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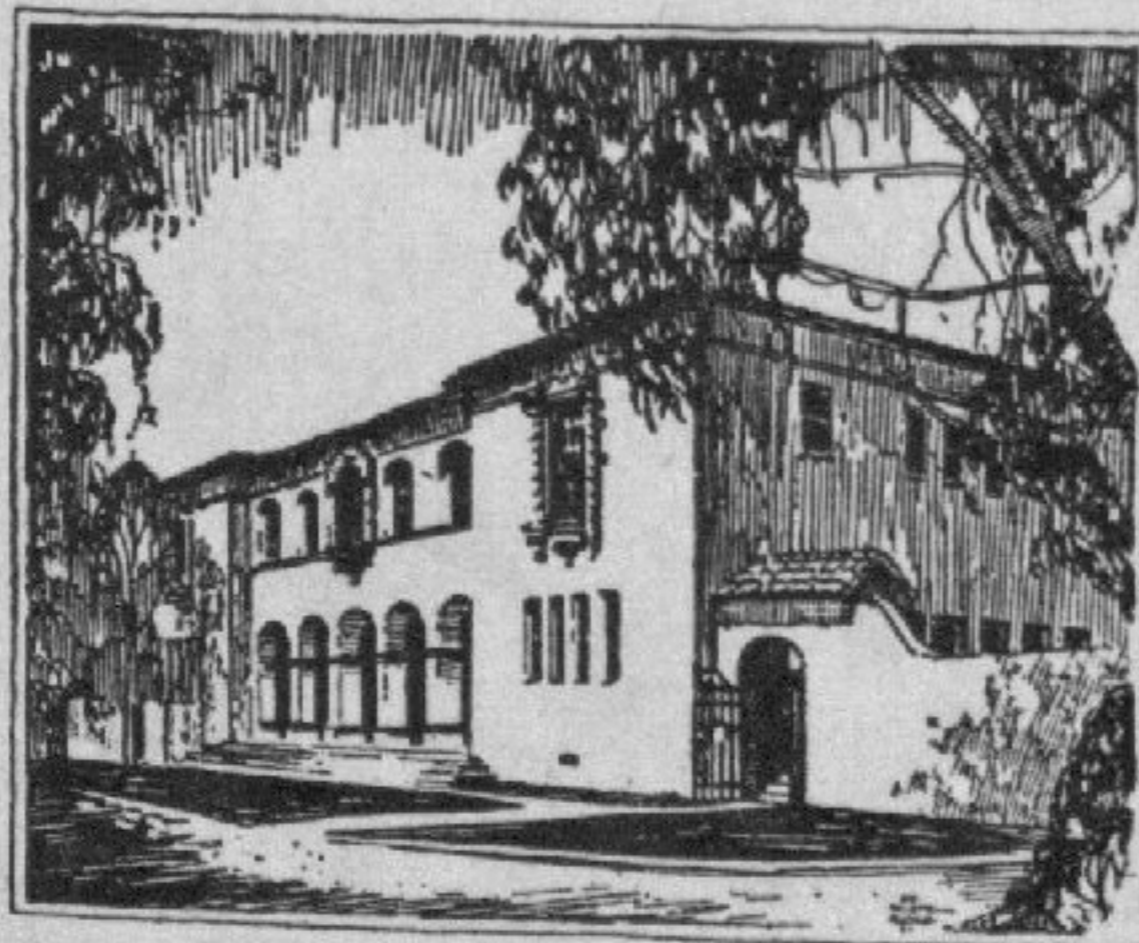
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**Taxonomic Studies of the Rattlesnakes  
of Mainland Mexico**

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## THE INTERMEDIUS GROUP

Dr. Hobart M. Smith (1946, p. 79)\* made a notable contribution to the taxonomy of the montane rattlesnakes of Mexico when he pointed out the differences that segregate the snakes of the *omiltemanus* (= *intermedius*) group from such forms as *triseriatus*, *pricei*, and *lepidus*, and their subspecies — differences of head size, scale keeling in the parietal region, and the simplifications and suppressions in the scales of the side of the head in *intermedius*, particularly in the ocular-loreal-nasal region. Once this group of rattlesnakes is separated from the others, the understanding of all is greatly facilitated and clarified. My reason for adopting the name *intermedius* for the group instead of *omiltemanus* will appear hereafter.

Of the *intermedius* complex, I have had available for study 22 specimens, and some additional data are at hand on three more. Since at least three forms are involved, the material is meagre and the conclusions are, at best, tentative. I shall first discuss the differences that distinguish the *intermedius* group from *triseriatus* and others, using all the available *intermedius* specimens as a unit, without segregating them into subspecies.

