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**NOTES ON CENTRAL AMERICAN AND  
MEXICAN CORAL SNAKES**

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The Central American coral snakes of the genus *Micrurus* were reviewed by myself (Field Mus. Nat. Hist., Zool. Ser., 20, pp. 29-40, 1933) just prior to my departure for Guatemala in November, 1933, to conduct the Mandel Guatemala Expedition, in which my share was supported by a John Simon Guggenheim Memorial fellowship. These snakes therefore formed an especial interest for our field work. Collecting for them was disappointing, as is usual with these secretive snakes, but I was able to see living specimens of two recently described forms and a specimen of *Micrurus affinis aglaeope* collected by my brother, F. J. W. Schmidt.

For aid in securing the very remarkable *Micrurus elegans veraepacis* I am especially indebted to Mr. Gustav Helmrich, owner of the Finca Samac, six kilometers west of Coban. Two additional specimens of this form were found dead on the roadside through the sharp eyes of Mrs. John P. Kellogg, on the occasion of a visit of Mr. and Mrs. Kellogg and myself to Samac.

The stay of our party at the great coffee plantation El Porvenir, at the foot of the Volcan Tajumulco, was made possible by the invitation of Dr. H. Goebel, of the Central American Plantations Company, and was rendered most agreeable and productive by the cordiality of the manager, Mr. Erich Zoller, and every member of the plantation staff. A considerable number of snakes, including *Micrurus nigrocinctus zunilensis*, were brought to us there through the cooperation of Don Rigoberto Pantaza, who was in charge of the workmen cultivating and clearing the plantation of undergrowth. One coral snake comes from the coffee plantation of Mr. Teodoro Engelhardt, Olas de Moca, at the base of the Volcan Atitlan, where my brother collected for a period of several weeks, and where the other members of the party were subsequently most hospitably entertained.



The gift of specimens of coral snakes collected at Quirigua by Dr. N. P. McPhail, of the United Fruit Company Hospital at Quirigua, enables me to redefine *Micrurus affinis hippocrepis* as the coral snake characteristic of the lower Motagua Valley.

Dr. E. R. Dunn, of Haverford College, who is engaged on a continued program of herpetological studies for lower Central America, has called my attention to some specimens of coral snakes from Panama which apparently represent an undescribed species. These are part of a very extensive collection of snakes and snake heads accumulated in Panama by Dr. H. C. Clark, of the Gorgas Memorial Institute, for the Museum of Comparative Zoology. A Costa Rican specimen, without definite locality, collected by Mr. J. C. Zeledon, is in the United States National Museum, and was loaned for comparison through the courtesy of Dr. Leonhard Stejneger.

I am indebted to Mr. H. W. Parker of the British Museum (Natural History) for the loan of coral snakes from British Honduras and from Coiba Island, Panama. The latter, with additional specimens from the Museum of Comparative Zoology, forwarded through the courtesy of Messrs. Arthur Loveridge and Benjamin Shreve, make possible the definition of a race of *nigrocinctus* from Coiba Island. Knowing my interest in the Upper Central American fauna, Dr. Thomas Barbour, Director of the Museum of Comparative Zoology, has forwarded Honduran collections made by Mr. R. E. Stadelman for identification. These include a few specimens representing *Micrurus nigrocinctus divaricatus* and *M. affinis aglaeope*.

Four specimens collected by Mr. Morrow J. Allen in eastern Nicaragua were submitted for examination through the courtesy of Messrs. Norman Hartweg and L. C. Stuart, of the Museum of Zoology of the University of Michigan, who have a report on Mr. Allen's herpetological collections in preparation. These clear up one of the principal remaining problems in the chain of subspecies of *Micrurus nigrocinctus*.

Mr. James A. Oliver, of the University of Michigan, has sent two specimens of *Micrurus diastema* from Colima.

Finally, Dr. Edward H. Taylor, of the University of Kansas, who is engaged in the study of his own Mexican collections, has forwarded a single coral snake for identification, which proves to be *Micrurus laticollaris* (Peters), known hitherto only from the original description in 1868. As the types were without definite locality, this specimen gives the first clue to the range of the species.



The list of species for which new information is available follows:

**Micrurus nigrocinctus zunilensis** Schmidt.

*Micrurus nigrocinctus zunilensis* Schmidt, Proc. Calif. Acad. Sci., (4), 20, p. 266, 1932; Field Mus. Nat. Hist., Zool. Ser., 20, p. 34, 1933.

