*, Mt. Makiling\*); Rizal Province (Alabang\*, Manila\*); Zambales Province (Binanga\*, Maquinaya Valley\*, Pinatuba\*, Olongapo\*, Grande Island\*). Mindoro.<sup>2</sup> Bongabon; Puerto Galera\*; San José\*. TICA0.

*Material examined* (28).—CAMIGUIN: Calayan (CAS 73771). LUZON: Bataan Province: Limay (CM 2196); Batangas Province: Bilibid Prison (CAS 15796–15797), Camp McGrath (CAS 15799); Baay Province: Abra (FMNH 53390); Laguna Province: Los Baños (CAS 61131–61133, 61135 [paratypes], 61134 [holotype], USNM 56600–56602), Mt. Makiling (CAS 61312); Pangasinan Province: Port Sual (CAS–SU 13684); Rizal Province: Alabang (USNM 50984–50985); Manila (FMNH 15064); Mandaluyong (FMNH 45750); Zambales Province: Binanga (CAS 15276), Maquinaya Valley (CAS 15273), Pinatuba (CAS–SU 14925), Olongapo (CAS 15271–15272), Grande Island (CAS 15274–15275). MINDORO: Puerto Galera (FMNH 15068), San José (AMNH 73414).

*Diagnosis*.—Almost always with 2 to 4 distinct black stripes on anterior third of body, 6 (rarely 8) stripes on posterior half; ventrals 174 to 184.

*Description of type*.—(Adult female.) Maxillary teeth 19; rostral broader than deep; internasals shorter than prefrontals; frontal as long as its distance from snout, 1.3 times broader than supraocular, shorter than parietals; nasal large, rectangular, longer than deep, divided; loreal about one-third as large as nasal, twice as long as deep, in contact with second and third upper labials; preocular reaches dorsum of head but does not contact frontal; 2 postoculars, upper shield largest; temporals 2 + 2; 9 upper labials, fifth and sixth shields bordering orbit; 10 lower labials, first pair in contact behind mental; first 5 in contact with anterior chin shields; posterior chin shields slightly longer but narrower than anterior shields; scales smooth, in 13 longitudinal rows at midbody, vertebral series scarcely larger than paravertebrals; ventrals 181; subcaudals 99, anal plate divided.

*Measurements (in mm)*.—Standard length 947; tail length 317; length of head 36.3; length of snout 10; diameter of eye 6.3.

<sup>2</sup> See comment on page 388 under discussion of variation.

Color (in alcohol) dark bluish brown above, except dorsum of head which is bronze; dark ventrolateral line originates at level of sixteenth ventral plate between ventral shields and outer row of scales and becomes more distinct posteriorly; narrow lateral black stripe originates at level of twenty-first ventral plate on second scale row, and extends onto tail; just beyond midbody a pair of paravertebral and pair of narrow middorsal black stripes appearing and extending to tail where middorsal stripes coalesce into single midcaudodorsal stripe and paravertebral stripes end abruptly. Below, immaculate bluish green (light green in life?) except for black line on underside of tail and light green on anterior lower labials, chin shields and lower edges of upper labials.

*Variation.*—All specimens examined agree closely with the type. The fifth and sixth upper labials usually border the orbit; in only three of 21 specimens does the fourth shield also reaching the eye, and in two of the three specimens this occurs on one side of the head only; 1 preocular; 2 postoculars; temporals 2 + 2, two specimens have 3 + 2 on one side of the head; ventrals 175 to 184; subcaudals 102 to 118.

There is little variation in color. The color above is bluish green, bronze, or brown, depending in part on method of original preservation; a stripe which originates at the eye passes onto the neck and becomes indistinct at about the tenth subcaudal plate; a narrow ventrolateral stripe originates at the level of the twenty-fourth to fifty-second ventral plate and extends the length of the body; six to eight black lines are present on the posterior part of the body, usually beginning just after the midbody; occasionally the paravertebral stripes are absent; a black stripe is present on the underside of the tail. Taylor [(1922a) 174] records three specimens from Mindoro which lack dark stripes and which he believed could be assigned to *D. modestus*. The counts of these specimens agree with those of *D. c. luzonensis*. I have examined one of these [FMNH 15068, formerly Bureau of Science, Manila R413]. I have also seen a second specimen from Mindoro which lacks stripes but which otherwise appears to belong to *D. c. luzonensis* [AMNH 73414].