*Outstanding Intermedius Characters.*—The small head of the *intermedius* rattlers, as pointed out by Smith, is a real difference, although the application in diagnosis of an ontogenetically variable character of this type is rather unsatisfactory. I find that all the *intermedius* specimens, with the exception of two *transversus*, fall close to the regression line  $H = .031L + 6.5$ .† This is well below the corresponding lines of *triseriatus*, *aquilus*, *pusillus*, and *pricei*, especially in the adult ranges. The head lengths of adults 550 mm. long over-all have averages (to the nearest ½ millimeter) as follows: *triseriatus* 29, *pusillus* 28, *aquilus* and *pricei* 27, *intermedius* group 23½. Thus the linear adult difference between *intermedius* and the others is at least 15 per cent. Remembering that this means a difference of not less than 50 per cent in bulk, it will be seen that *intermedius* has a notably small head. In adults the difference can be easily seen without the necessity of measurements; it is not so marked in juveniles.

The tail-length regression lines for the *intermedius* group are approximately  $T = .083L + 1.2$  in the males, and  $T = .061L + 2.9$  in the females. The snakes of the *intermedius* group are shorter-tailed than *triseriatus*, *aquilus*, and *pusillus*, although the differences are hardly sufficient to be of diagnostic value. The *intermedius* tail proportionality is about the same as that of *pricei*. The fangs

\* Full citations to references of this type will be found in the bibliography.

† I fully realize the anomaly of straight-line equations with constant terms for body proportionalities of this type; however, their practicality and reasonable accuracy, within the usual range from juveniles to adults, fully justifies their use, in preference to slightly more accurate but also more complicated higher-degree curves passing through the origin. It is to be understood that, where equations of this type are given in the present studies, all dimensions are expressed in millimeters.

in *intermedius* are short, not only in proportion to the body, as might be expected in a short-headed snake, but in proportion to the head as well.

The rattle widths are found to be different in two subspecies of *intermedius* and therefore will be discussed separately under the subspecies.

All available specimens of the *intermedius* group have 21 scale rows at mid-body, thus showing a similarity to *pricei* rather than to *triseriatus*, *aquilus*, and *pusillus*. The same is true of the labials, which are lower (on the average) in the *intermedius* group and *pricei* than in the others. Also, in the intersection of the anterior subocular with the supralabials, similar relationships are evident; for, in the *intermedius* group, the labials contacted are the third and fourth as in *pricei*, rather than the fourth and fifth as is normal in *triseriatus*, *aquilus*, and *pusillus*.

Smith (1946, p. 98) has pointed out the absence of keeling on the posterior head scales of the members of the *intermedius* group. This difference is quite apparent, particularly as to the parietal, rather than the occipital region, for the parietal region scales are smoother in *intermedius* than in *triseriatus*. Farther back, both groups have keeled scales, although the ridges are more accentuated in *triseriatus*.

In squamation, the outstanding divergences of the *intermedius* group involve the contacts of various scales on the side of the head. None of these characters is invariable in the members of the *intermedius* group, with a corresponding difference in other rattlers, and hence unfailing key characters are not at hand. Nevertheless, in summation, they do testify to the unity of this group and its definite separation from *triseriatus*, *aquilus*, and *pusillus*. Among all rattlesnakes the one most nearly related to *intermedius* is undoubtedly *pricei*, as confirmed by several characters already mentioned.

The head-scale items above referred to are these: (1) A frequent contact of the prenasal\* and the loreal over the top of a much reduced postnasal. This does not occur in a majority of specimens of the *intermedius* group, but certainly it is more frequent in these than in any other form. In fact, I have seen only one specimen, a *pricei*, belonging to any other species, in which this contact was made. Borderline cases are frequent in the *intermedius* forms; in these the internasals, prenasals, postnasals, and loreals meet at a point. But whether the prenasal-loreal contact is, or is not, effected, the jutting of the prenasal over the postnasal, with a reduction of the latter in size, is characteristic of the *intermedius* forms.

(2) The loreal contacts one or more supralabials. This contact is almost always made in *intermedius* and *omiltemanus* (but not in *transversus*), and is found in no other rattlesnake. In the material I have examined, it fails only on one side of a single *i. intermedius*, and on one side of an *i. omiltemanus*. It is probably the best single character for recognizing the *intermedius* complex.

\* I prefer the continued use of the older terms prenasal and postnasal to Smith's preseminasal and postseminasal.

(3) Lack of prefoveals.\* These are nearly always absent in the *intermedius* group but are present to the extent of one or more in all other species. Occasionally a pit-border scale or lacunal extends so far forward out of the pit in *intermedius* that it is difficult to tell how it should be classified—whether as a lacunal or prefoveal.