Two specimens: Field Museum No. 20174, collected by F. J. W. Schmidt at Olas de Moca, Solola, Guatemala, at an altitude of 4,000 feet, January 10, 1934; and No. 20643, collected by myself at

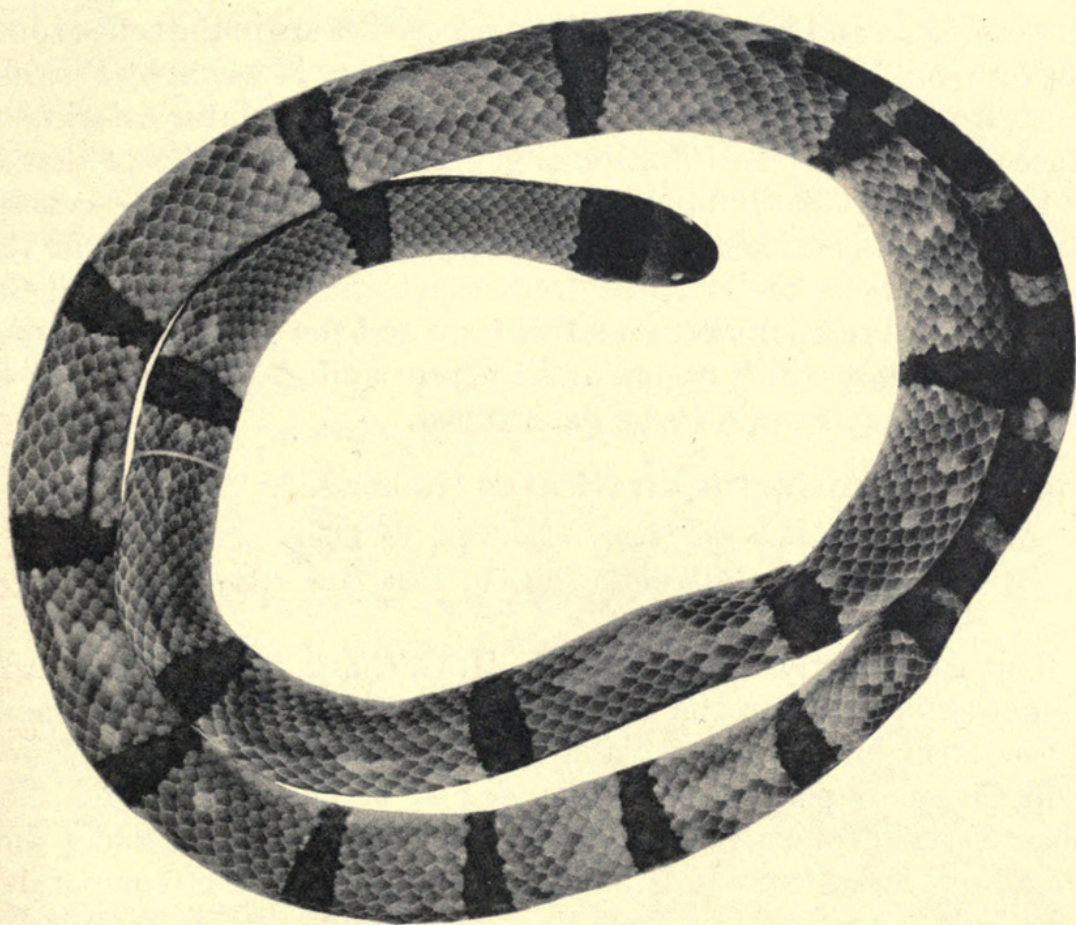


FIG. 24. *Micrurus nigrocinctus zunilensis* Schmidt, with typical coloration, from El Porvenir, Guatemala.

El Porvenir, San Marcos, Guatemala, March 5, 1934, at 3,400 feet. These fall within the range of variation of previously examined specimens. The complete absence of black spots on the scales of the red zones, the diagnostic character in this form, is constant. In life the colors of the Porvenir specimen were Madder Brown<sup>1</sup> in the dorsal scales of the red rings, each scale outlined with lighter red, lighter on the sides, which approach the Coral Red of the ventrals.

<sup>1</sup> Color names from Ridgway's *Color Standards* are capitalized.



Yellow rings Deep Olive Buff above, Pale Olive Buff below; light band on head Dark Olive Buff. The narrow yellow rings disappear entirely in alcoholic specimens.

The specimen from Olas de Moca was seen at the side of the road, and was caught by the tail when it sought refuge in a gopher hole. It was extremely active and attempted to bite when captured.