*Sexual dimorphism.*—Differences between sexes are slight. Males average a few less ventrals and more subcaudals than females. The range of variation in the sample of females is greater than that for the males in both ventrals and sub-

TABLE 5.—Summary of variation between sexes in *Dendrelaphis caudolineatus luzonensis*.

Character	Male			Female		
	N	Mean	Range	N	Mean	Range
Ventrals.....	11	* 177.6 ± 1.6 ± 0.5	175-181	12	180.7 ± 2.4 ± 0.7	177-184
Subcaudals.....	13	107.8 ± 5.2 ± 1.5	100-118	10	105.9 ± 5.1 ± 1.6	99-117
Tail length/ standard length.....	9	0.377	0.354-0.394	7	0.361	0.335-0.405

\* Mean, 177.6; standard deviation, 1.6; standard error, 0.5.

caudals, the extreme counts for the males falling within the range of female variation. The difference in means of ventrals between males and females is statistically significant, student's 't' test yielding a value of  $t = 3.546$  and a  $p < 0.001$ ; this is not true for subcaudal counts, however, there being no statistically significant evidence of sexual dimorphism in this character ( $t = 0.877$ ,  $p > 0.4$ ).

*Ecological notes.*—Skinks of the genus *Mabuaya* were found in the stomachs of two specimens. Since the skinks of that genus dwell on the ground, it seems likely that these arboreal snakes at least occasionally forage for food on the ground.

#### DENDRELAPHIS CAUDOLINEATUS TERRIFICUS (Peters).

- ? *Dendrophis picta*, GÜNTHER (1858) 148 (in part; var. B [fide BOULENGER (1894) 90]).
- ? *Dendrophis punctulata*, GÜNTHER (1858) 150 (in part; specimen 'o' [fide BOULENGER (1894) 90]).
- Dendrophis terrificus* PETERS (1872) 583 (type locality: see discussion below; type in Berlin Museum); BOETTGER (1886) 111 (in part; Samar [Loquilocun, Borongau], Mindanao; listed).
- Dendrelaphis terrificus*, BOULENGER (1894) 90 (Mindanao [type of *D. philippinensis* GÜNTHER], Celebes [Manado]; description, counts of material examined); BOETTGER (1898) 57 (Leyte [Ormoc], Mindanao [Dapitan]; listed); GRIFFIN (1911) 261 (in part; distribution compiled; listed in key); TAYLOR (1917) 360 (Negros; *D. caeruleatus* GRIFFIN a synonym of *D. terrificus*), (1922a) 174, pl. 23 (in part; Bantayan, Mindanao, Siquijor, Samar, Polillo; synonymy, description, color in life, variation, counts and measurements of material examined).
- Dendrelaphis caudolineatus terrificus*, MEISE and HENNIG (1932) 280 (in part; distribution compiled; descriptive notes).
- Dendrophis philippinensis* GÜNTHER (1879) 78 (type locality: northern Mindanao; type in British Museum).
- Dendrelaphis caeruleatus* GRIFFIN (1909a) 55 (type locality: restricted to Siquijor by MEISE and HENNIG (1932) 281; type

destroyed, formerly in Bureau of Science, Manila), (1910) 213 (Polillo Island; listed), (1911) 261 (Banton, Negros [Negros Occidental Province], Polillo, Siquijor; listed in key); TAYLOR (1917) 360 (regarded as a synonym of *D. terrificus*).

*Dendrelaphis fuliginosus* GRIFFIN (1909a) 55 (type locality: Negros; type destroyed, formerly in Bureau of Science, Manila; original description), (1911) 261 (listed in key); TAYLOR (1917) 359 (synonym of *D. modestus*).

*Dendrelaphis modestus* (nec BOULENGER), TAYLOR (1917) 359 (Negros [La Carlota; mountains near Isabela]; listed), (1918) 260 (Bubuan; listed), (1922a) 172, pl. 13, figs. 6-7 (in part; Negros Island and Sulu Archipelago; synonymy, description, color in life, variation, counts and measurements of material examined).

*Range.*—BANTAYAN. BANTON. BASILAN: Abung-Abung\*. BOHOL: Sierra Bullones (Cantaub Sitio\*). BUBUAN. CAGAYANCILLO\*. CEBU: Basak area\*, Tisa area\*. KALOTKOT\*. LEYTE: Abuyog\*; Carigara\*; Ormoc. MINDANAO: Agusan Province (Bunawan\*); Bukidnon Province (Del Monte Plantation\*); Cotabato Province (Buayan\*; Kraan Pt.\*; Parang\*; Talayan\*); Davao Province (Caburan\*; Davao\*; Malita\*; Madaum\*; Mt. Apo\*; Mt. McKinley\*; Santa Cruz\*); Lanao Province (Maigo\*); Zamboanga Province (Dapitan; Dicayo River, Katipunon\*; Sigayan\*; Zamboanga City\*). NEGROS: Negros Occidental Province (La Carlota; mts. near Isabela); Negros Oriental Province (Dumaguete\*). POLILLO: without exact locality\*. SAMAR: Borongau; Loquilocum; Matuquinao\*. SIQUIJOR. SITANKI\*. CELEBES: Gorontolo; Manado [?].