(4) In most rattlesnakes the crescentic lower preocular passes forward along the upper edge of the pit until it ends in contact with the loreal. In *intermedius* and its allies, the lower preocular generally passes into the pit, thus failing to contact the loreal. In some specimens this is quite clear, but in others it is difficult to tell whether a contact with the loreal is made just on the edge of, or within, the pit. I have not found this a particularly satisfactory character in classifying specimens, although, as an additional peculiarity of *intermedius*, it is important.

Smith (1946, p. 81) has called attention to differences between the jaw bones of *intermedius* and *triseriatus* subspecies. Were more material to be skeletonized, these differences might prove to be of the highest importance.

Having discussed the *intermedius* group as a group, I shall now proceed to a consideration of the several species and subspecies that are included in it.

### ***Crotalus intermedius intermedius* Troschel**

#### TOTALCAN SMALL-HEADED RATTLESNAKE

1865. *Crotalus intermedius* Troschel, in von Müller, Reisen in Vereinigten Staaten, Canada und Mexico, vol. 3, p. 613
1882. *Crotalus intermedius* Fischer, [not of Troschel, 1865], Abh. Nat. Ver. Bremen, vol. 7, p. 230
1896. *Crotalus triseriatus* (part) Boulenger, Cat. Snakes Brit. Mus., vol. 3, p. 581

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\* Smith advocates the term subloreal for the small scales that, in most rattlesnakes, occupy the area (usually triangular) between the postnasal, lower loreal, pit-border, and supralabials. I prefer the term prefoveals, as, in many species (e.g. *molossus*), these scales extend forward, between the prenasal and the first supralabial, to the rostral, and hence occupy an area far removed from the loreal. It is true that in some species they extend backward between the pit-borders (or lacunals) and the labials and would, in such an instance, deserve the name of subfoveals, the prefoveals and subfoveals being distinguished from each other as postoculars are segregated from suboculars. In any case, these small scales are more nearly related to the pit than to the loreal. The new scale designations foveal, lacunal, pre- and postsupraloreal, preciliary (as applied to rattlesnakes), postrostral, and interoculabial were arrived at in discussions with Charles H. Lowe, Jr., and Kenneth S. Norris, and comprise our joint recommendations. The lacunals are the scales forming the inner border of the pit. Pre- and postsupralorals are self-explanatory; they are particularly prevalent in *molossus*, *basiliscus*, and *durissus*. A preciliary is a small scale sometimes detached from the upper posterior corner of an upper preocular. Postrostrals are scales in contact with the rostral, and lying between the prenasal and the first supralabial. Where an unbroken chain of prefoveals reaches the rostral (as is usual in *molossus*) all, including the one touching the rostral, are counted in totaling the prefoveals. Interoculabials are the scales between the eye and the lip, including a subocular and a supralabial at the upper and lower ends of the series. They are usually counted below the center of the eye.

1936. *Crotalus triseriatus triseriatus* (part) Klauber, Trans. San Diego Soc. Nat. Hist., vol. 8, no. 20, p. 247
1940. *Crotalus triseriatus anahuacus* (part) Gloyd, Chi. Acad. Sci. Spec. Pub. no. 4, p. 91.
1941. *Crotalus triseriatus gloydi* Taylor, Univ. Kans. Sci. Bull., vol. 27, pt. 1, no. 7, p. 130.
1946. *Crotalus gloydi lautus* Smith, Univ. Kans. Sci. Bull., vol. 31, pt. 1, no. 3, p. 75
1946. *Crotalus gloydi gloydi* Smith, Univ. Kans. Sci. Bull., vol. 31, pt. 1, no. 3, p. 78

Unfortunately, the type specimen of Troschel's *Crotalus intermedius*, once contained in the Bonn Museum, is no longer available, having been destroyed in World War II, as I have lately been advised by Dr. Robert Mertens.

*Nomenclatorial Problems.*—It has usually been assumed that *Crotalus intermedius* Troschel, 1865, was either a synonym of *triseriatus* Wagler, 1830, or was unrecognizable. As a matter of fact, it may definitely be shown to belong to the form described as *Crotalus gloydi lautus* by Smith in 1946; for both the original description, which is quite complete, and the itinerary of the collector, Baron von Müller, sharply narrow the possibilities to the short-headed rattlesnakes, and especially to the subspecies that, for the purposes of this discussion, I shall designate by the vernacular name of Totalcan small-headed rattlesnake.

The type of *intermedius* Troschel was described as having 21 scale rows, 160 ventrals, 20 subcaudals (therefore a female), 10 supralabials of which the fourth and fifth were separated from the orbit by a single scale, a pair of internasals, a pair of canthals, 3 intercanthals (thus making a total of seven scales in the internasal-prefrontal area), 3 intersupraoculars, and more than 40 dorsal body blotches. The type was only 16½ inches long, yet had 4 rattles.