The localities from which this subspecies is known are El Porvenir, at the base of Tajumulco; El Cipres, at the base of Zunil; Patulul and Olas de Moca, at the foot of Atitlan; and Duenas, between Agua and Fuego. All of these localities are in the coffee zone. The form has been forwarded to the Senckenberg Museum by Fleischmann from Retalhuleu, and by Bernouilli to the Naturhistorisches Museum in Basel from Mazatenango, which would indicate that it ranges from about the upper level of the coffee zone to the coastal plain. These specimens, however, may well have come from the coffee zone above the localities from which they were sent, and the distributional relations between this form and the even more distinct *M. latifasciatus*, which occurs at El Cipres and at Olas de Moca in the coffee zone, remain to be determined.

***Micrurus nigrocinctus divaricatus* (Hallowell).**

*Elaps divaricatus* Hallowell, Jour. Acad. Nat. Sci. Phila., (2), 3, p. 36, 1855.

*Micrurus nigrocinctus divaricatus* Schmidt, Field Mus. Nat. Hist., Zool. Ser., 20, p. 33, 1933.

Due to the active interest of Dr. H. C. Clark, now of the Gorgas Memorial Institute in the Canal Zone, large numbers of specimens of this form have been available for examination from the United Fruit Company plantations in the vicinity of Tela, Honduras. The range of scale counts in this series, 195–212 in forty-six males and 207–220 in forty females, is almost the same as that of comparable series in *M. m. nigrocinctus* from Panama, so that only the irregularity and greater amount of the black pigment in the red zones remains to distinguish *divaricatus*.

A peculiarity of the Tela series is the emargination of the posterior border of the black on the top of the head, which apparently characterizes the population in the Lancetilla Valley, but is variable or absent in specimens from the various inland plantation districts.

***Micrurus nigrocinctus coibensis* subsp. nov.**

*Type* from Coiba Island, Panama. No. 26.1.20.76 British Museum (Natural History). A medium-sized male specimen. Collected in 1926 by the St. George Expedition.



*Diagnosis.*—Distinguished from *M. nigrocinctus nigrocinctus* of the adjacent Panama mainland by a higher number of ventrals in each sex, lower number of caudals, and greatly reduced black spotting of the red scales.

*Description of type.*—Proportions and head-shields of the normal *nigrocinctus* type; supra-anal tubercles well developed; upper labials 7-7, lower labials 7-7, oculars 1-2, temporals 1-1, ventrals 217, caudals 44, dorsal scales in 15 rows; 17 black rings on the body, and 6 on the tail; the black rings  $3\frac{1}{2}$  scales and 3 ventrals in length, the red rings 10 to 12 ventrals; black spotting on the red scales present on about one-tenth of the scales; nuchal ring crossing the tips of the parietals with a projection forward on to the parietals and reaching the tips of the chin-shields beneath, extending from the second to the sixth ventral; yellow rings barely distinguishable, one full scale-length wide; black of the snout with irregular posterior border, projecting on each parietal.

*Measurements.*—Total length 476, tail 60.

*Notes on paratypes.*—Three specimens in the British Museum, 26.1.20.77-79, and three in the Museum of Comparative Zoology, Nos. 37061-3, include two additional male specimens and four females; the ventrals and subcaudals in the two males are 213 and 216, and 43 and 48; in the females 230, 228, 228, and 229, and 35, 34, 31, and 33. In forty-two males from Panama the range in ventrals is 194 to 212, and in 39 females from 209 to 222, so there is no overlap in this character. *M. nigrocinctus zunilensis* in Guatemala has undergone a loss of the black spotting in the red zones similar to that of *coibensis*, but this form has a lower scale count. *M. nigrocinctus coibensis* is thus distinguishable from any known coral snake.

### ***Micrurus nigrocinctus alleni* subsp. nov.**

*Type* from Rio Mico, seven miles above Rama, Siquia District, Nicaragua. No. 307 Museum of Zoology, University of Michigan. Adult female. Collected in 1935 by Morrow J. Allen.

*Diagnosis.*—An ally of *Micrurus n. nigrocinctus* and *M. n. divaricatus*, with a much higher number of ventrals in both sexes, very wide yellow bands, and a backward projection of the black marking of the head.

*Description of type.*—Head slightly wider than body, somewhat flattened; head-shields with normal arrangement but extensively coalesced; temporals 1-1; ventrals 240; anal divided; caudals 37;



17 black rings on the body and 4 on the tail; black rings 4 ventrals in width; yellow bands 3 or 4 ventrals wide, always covering 2 full dorsal scales, widening at the sides; red zones with scales heavily black-spotted; black marking of the snout projecting backward on the frontal to the parietal.

*Measurements.*—Total length 1,068, tail 90.