*Material examined* (67).—BASILAN: Abung-Abung (CAS 60347). BOHOL: Sierra Bullones: Cantaub Sitio (CAS-SU 18893). CAGAYANCILLO: (USNM 36112). CEBU: Basak area (CAS-SU 20724); Tisa area (CAS-SU 20699). KALOTKOT: (CAS 60575-60576). LEYTE: Abuyog (AMNH 88145); Carigara (CAS-SU 18461); Tarragona (FMNH 42800, 42848). MINDANAO: Agusan Province: Bunawan (CM 2193-2195); Bukidnon Province: Del Monte Plantation (CAS-SU 8673-8675, 14984); Cotabato Province: Parang (USNM 39306-39307); Buayan (FMNH 53409-53410); Kraan Pt. (MCZ 25737); Talayan (MCZ 25738); Davao Province: Caburan (FMNH 53405-53408); Davao City (FMNH 53411); Malita (FMNH 53404); Madaum (FMNH 53401-53402); Mt. Apo (USNM 34767); Mt. McKinley (FMNH 53400); Santa Cruz (FMNH 53403); Lanao Province: Maigo, 9 km. N. Kalam-

bugan (CAS-SU 18451, 18453); Zamboanga Province: Sigayan (FMNH 63162); Dicayo River, Katipunan (FMNH 68911); Zamboanga City and environs (CAS-SU 14981-14983, MCZ 13665). NEGROS: Negros Oriental Province: Dumaguete (CAS-SU 14923, 14959); Bonitas River, E. side Cuernos de Negros (CAS-SU 18784); Mabaya Creek, 20 km W. Bais (CAS-SU 18460); Palimpinon (CAS-SU 21077); Sibulan (FMNH 67409); Tolong (FMNH 62915); Negros Occidental Province: Isabela (CM 2629); La Carlota (CM 2627-2628). PANAY: (FMNH 41093-41096). POLILLO: (CAS 62403-62406). SAMAR: Matuquinao (FMNH 96611-96612; USNM 36426, 36429, 121737, 122208). SULU ARCHIPELAGO: Sibutu Group: Sitanki Island (CAS 15807); without exact locality (CAS 62490).

*Taxonomic notes.*—Meise and Hennig [(1932) 280] state that specimens from Samar and Luzon islands were in Peters' possession at the time he described *Dendrelaphis terrificus*, as well as a single specimen from Gorontalo, Celebes. In spite of the fact that Peters specifically described only the single specimen from Gorontalo, "Das einzige Exemplar dieser Art von Gorontalo . . .," Meise and Hennig nevertheless sought to restrict the type locality to Samar Island. It seems likely that Peters' specimen, said to have been collected by A. B. Meyer in the Celebes, was in fact taken in the Philippines, because A. B. Meyer's data was frequently found to be in error (see Footnote 1 from page 381).

Taylor [(1922a) 172-174] referred several specimens which lacked black ventrolateral stripes, generally characteristic of *D. caudolineatus* populations in the Philippines, to the Papuan species *D. modestus*. *Dendrelaphis modestus*, which Meise and Hennig, and Mertens, place as a subspecies of *D. caudolineatus*, differs from *D. caudolineatus* in its higher ventral count, in lacking a dark line beneath the tail, and in the absence of dark lines on the dorsum. I have re-examined several of the specimens which Taylor identified as *D. modestus* and find that I cannot agree with his identifications. In all but one specimen the black line on the underside of the tail, characteristic of Philippine populations of *D. caudolineatus*, is present. In addition, there are faint evidences of dark ventrolateral lines in most of the specimens, although it is quite evident that the specimens lack heavy deposits of melanin in those areas. The ventral counts, also, fall within the range of Philippine *D. caudolineatus*. From this I conclude that an abnormal color

phase has resulted from the lack of adequate pigment deposition along the border of the ventral and lateral scales. This conclusion is strengthened by the fact that the aberrant specimens have been taken at scattered localities, usually in company with normal *D. c. terrificus* with which they agree in all other characteristics.