Baron von Müller's expedition took him only to the states of southern Mexico; altogether, he visited Veracruz, Puebla, Distrito Federal, Morelos, México\*, Guerrero, and Oaxaca. The combination of 21 scale rows and 7 scales on the crown at once limits the possibilities in this area† to *triseriatus* and

\* I have made it a quite illogical practice to use an accent in designating the state but not the country.

† As a matter of fact, it is not necessary to lean heavily on von Müller's itinerary in order to eliminate contenders for the name *intermedius*. Only one other rattlesnake, *pricei*, comes near to conforming to Troschel's type, and this does not fit unless we assume the type to have been one of the rarely found specimens of *pricei* with nearly all dorsal blotches cross-confluent. Even conceding this assumption, by applying R. A. Fisher's method of compounding probabilities to the squamation of Troschel's type in comparison with the known population statistics of *pricei* and the Totalcan rattlesnake, we find that the relative probability of Troschel's type being *pricei* is .22, compared with .93 in the case of the Totalcan small-headed rattler. As von Müller, at his closest point, was separated from the *pricei* range by about 400 miles, I think we are justified in dropping *pricei* from consideration.

the small-headed rattlesnakes. Of these, *omiltemanus* and *transversus* are eliminated since the ventrals in the type are too low for the former and too high for the latter. Of the southern subspecies of *triseriatus*, the one inhabiting the area traversed by von Müller, I have had available for study about 110 specimens. Of these only 4 have 21 scale rows, and none has as few as 10 supralabials. No female has more than 152 ventrals (although the type of *triseriatus*, a male, has 159), and only 2 females out of 43 have as few as 20 subcaudals. The type description fits the northern subspecies no better, besides which von Müller did not traverse the habitat of the northern subspecies. Thus we find that Troschel's type, to have been a *triseriatus*, would of necessity have been anomalous in several characters. On the other hand, every one of these characters is close to the mode of the Totalcan small-headed rattlesnake. Indeed, one specimen, out of the eight of that form available to me, exactly matches Troschel's type in all but one scale character; it duplicates the type in scale rows, subcaudals, supralabials, intercanthals, and intersupraoculars. Only in the ventrals is there a slight deviation, for this specimen has 162 compared with 160 in the type. This single variation is of no importance, as the Totalcan female range is from 157 to 165, thus bracketing the type. From these data we see how remote is the possibility that the type of *intermedius* Troschel could have represented the species designated *triseriatus* by Wagler, and how perfectly it fits the Totalcan small-headed rattler, and no other.

By a most peculiar coincidence Fischer, in 1882, also described a Mexican rattlesnake under the name *Crotalus intermedius*, being unaware of Troschel's prior use of the name. Fischer's name, of course, has no standing, but the coincidence is the more impressive, in that his type is also a Totalcan small-headed rattler, as can be determined from his figure, which shows the loreal in contact with the second supralabial. The ventrals and the nature of the dorsal blotches in Fischer's type eliminate *omiltemanus* and *transversus*. Any argument disputing the allocation of *intermedius* Troschel that I have made, on the score of the relative rarity of the Totalcan small-headed rattler, compared with *triseriatus*, is at once refuted by the fact that the same allocation can be verified in the case of the type of *intermedius* Fischer.

*Subspecific Relationships.*—Although intergradation between *intermedius* and *omiltemanus* has not yet been demonstrated, I prefer to consider *omiltemanus* a subspecies, since they are similar in virtually all characters except the number of ventrals and body blotches.

Smith (1946, p. 75) segregated his new subspecies *lautus* (= *intermedius*) from *gloydi* Taylor, 1941, by reason of its having the postnasal in contact with 2, rather than 1, supralabials, and in having the lower preocular in contact with the loreal. With a larger series of *intermedius* at hand than was available to Smith—although the *gloydi* material is still limited to the type, a specimen in very poor condition—these differences disappear in the greater variability of the *intermedius* series. At least two specimens of *intermedius* have their lower preoculars in contact with the loreals. Another specimen of *intermedius* has its postnasals in contact with the first supralabials only, although

it is true that this specimen is from an area (Michoacán) distant from the type locality of *lautus*, and may eventually be shown to belong to a different subspecies, when additional material shall have become available. But I do not believe recognition of *gloydi* and its separation from *intermedius* to be warranted, based on a single specimen with only this slight divergence in the postnasal-supralabial contact. In the subspecies *i. omiltemanus*, with 10 specimens available, the postnasal-first-supralabial contacts are found to be quite variable; although in most specimens the postnasal touches both the first and second supralabials (as is the case in *intermedius*), there are some in which only the first supralabial is reached, and in one specimen on one side only, the second. With this variability in the critical differential character, I deem it best not to segregate *gloydi* from *intermedius*, at least until such time as additional specimens from Oaxaca shall disclose other differences between the Totalcan and Oaxacan snakes.