*Notes on paratypes.*—The addition of four specimens to those previously known from eastern Nicaragua settles the status of the

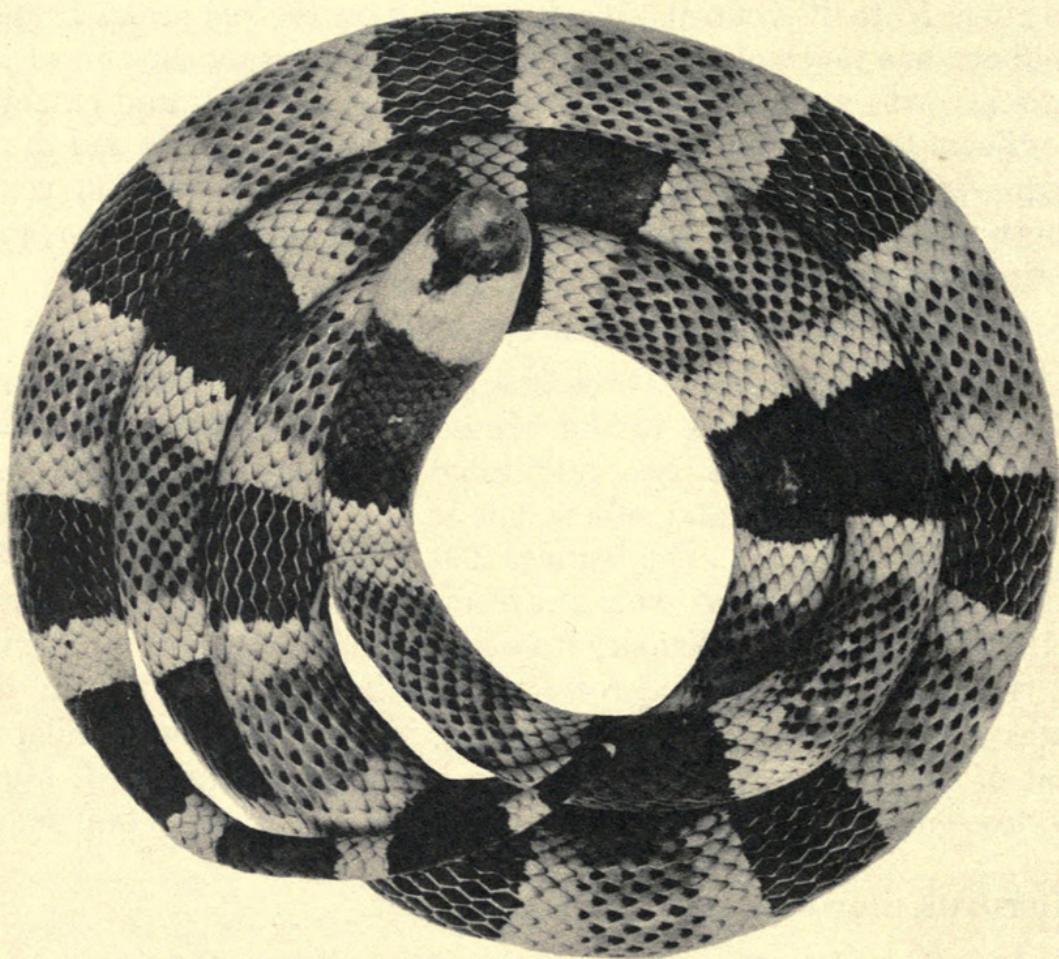


FIG. 25. *Micrurus nigrocinctus alleni* Schmidt, type, from Rio Mico, Nicaragua.

coral snakes of this area, which has been far from clear. Besides the type, Mr. Allen obtained a second large female, and two juveniles, male and female. The Nicaragua expedition of the American Museum of Natural History collected two specimens with high ventral count in this area, Nos. 12703-4. A specimen in the Academy of Natural Sciences of Philadelphia, No. 6844, from Machuco, collected by Dr. J. E. Bransford, may be placed here; there are two specimens in



the United States National Museum, No. 15306 from Cape Gracias, and No. 20688, with no other data than Nicaragua; and four specimens in the Museum of Comparative Zoology, Nos. 9569 from Matagalpa and 3801, 5486, and 5486a from Polvon. In this series (including the type) the ventrals vary from 205 to 227 in six males and from 230 to 240 in seven females; caudals 57–60 and 36–41.