*Diagnosis*—Single black stripe usually present along border of ventrals and outer row of scales, and bordered above by light yellowish green (in life) stripe, occasionally second narrow black stripe present between scale rows 2 and 3 on anterior one-fifth of body; ventrals 163 to 179.

*Supplemental description*—Maxillary teeth 19 to 23; 1 preocular, not in contact with frontal; 2 postoculars; 9, rarely 10, upper labials, fifth and sixth, rarely fourth, fifth and sixth bordering orbit; 10 lower labials, rarely 9 or 11, first 5 in contact with anterior chin shields; ventrals 163 to 179; subcaudals 98 to 110.

Color (in alcohol) usually green, bluish green, or medium gray above, most dorsal scales edged with black; narrow black line usually present between ventrals and outer row of scales, especially posterior, and frequently bordered above by light yellowish green line; below light yellowish green.

Color (in life) "Bright greenish bronze (when scales are shed in alcohol, bluish green to blue), each scale with a concealed lower portion bright blue, only noticeable when the skin is distended; scales edged for the most part with black, the skin between them also black; head somewhat darker brown above; a broad black stripe begins behind eye and continues some distance on side of neck, growing narrower; a zigzag black line borders ventrals; above this is a yellowish brown stripe, lighter than the body color, growing more indistinct as it continues along body; a zigzag line between subcaudals; a blackish area in loreal region; the black edges of the scales are more prominent on anterior part of body; lips and chin a greenish yellow; belly immaculate yellow." [Taylor (1922a) 175-176.]

*Sexual dimorphism*—Slight interisland variation necessitates treating the samples from each of the islands separately. These data have already been compiled for variations in ventrals and subcaudals (Tables 2 and 3). Unfortunately, none of the sample was sufficiently large to permit adequate statistical analysis. Comparison of the ventral counts between

sexes suggests that males average slightly fewer shields than females. The number of subcaudals, on the other hand, seems to vary independently of sex as does the tail length/standard length ratio (Table 6).

TABLE 6.—Summary of the variation in the ratio of tail length/standard length in *Dendrelaphis c. terrificus*.

Island	Male			Female		
	N	Mean	Range	N	Mean	Range
Bantayan	1	0.374				
Basilan	1	0.396				
Bohol				1	0.367	
Kalotkot				2	0.386	0.376-0.395
Leyte	1	0.405		2	0.369	0.360-0.378
Mindanao	7	0.388	0.366-0.415	16	0.386	0.332-0.428
Negros	2	0.384	0.383-0.385	6	0.388	0.352-0.419
Panay				2	0.378	0.374-0.382
Polillo	2	0.380	0.375-0.384	4	0.399	0.389-0.408
Samar	1	0.408		2	0.399	0.387-0.411
Siquijor	1	0.366				
Sulu Islands	1	0.360		1	0.387	

*Ecological notes.*—Two females, both collected on Polillo Island between July and August, 1920, were found to be gravid. Seven large eggs were present in one individual, the largest measuring 39 mm in length. Two young specimens, one from Bohol and one from Sitanki, probably not more than two and three months old (225 mm and 262 mm in standard length respectively) were taken during July and May. Assuming the incubation of the eggs takes about three months, the eggs from which these specimens hatched must have been laid sometime in February and April. From the above it would seem to follow either that there is continuous breeding among these snakes, or that the southern populations breed earlier in the year than those from the northern islands.

This snake has been taken only at low elevations, at or near sea level. There are no authenticated altitudinal records for above 100 feet, the latter being based on a specimen taken at Conel, Babuyan, Cotabato Province, Mindanao Island (FMNH 53409).

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## BOOK REVIEWS

Books reviewed in this section represent as a selection from those received occasionally by the National Institute of Science and Technology and the Philippine Atomic Energy Commission, two sister agencies under the National Science Development Board.

*The Pocket Encyclopedia of Plant Galls in Colour.* By Arnold Darlington, Philosophical Library, Inc., New York, 1968. 191 pp., illus. Price, \$7.50.

An excellent book for easy recognition of the commoner plant galls of temperate plants and their causes. The striking features of the book is the set of beautiful colored photographs and drawings which are accompanied by a descriptive text. The life histories of many of the causers are briefly summarized. The techniques of collecting and preserving galls, rearing, and culturing of the gall occupants are also discussed. For practical purposes, this pocketbook could be carried along in field trips thus making identifications of plant galls quite easy.