*Description of Subspecies.*—Seven specimens of *i. intermedius* have been at hand, with some data on 3 others. There are 4 males and 6 females. The data on these are as follows: Scale rows 21; ventrals, males 152 to 161, mean 157.5, females 157 to 165, mean 160.5; subcaudals, males 24 to 29, mean 25.8, females 20 to 22, mean 20.5; supralabials 8 to 11, mean 9.6; infralabials 8 to 11, mean 9.1; scales in the internasal-prefrontal area 4 to 8, mean 6.0; minimum intersupraoculars 1 to 4, mean 2.4; rattle-fringe scales 10; body blotches 38 to 45, mean 42.3; tail bands, males 7 to 9, mean 8.0, females 5 to 7, mean 6.0.

In *intermedius intermedius* the prenasal may or may not—with about equal frequencies—reach the canthal over the top of the reduced postnasal. The postnasal usually touches both the first and second supralabials, but in some specimens it contacts only the first; it may touch either the internasal or both internasal and canthal. In all but one specimen on one side, the loreal contacts a supralabial; usually it touches the second, but it may contact the first as well, or rarely only the first. Usually there are no prefoveals, although one may be present. The lower preocular may or may not contact the loreal.

The longest specimen available is a male measuring 482 mm.; the shortest is 216 mm. The approximate regression lines of the head-body and tail-body proportionalities have already been given in the general discussion of the *intermedius* group, as *intermedius* and *omiltemanus* do not differ in these characters. But *intermedius* does diverge from *omiltemanus* in the width of the proximal rattle, the former having a slightly larger rattle, the equation for which is  $W = .012L + .05$ . The fang length (upper lumen to point) is contained in the adult body length about 207 times, and in the head length 9.3 times. *C. i. intermedius* has, relatively, the shortest fang of any rattlesnake, not only short compared with the body length, as would be expected from the small head, but in proportion to the head length as well.

The specimens of *intermedius* that I have seen are very dark dorsally and almost without visible pattern. Placed under water, a pattern becomes evident; I presume in live specimens it would be visible to about the same extent. It

comprises a dorsal series of rectangular to elliptical blotches about 7 scale rows wide and  $1\frac{1}{2}$  to 2 scales long, end-to-end; the interspaces cover 1 to  $1\frac{1}{2}$  scales. The blotches are dark gray-brown edged with black, the interspaces gray-black. The blotches are punctate, the interspaces almost solid color. Additional series of smaller blotches are made evident laterally by groups of punctate scales. The ventrum is cream, buff, or pink, much more punctated with dark-brown or dark-gray in some specimens than in others. The single Michoacán individual is mottled with black below.

Head marks are virtually absent, except that the darkness of the postocular streak is somewhat accentuated, and the posterior labials are lightened, thus setting it off. Below, the infralabials and the adjacent gulars are much punctated, especially anteriorly.

The tail is crossed by a series of bars that are increasingly in contrast with the ground color toward the rattle. It is pink or buff below, with considerable stippling in dark-brown. The anterior lobe of the rattle matrix is buff to brown.

*Subspecific Comparisons.*—The principal differences between *intermedius* and *omiltemanus* lie in the number of ventrals and body blotches, as shown in the following tabulation:

	<i>C. i. intermedius</i>	<i>C. i. omiltemanus</i>
Ventrals, males, range	152–161	165–175
mean	157.5	170.2
females, range	157–165	173–185
mean	160.5	179.4
Body blotches, range	38–45	45–61
mean	42.3	51.6

It is doubtful whether larger series from the central areas would show overlapping in the ventrals, although specimens from intermediate territory may be expected to do so.

All but 2 of the available specimens of *intermedius* are from the vicinity of the type locality of Smith's *lautus*, from near El Limón Totalco on both sides of the Puebla-Veracruz border, from Las Vigas, Veracruz, and Zacopoaxtla, Puebla. All of these localities are within a radius of about 25 miles. The elevations range from about 7800 to 8500 feet. The two remaining specimens are from distant points. First, there is the type specimen of *gloydi*, from Cerro San Felipe in central Oaxaca at 10,000 feet. This locality is about 200 miles to the south of the center of the Totalcan population. The distinctive characters of this specimen, as far as they may be determined, for it is in very poor condition, have already been mentioned. The second distant specimen is from Tancítaro, Michoacán, a point across the Mexican central plateau, some 300 miles to the west of El Limón Totalco. This specimen also is far from perfect, as the rattles and a part of the tail have been cut off. This snake has all the characteristics of the *intermedius* group, including the important loreal-supralabial contacts.