*Remarks.*—In addition to its distinctive peculiarities of coloration, the new form is well distinguished by the much higher number of ventrals. *Micrurus n. mosquitensis* overlaps its range, occurring also at Matagalpa, and the only evidence of intergradation is furnished by two male specimens in the American Museum collection, Nos. 12700 and 12701 (with 196 and 197 ventrals) from Kanawa and Big Falls on the Pis Pis River; these specimens I interpret as hybrids rather than as the normal type of intergrades between geographically distinct subspecies. *M. n. divaricatus* of northern Honduras and *M. n. nigrocinctus* of western Nicaragua may well prove to intergrade with the new form when the ranges are traced out. The specimens at present known exhibit the following geographic variation in ventrals and caudals:

		Ventrals	Caudals
Honduras ( <i>divaricatus</i> )	46♂	195–212	45–55
	40♀	207–220	35–41
E. Nicaragua ( <i>alleni</i> )	6♂	205–227	51–60
	7♀	230–240	36–41
E. Nicaragua ( <i>mosquitensis</i> )	6♂	188–192	46–54
	4♀	203–208	33–37
W. Nicaragua ( <i>nigrocinctus</i> )	1♂	200	51
	1♀	214	..
Panama ( <i>nigrocinctus</i> )	49♂	194–218	45–54
	40♀	209–227	32–39
Coiba Id., Pan. ( <i>coibensis</i> )	3♂	213–217	43–48
	4♀	228–230	31–35

*Elaps melanccephalus* Hallowell, from Ometepe, western Nicaragua, is not the form here described.

#### *Micrurus clarki* sp. nov.

*Type* from Yavisa, Darien, Panama. No. 38390 Museum of Comparative Zoology. Juvenile male. Collected in 1934 by Dr. H. C. Clark.

*Diagnosis.*—Allied to *Micrurus mertensi* and *M. peruvianus* by absence of supra-anal tubercles, the black cap and type of body pattern, and more remotely to *M. corallinus* of eastern Brazil; the ven-



tral scales are much fewer than in *mertensi* and the number of black rings much fewer than in *peruvianus*; and the tail is much longer, with a higher number of caudal scales, than in *corallinus*.

*Description of type.*—Body form and general appearance of *Micrurus corallinus*; upper labials 7-7; lower labials 7-7, oculars 1-2, temporals 1-1; right internasal fused with prefrontal of the same side; ventrals 199; anal divided; caudals 58; parietals angulate at the sutures of temporals and post-temporals, and produced at the postero-lateral angles into distinct points; 13 black rings on the body, usually three ventrals in width, and 7 on the tail; the nuchal black ring six scales long, narrowed ventrad to three ventrals; yellow rings one scale-length wide; scales of the yellow and red zones uniformly spotted with black at the tips; black of head extending to tips of parietals; yellow nuchal scales heavily black-margined; black caudal rings separated by yellow rings which are immaculate beneath but heavily black-mottled above; red ventrals immaculate.

*Measurements.*—Total length 274 mm., tail 41 mm.

*Notes on paratypes.*—An adult male (U.S.N.M. 14062 from Costa Rica) without supra-anal tubercles, with 192 ventrals and 53 caudals, and with the same peculiar head pattern, clearly belongs here. The black rings number 16+9. The existence of numerous heads in the Clark collection from Darien, all with exactly the same coloration, proves that the form is common in that region. Six of these heads, catalogued as Field Museum No. 21068, may be retained as paratypes until further complete specimens become available.

*Remarks.*—The Costa Rican specimen suggests that there are two or more isolated populations of this species on the Pacific side of Panama and Costa Rica. *Micrurus clarki*, without supra-anal tubercles, is separated from the Peruvian and Brazilian species which agree with it in this character by a series of forms in Colombia and Venezuela in which the tubercles are highly developed.

### ***Micrurus affinis alienus* (Werner).**

*Elaps alienus* Werner, Zool. Anz., 26, p. 249, 1903.

*Elaps fulvius* Boulenger, Cat. Snakes, 3, p. 422, 1896—part.

*Elaps fulvius* var. *sapperi* Werner, Abh. Bayer. Akad. Wiss., (2), 22, p. 350, 1903.

*Micrurus affinis stantoni* Schmidt, Field Mus. Nat. Hist., Zool. Ser., 30, p. 36, 1933.

Through the courtesy of Dr. Victor Van Straelen, Director of the Musée National de Belgique, the type of *Elaps alienus* was loaned



for examination in connection with the present studies. This specimen was adequately described by Werner; it is characterized by the reduction of the black rings to a half ring in the nuchal region, and a single one anterior to the anus; anal plate and all subcaudals entire; top of head black to tips of parietals; temporals 1-1 on one side, 1-2 on the other. I can now add that there is no trace of supra-anal tubercles. This combination of characters is unique.