Biology students, teachers, and researchers alike will find this book very useful and handy. While it does not represent the plant galls found in the tropics, nonetheless it serves as a good reference and model for similar work that might be done for tropical plants.—C. R. B.

*Proceedings of the Fourth Conference of the International Organization of Citrus Virologists*, edited by J.F.L. Childs, Univ. of Florida Press, Gainesville, xvi + 404 pp., illus. Price, \$10.00.

The book is well organized into chapters which grouped together papers dealing with the same or related subjects. A total of 80 articles is presented and only about one-eighth of the book is devoted to the tristeza disease, a subject given considerable importance in previous symposia. The papers covered all known virus diseases of citrus, including cristicortis and other newly described virus diseases. Some new findings in the physiology and biochemistry of viruses causing citrus diseases as well as recent trends in the control of virus diseases are included. In the case of tristeza, bud certification has been widely practiced to prevent the spread of the

disease. In this conference, Fraser and others, advocating cross-protection, claim that "infection with mild strains can have a protecting effect under average orchard conditions for a considerable number of years. The current laboratory and field techniques used by various specialists are thus made available to researchers throughout the world. The appraisal of the disease status by countries is informative as well as useful in guiding plant quarantine officers with regard to movement of plant materials within a country or among countries.

This volume contains thorough reviews of citrus diseases caused by different viruses. There are, however, small experiments in their initial stages or very short papers which qualify research notes or short communications. As pointed out in Chapter 5, p. 169, the same disease in the Philippines was given two different names: leaf-mottle-yellows by Martinez and Wallace and leaf-mottling disease by Salibe and Cortez. During the conference, the authors and/or delegates could have settled for one name to avoid confusion.

In general the papers are brief and well written. The illustrations are nicely reproduced. Editing was almost perfect except for a few typographical errors.

This book is an invaluable reference and a splendid supplement to the three previous proceedings of the Conference of International Organization of Citrus Virologists (IOCV). Better participation from citrus-growing areas of the world is very obvious.—C. R. B.

Genius and Creative Intelligence. By Nathaniel D. Mittron Hirsch, Philosophical Library, Inc., New York, 1969. 339 p. Price, \$10.00.

This book was originally published in 1931, but the subject, as well as its treatment, is as timely new as it was then.

While the book is primarily directed towards the study of the nature of genius, it affords the reader an interesting glimpse into the nature of man. The first part of the book seeks to interpret the nature of man by analyzing his socio-historical development, particularly his methods of adaptation. Aside from physical and social adaptation, creative adaptation is advanced as the primary factor that leads to the development of man. Thus, the nature and necessity of creative adaptation is explained at length.

The greater part of the book, however, deals with the psychological constitution of man. The author proposes the thesis

that intelligence of the type possessed by animals lower than man, is part of or is an aspect of instinct. This, he calls, the First Dimension of Intelligence or Subjective Intelligence, which is nothing more than the cognitive aspect of instinct. He then proceeds with the thesis involving another dimension of intelligence, which he calls intelligence of the Second Dimension or Objective Intelligence, that is found in man alone. Its functioning produces both intellectual and moral traditions which gives man and man alone a "social heritage" and culture.

Yet these two dimensions of intelligence cannot explain the creative side of man's nature as manifested in original works of art and science, in the formation of religions and philosophies, etc. For this, the author proposes the coalescence of instinct and objective intelligence, forming what he terms the Third Dimension of Intelligence—Creative Intelligence. Its cognitive aspect is intuition, its conative aspect is the impulse to create, and its affective phase is the emotional experience of ecstasy. Its motor mechanisms may be language as in poetry and drama, symbols as in logic and mathematics, or even materials such as in those utilized in sculpture and painting.

All these lengthy discussion, however, constitute merely an introduction to the author's main thesis on the nature of genius. After reviewing (and unsuccessfully refuting) the theories on the nature of genius so far advanced by others, he proposes that genius is another psycho-biological species, differing as much from man as man differs from the ape. It seems that the genius is possessed of surplus powers which, from the coalescence of intelligence and instinct, enables him to draw from the psychobiological history of the human race through intuition, and thus create and re-create "ideas" in the form of immortal poems, inventions, music, scientific theories, etc.

While the theory itself is very interesting and the way in which the author describes and depicts his theory makes interesting reading, it is unfortunate that he did not spend as much space and time for a more thorough and profound discussion to support his theory on genius as he did for language and the different dimensions of intelligence. Of course, the author himself recognizes that no final study of genius is possible until a genius writes about genius.—R.F.F.