It is like the type of *gloydi* in that the postnasal touches only the first supralabial, and in addition it is unique among specimens of the *intermedius* group in having 3 internasals. Only the availability of additional specimens from Oaxaca and Michoacán will make it possible to judge whether *intermedius* is divisible into 2 or more additional subspecies, one of which would be *gloydi*. Also, it remains to be seen whether I am correct in judging *omiltemanus* a subspecies of *intermedius*, or whether it should be considered a separate species.

### *Crotalus intermedius omiltemanus* Günther

#### OMILTEMAN SMALL-HEADED RATTLESNAKE

1895. *Crotalus omiltemanus* Günther, Biol. Cent. Amer., Rept. Batr., p. 192  
 1896. *Crotalus triseriatus* (part) Boulenger, Cat. Snakes Brit. Mus., vol. 3, p. 581  
 1936. *Crotalus triseriatus triseriatus* (part) Klauber, Trans. San Diego Soc. Nat. Hist., vol. 8, no. 20, p. 247  
 1938. *Crotalus triseriatus omiltemanus* Klauber, Copeia, no. 4, p. 196

I have had 12 specimens of *C. intermedius omiltemanus* available for examination, 5 males and 7 females. Seven specimens were from Omilteme, Guerrero, the type locality, the others being from the vicinity of Chilpancingo in the same state.

*Description of Subspecies.*—*C. i. omiltemanus* is a small rattlesnake; the longest specimen is a female 560 mm. long, the shortest 218 mm. The head- and tail-length regression lines have already been given for the group as a whole; with so few specimens available, I have not been able to demonstrate any difference between *omiltemanus* and *intermedius* in these proportionalities. In the width of the proximal rattle there is a difference; the *omiltemanus* line, as determined from the few specimens available, is  $W = .01L + .13$ . *C. i. omiltemanus* has a larger rattle than *pusillus* or *triseriatus*, but smaller than *intermedius*, *aquilus*, or *pricei*. In *omiltemanus* the fang length is contained about 185 times in the body length over-all, and 8.2 times in the head length. These proportions are somewhat less extreme than those of *intermedius*.

The scale-count data are as follows: Scale rows 21; ventrals, males, 165 to 175, mean 170.2, females 173 to 185, mean 179.4; subcaudals, males 24 to 29, mean 26.6, females 20 to 24, mean 22.3. The supralabials vary from 8 to 10, mean 9.2; and the infralabials from 8 to 11, mean 8.9. The scales in the inter-nasal-prefrontal region vary from 5 to 8, mean 6.6; the minimum scales between the supraoculars range from 2 to 4, mean 2.9. The rattle-border scales number either 8 or 10.

The dorsal blotches on the body vary from 45 to 61, mean 51.6; the tail rings from 7 to 11, mean 7.4, in the males, and from 5 to 9, mean 7.0, in the females.

It is well known that among the rattlesnakes (and in many other groups as well) there is a fair degree of correlation between the size of the body, the number of ventral scales, scale rows, and labials. *C. i. omiltemanus* is a subspecies in which the ventral scales are much more numerous than would be expected in a small snake with so few scale rows and labials. For example, rattlesnake species roughly follow the regression line  $V = 11.4S - 120$ , where  $V$  is the average number of ventrals in the males and  $S$  the number of scale rows at mid-body. Thus rattlers with 21 scale rows might be expected to have about 120 ventrals, yet *omiltemanus* has about 170.

With regard to the scale arrangements characteristic of the *intermedius* group, the following are the trends shown by the 12 available specimens of *omiltemanus*. The prenasal contacts the loreal in 55 per cent and fails to do so in 45. The postnasal touches both the first and second supralabials in 70 per cent, contacts only the first supralabial in 25 per cent, and touches only the second supralabial on one side of one specimen. Where the prenasal meets the loreal, the postnasal is, of course, prevented from touching the internasal or canthal. In most of the remaining 45 per cent, the postnasal touches the internasal only, but in one instance it reaches both internasal and canthal. Usually the loreal contacts the second supralabial, but in about one-fourth of the specimens it reaches both the first and second. On one side of one specimen it does not touch any supralabial, thus failing in this unique *intermedius* character. Fifteen per cent of the specimens have prefoveals; and the same proportion have lower preoculars that contact the loreals.

The scales bordering the orbit number 7 or 8, usually the former; and the supralabial opposite the posterior edge of the eye is most often the fifth, but may be the fourth or sixth. Usually the anterior subocular contacts the third and fourth supralabials. Sometimes the fourth supralabial touches the eye; this is the only rattlesnake known to me in which this occurs, all others having at least one scale interposed. The posterior suboculars normally touch the fourth and fifth supralabials.