Since the form was described from a specimen of unknown provenience it is necessary to search the variation tendencies of the known forms in order to allocate the name. The forms in which reduction of the black rings or various irregularities in them are known are *Micrurus diastema* of western Mexico, *Micrurus antioquiensis* from Medellin, *Micrurus affinis stantoni* from British Honduras and Peten, *Elaps fulvius* var. *sapperi* from Guatemala, and *Micrurus nigrocinctus divaricatus* from northern Honduras. The Medellin form is suggested by the black cap, but this is excluded by the want of supra-anal tubercles in *alienus*; and *M. diastema* appears to be excluded by the number of entire subcaudals and the black cap. The tendency to great increase in the number of undivided subcaudals, to irregularity of the black rings, to the temporal arrangement 1-2, and to the extension of the black of the snout backward on the parietals in Belize specimens makes it probable that this is the true source of the type of *alienus*; and this hypothesis is greatly strengthened by the fact that certain other material is known to have reached the Brussels Museum from Belize.

Since there is no trace of a coral snake with supra-anal tubercles in the Motagua or Izabal drainage basins in Guatemala, and since most of the material described by Werner in 1903 from that country came from Alta Verapaz, I now incline to place that author's *Elaps fulvius* var. *sapperi* in the synonymy of *alienus* on grounds of geographic probability and on account of its reduction of the black rings to dorsal spots. Unfortunately the type of *sapperi* could not be found in the Zoologische Staatssammlung in Munich in 1932, and it has been impossible to check the presence or absence of supra-anal tubercles in it.

Mr. H. W. Parker of the British Museum has forwarded four additional specimens, which agree well with my diagnosis of this form under the name *stantoni*. I infer that the range of this form meets that of *M. affinis affinis* somewhere in Tabasco, *M. a. apiatus* on the high plateau of Alta Verapaz, and *M. a. hippocrepis* in the Lake Izabal Valley in lowland Guatemala.



**Micrurus affinis hippocrepis** Peters.

*Elaps hippocrepis* Peters, Monatsber. Akad. Wiss. Berlin, 1861, p. 925, 1861.

The type locality of *Elaps hippocrepis* is clearly the Santo Tomas opposite Puerto Barrios in the Atlantic lowland of Guatemala. The type, examined in Berlin in 1932, agrees closely with three specimens from Quirigua presented to the Mandel Guatemala Expedition by Dr. P. N. McPhail. This form differs from *alienus* in its more regular color pattern and from *apiatus* in its reduced number of body rings. It is to be presumed that this subspecies is the form characteristic of the broad Motagua Valley. The five known specimens agree in having a light snout, and the range of variation of ventrals is small; they are 204 in the single male specimen from Quirigua and range from 220 to 226 in four females.

**Micrurus affinis aglaeope** Cope.

*Elaps aglaeope* Cope, Proc. Acad. Nat. Sci. Phila., 1859, p. 344, 1859.

*Micrurus affinis apiatus* Schmidt, Field Mus. Nat. Hist., Zool. Ser., 20, p. 37, 1933—part.

*Type locality*.—Honduras.

A specimen of this striking form was collected by Mr. Leon L. Walters and myself on a path skirting Lake Yojoa, Honduras, in 1923. A second specimen was collected by my late brother, F. J. W. Schmidt, at Bobos Plantation in the northern foothills of the Sierra Merendon south of the United Fruit Company headquarters at Bananera, Guatemala; and the third specimen known, in addition to the type, was sent by Mr. R. E. Stadelman to the Museum of Comparative Zoology from San Pedro Sula, where it had been collected by Dr. S. M. Waller. Since the rings on these four specimens range only from 27 to 34, as compared with 30 to 66 in *apiatus* from Alta Verapaz, and as the Honduran snakes are separated from the latter region by the broad Motagua Valley inhabited by still another race of coral snakes, *Micrurus affinis hippocrepis*, I believe it will be useful to maintain *aglaeope* as the race of *affinis* in Honduras. Perhaps it is somewhat more of a highland snake than is thus far indicated.

**Micrurus elegans verae-pacis** Schmidt.

*Micrurus elegans verae-pacis* Schmidt, Field Mus. Nat. Hist., Zool. Ser., 20, p. 32, 1933.