Most specimens of *omiltemanus* are quite dark, with patterns so obscure that they are only evident under water. I cannot say how much of this obscurity may be the result of preservation. One or two specimens have fairly evident markings; and I judge from experience with other kinds of rattlesnakes that live specimens may have readily evident patterns.

The dorsal ground color in *omiltemanus* varies from medium-brown to almost black. The head marks are limited to parallel longitudinal dark-brown bars in the occipital region, and dark-brown postocular streaks passing above the angle of the mouth. Below these the supralabials are buff; they are lighter than any other part of the snake. The underside of the head is heavily mottled with black or gray, particularly laterally toward and including the infralabials.

The body pattern comprises a series of dorsal dark-brown blotches about 5 scale rows wide and 2 scales long, end-to-end, on a lighter brown background. The interspaces measure 1 to  $1\frac{1}{2}$  scales. The dorsal blotches are quite irregular

in shape; some are heart-shaped with a posterior indentation. There are 2 lateral rows of spots of smaller size; the upper alternates with, and the lower matches, the dorsal series. Sometimes a third series of spots is in evidence. Ventrally the color varies from gray to almost black, becoming darker posteriorly. The color is applied in the form of dense punctations. Where the ground color is evident, it runs from pink or buff to gray.

The tail is crossed by obscure bars of dark-gray on a light-gray background. The anterior lobe of the rattle matrix is buff to brown. Conspicuous dark spots of the *lepidus* type are not evident.

This subspecies, like other small rattlesnakes, feeds largely on lizards.

*Crotalus i. omiltemanus* is at present known only from the mountains of central Guerrero, where it has been collected at or near Omilteme and Chilpancingo. The latter point is at an elevation of about 4500 feet, but to the east and west the mountains rise to 6000 feet or above. Smith and Taylor (1950, p. 9) place Omilteme 3 miles northwest of Chilpancingo. Various maps show it about 12 miles slightly south of west of Chilpancingo. Gadow (1908, pp. 377, 381) gives the altitude of Omilteme as about 7000 feet, and its distance from Chilpancingo as about 19 miles.

### *Crotalus transversus* Taylor

#### CROSS-BANDED MOUNTAIN RATTLESNAKE

1940. *Crotalus triseriatus anahuacus* Martín del Campo, Anales Inst. Biol. Mex., vol. 11, no. 2, p. 742
1944. *Crotalus transversus* Taylor, Univ. Kans. Sci. Bull., vol. 30, pt. 1, no. 4, p. 47

Only three specimens of this species are known: the type, EHT 30001, an adult female from 55 km. southwest of Mexico City, near Tres Mariás (=Tres Cumbres), Morelos, at about 10,000 feet; the paratype, EHT 15879, a juvenile probably from the Ajusco Mountains, between Tres Mariás and Cuernavaca, which specimen I have not seen; and, finally a specimen in the collection of the Mexican National Museum, from Lagunas de Cempoala (=Zempoala), Morelos.

*Description of Subspecies.*—The distinctive pattern of *transversus*, as exemplified in the type, comprises a series of narrow crossbands of black on a gray background, except middorsally where the background is buff. The black never engages the anterior end of any scale; therefore, because the scales are arranged in diagonal rows, no black band is uninterrupted. However, middorsally, in lieu of the black, the band scales are darkened with gray, so that the bands are made more even and definite. The bands are about 1 scale wide, and the interspaces 2 to 3 scales, end-to-end. The gray of the ground color and bands is applied in the form of dense punctations. Laterally the gray areas of

the bands and ground color are completely merged, so that only the interrupted black is evident. On the sides, many scales have 2 small black dots at their apices where the scale pits are usually located. The ventrum is heavily mottled with black on buff.

On the head, a light mark across the supraoculars is faintly visible; also a pair of occipital blotches may be discerned, otherwise the top of the head is uniform gray. On each side there is the usual postocular dark streak, but it is only slightly set off from the background above. Below the streak, there is a sharp contrast with the supralabials, which are buff, except for some dark mottling on their lower edges. The infralabials are heavily mottled. The tail is marked with crossbars above. The anterior rattle matrix is buff.

The pattern of the juvenile paratype, as illustrated by Taylor (1944, plate 6, fig. A), exhibits more conspicuous crossbands than the type. I have not seen this specimen. But in the third specimen, the contrast between bands and ground color is much reduced, so that the bands cannot be counted with accuracy, even with the specimen immersed in water.