Four specimens of this fine coral snake were obtained by the Mandel Guatemala Expedition. Two of these were picked up from the roadside en route from Coban to Samac. Two more, a male and



a female, were obtained at Samac through the help of Mr. Gustav Helmrich, who detailed a workman to help me so that I was able to work through a large compost heap in the coffee plantation. In these specimens the larger light rings were Capuchin Yellow, the dorsal scales yellow with dusky tips; the ventral section was clear;

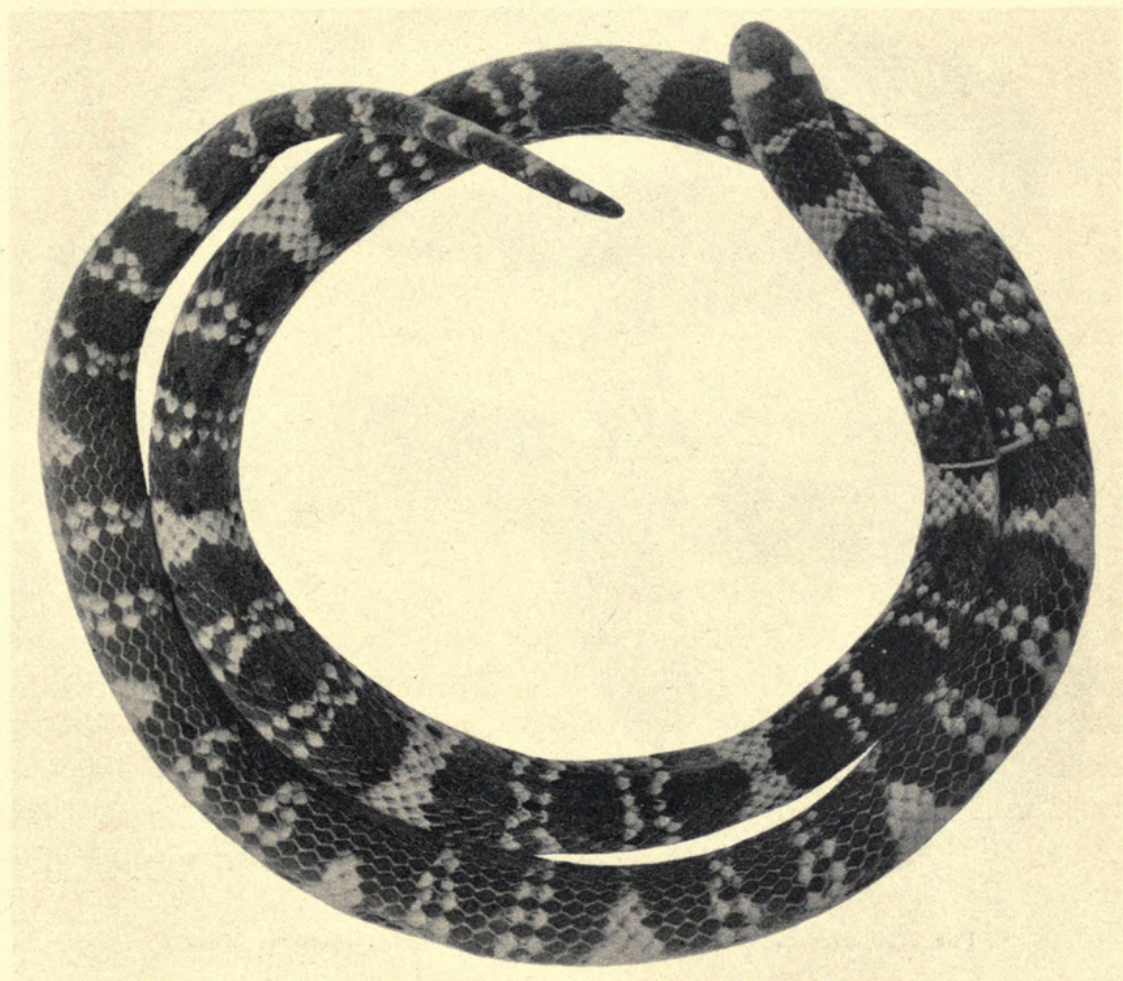


FIG. 26. *Micrurus elegans verac-pacis* Schmidt, from Samac, Alta Verapaz.

the narrow light rings were pure white; the black was a shiny dead black. The ventrals and caudals of these specimens number 210 and 48 in the male and 225 and 34 in the female, thus agreeing exactly with the typical series. The specimens were extremely active when turned out with the fork, and bit the forceps when caught.

### ***Micrurus laticollaris* (Peters).**

*Elaps marcgravii* var. *laticollaris* Peters, Monatsber. Akad. Wiss. Berlin, 1869, p. 877, 1869.

*Micrurus laticollaris* Schmidt, Field Mus. Nat. Hist., Zool. Ser., 20, p. 39, 1933.

A specimen of this striking form, the only species north of Panama with the black rings in triads, other than *Micrurus elegans*



and its ally *verae-pacis*, was collected by Dr. Edward H. Taylor at the intersection of the Mexico City–Acapulco Road with the Balsas River, near Mezcala, Guerrero. This specimen (in the University of Kansas), a female, has 216 ventrals and 35 caudals; there are 7 triads of black

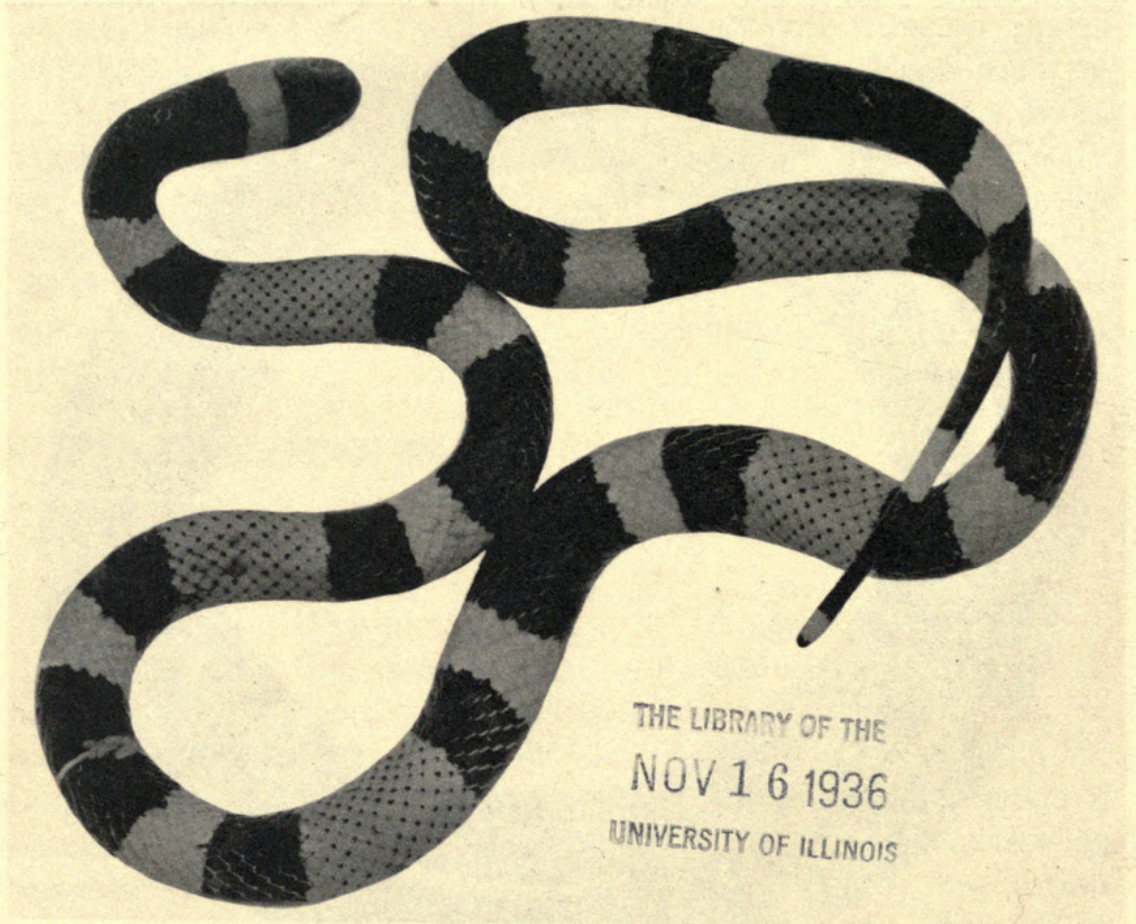


FIG. 27. *Micrurus laticollaris* (Peters), from Mezcala, Guerrero, Mexico.

rings on the body (more correctly  $\frac{2}{3} + 5 + \frac{2}{3}$ ), and 2 broad black bands on the tail in addition to the black tip.

***Micrurus diastema diastema* (Duméril and Bibron).**

*Elaps diastema* Duméril and Bibron, *Erpétol. Gén.*, 7, p. 1222, 1854.

*Micrurus diastema diastema* Schmidt, *Field Mus. Nat. Hist., Zool. Ser.*, 20, p. 38, 1933.

Two specimens collected at Colima by Mr. James Oliver of the University of Michigan were kindly forwarded by him for examination. These agree excellently in scale characters with the series already examined from Colima, but do not exhibit any tendency to reduction of the black rings to dorsal spots which is frequent in this form.





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