The two specimens of *transversus* at hand are both females. The scale rows at mid-body are 21, the ventrals 145 and 155, subcaudals, 19 and 20, supralabials 8 to 10, infralabials 8 or 9, internasals 2, canthals 1-1, intercanthals 2, minimum intersupraoculars 2, total scales in the orbit 8; the anterior subocular contacts the third and fourth supralabials; the posterior usually contacts the fourth and fifth, but may contact only the fourth; the fifth supralabial is opposite the posterior edge of the orbit. The upper preocular is undivided.

*Relationships.*—The pattern of *transversus* is sufficiently different from that of any other rattlesnake found in central Mexico to distinguish the snake immediately. But we may ignore the pattern for the moment, and see what other species the scale data may suggest. There are several important likenesses to the *intermedius* group and *pricei*, including, especially, the dorsal scale-row formula (21-21-17), and the low number of labials (8 to 10). The anterior subocular contacts the third and fourth supralabials and the next subocular contacts the fourth and fifth. The lower preocular fails to reach the loreal. The scales of the parietal area are smooth, and, in the occipital area, they are but weakly keeled. All these are *intermedius* affinities; they show at once that we are not merely dealing with aberrant-patterned specimens of *C. triseriatus triseriatus*, the other small mountain rattler of this area. But there are also differences in squamation between *transversus* and *intermedius* or *omiltemanus*, in that *transversus* lacks some of the most conspicuous characters of these other members of the *intermedius* group. In *transversus* the postnasal is not suppressed, and the prenasal does not approach the loreal over its top. Most important of all, the loreal contacts no labial, since a large prefoveal intervenes. *C. transversus* has 8 rattle-fringe scales, whereas the others usually have 9 or 10.

Thus we find *transversus* to be different from both *intermedius* and *omiltemanus*, on the one hand, and *triseriatus*, *aquilus*, and *pusillus*, on the other. Like *pricei* it has some likeness to both groups, but also differences from both.

Too few specimens of *transversus* are available to permit conclusions as to its body proportions. The head of the type specimen is larger than the head of an *intermedius* or *omiltemanus* of the same length, but the Zempoala specimen falls exactly on the *intermedius* regression line. The tail is slightly longer than that of *intermedius* or *omiltemanus*; it is about the same as in *t. triseriatus*. The rattle width is greater than in *pusillus* or *triseriatus*, and slightly greater than in *omiltemanus*. It closely approaches the proportionality of *intermedius*.

In summary it may be stated that *transversus* fails to agree with any other species in form and scalation; and if we add the peculiar pattern, we must conclude that this is a valid species, possibly intermediate between the *intermedius* and *triseriatus* groups, but somewhat favoring the former. More material will be necessary to make a final determination of its status.

The vagaries of rattlesnake collecting are illustrated by the discovery, as recently as 1940, of this strikingly patterned species so near Mexico City.

#### THE TRISERIATUS GROUP

Just as the discussion of *intermedius*, *omiltemanus* and *transversus* was facilitated by considering them as a group, because of relationships suggested by certain head-scale contacts, so also it will be advisable to consider *triseriatus* and a related species as a group.

As a result of following H. M. Smith (1946) in divorcing *intermedius* and *pricei* (*pricei* will be treated subsequently) from *triseriatus*, there is a marked simplification in the problem of dividing *triseriatus* into subspecies. In considering its remaining, more limited scope, it should be noted that Gloyd (1940, p. 84) was the first to divide *triseriatus* into northern and southern subspecies. In this division I concur, although I find it desirable to adopt new segregative characters, which, in turn, lead to different boundaries between the subspecies than those Gloyd proposed.

*Nomenclatorial Problems.*—In order to facilitate the discussion, it is necessary, first, to resurvey some of the nomenclatorial problems involved, and particularly to decide whether the name *triseriatus*, when applied subspecifically, belongs to the northern form (as allocated by Gloyd) or to the southern.

Wagler's\* original description (Nat. Syst. Amph., 1830, p. 176) is so brief and generalized that it might apply to any of a dozen rattlesnakes. Cope (1866, p. 309) was apparently the first to give a description of *triseriatus* that made the snake fairly recognizable; this was improved upon by Garman (1883, p. 117), who presented a description sufficiently detailed so as almost to restrict the name to the species to which it has since been usually applied.

\* Wagler attributed the name *triseriatus* to Wiegmann, for what reason is not known. Duméril and Bibron (Erp. Gen., vol. 7, part 2, p. 1768, 1854), and Lichtenstein (1856, p. 34) did likewise. It is probable that Wiegmann selected the name and attached it to the type specimen in the Berlin Museum, but failed to publish a description. I have looked in vain among Wiegmann's papers published in *Isis* in 1828 and 1829 for such a description. This in no way affects the validity of the name.