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SNAKES OF THE GENUS *ALSOPHIS*
IN PUERTO RICO AND THE VIRGIN ISLANDS

by

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The eastern end of the Greater Antilles between the Mona and the Anegada passages is composed of isolated Mona in the former passage, Puerto Rico (including its satellite islets), Vieques, Culebra, and the Virgin Islands. The major islands of the Virgins are St. Croix, St. Thomas, St. John, Tortola, Jost van Dyke, Virgin Gorda, and Anegada; there are as well a multitude of smaller islands, islets, and rocks. Of the Virgin Islands, St. Croix to the south is separated from the Virgin Bank, whereas the balance of the Virgins (except Anegada) are separated from one another by narrow and relatively shallow channels. From this entire region have been described six forms of the Antillean snake genus *Alsophis*. The purpose of the present paper is to define these forms and delimit

their ranges more closely than heretofore, and to comment upon the interrelationships between them.

Since *Alsophis* is either extremely rare or extinct on many of the larger Virgin Islands, and is likewise not exceptionally common on Puerto Rico itself, the present study could not have been undertaken without the complete cooperation of the following curators, who have loaned specimens for study: CHARLES M. BOGERT and GRACE M. TILGER, American Museum of Natural History (AMNH); JAMES BÖHLKE and EDMOND V. MALNATE, Academy of Natural Sciences of Philadelphia (ANSP); ALICE G. C. GRANDISON, British Museum (Natural History) (BMNH); NEIL D. RICHMOND, Carnegie Museum (CM); WILLIAM E. DUELLMAN, Museum of Natural History, University of Kansas (KU); ERNEST E. WILLIAMS, Museum of Comparative Zoology, Harvard University (MCZ); CHARLES F. WALKER and GEORGE R. ZUG, Museum of Zoology, University of Michigan (UMMZ); DORIS M. COCHRAN and JAMES A. PETERS, United States National Museum (USNM). Specimens in my own collection are designated Albert Schwartz Field Series (ASFS); I have also utilized specimens in the collections of RICHARD THOMAS (RT) and DENNIS R. PAULSON (DRP). For the assembling of *Alsophis* from the area under study I wish to acknowledge the capable assistance of GERALD D. GAGNON, RONALD F. KLINIKOWSKI, DAVID C. LEBER, and RICHARD THOMAS. The illustrations for the present paper have been executed by Mr. KLINIKOWSKI and he has my gratitude for this task.

GENERAL TREATMENT

The first (as now accepted) name applied to *Alsophis* from the Puerto Rico-Virgin Islands area is *sancticrucis* Cope, 1862, described from St. Croix. In the following year REINHARDT & LÜTKEN named *A. portoricensis* from Puerto Rico; this was followed over half a century later by *Alsophis anegadae* Barbour, 1917, from the north-easternmost Virgin, Anegada. *Alsophis variegatus* Schmidt from Mona was named in 1926, followed in 1937 by *Alsophis nicholsi* Grant from Buck Island south of St. Thomas; later (1946) this same author described *richardi* (as a race of *nicholsi*) from St. Thomas itself. Thus there are presently available six names for the populations of *Alsophis* between Mona and Anegada.

As a slight complication, the name *Alsophis antillensis* Schlegel had been regularly applied to the non-Puerto Rican populations, or even at times (SCHMIDT 1928, p. 139) to snakes from Puerto Rico. BRONGERSMA (1937), having restudied the SCHLEGEL cotypes, found them to be a composite of *Dryadophis boddaerti*, *Alsophis sancticrucis*, and another species of *Alsophis* which was identical

to that found on Guadeloupe in the Lesser Antilles; BRONGERSMA chose the Guadeloupe-like specimen as the lectotype of *A. antillensis*, thereby replacing the name (*leucomelas*) then in use for the Guadeloupe species. None of the cotypes of *A. antillensis* except the specimen at that time identified as *A. sancticrucis* originated in the Puerto Rico-Virgin Islands region, and none of SCHLEGEL's specimens appeared to have come from St. Thomas (as the describer stated). Thus the name *A. antillensis* Schlegel as restricted by BRONGERSMA is not applicable to any *Alsophis* of the region under study.

The fact that since the introduction of the mongoose in the Virgin Islands and Puerto Rico *Alsophis* has either disappeared completely or has become extremely rare makes resolution of the systematic and biological problems rather difficult. Another is that no one has ever spent sufficiently long time on any of the smaller Virgins, or has visited any of the smaller Virgins repeatedly enough, to secure an adequate series from these islets. Presently, *Alsophis* appears to be extinct on Vieques, St. Croix, and St. Thomas. It is very rare on Tortola, where the natives know of it; a specimen was collected there as late as 1963 at Bellevue, and I have examined it casually in Roadtown. Fortunately, these snakes can still be secured on many of the satellite islands (for example, Water Island, Hans Lollick, Great and Little St. James, Dog Island, all off of St. Thomas) about the larger Virgins where they no longer occur. The major exception to this statement is St. Croix, where *A. sancticrucis* has not to my knowledge ever been recorded or taken from any of the three islets (Protestant Cay, Buck Island, Green Cay) off of St. Croix; of these three islets, Buck is infested with mongoose and Protestant is occupied by a hotel, so that chances of the survival of the large and conspicuous *sancticrucis* on these islets is most unlikely. MESSRS. LEBER and THOMAS visited Green Cay, and although they spent two hours on the islet and were able to secure other St. Croix endemics, no snakes were seen. It is possible that *sancticrucis* never occurred on Green Cay, or that it still persists there in small numbers; certainly there is no sure evidence that it does not occur there now.

On the large Virgins which lack mongoose, *Alsophis* may be quite common (Virgin Gorda for example), and although we secured only two on Anegada in a day's collecting, natives reassured us that snakes were often seen. On some of the smaller islets (Peter, Guana) *Alsophis* is moderately abundant, and even a half day's visit will yield a few specimens.

In Puerto Rico, *Alsophis* is presently widespread and locally abundant. The genus still occurs very abundantly on Caja de Muertos of the south coast of Puerto Rico; HEATWOLE, SADE & HILDRETH (1963) reported an *Alsophis* from Cayo Santiago off the eastern coast of Puerto Rico. The status of the population on Desecheo and that of Mona is presumably unchanged, although in three days, no *Alsophis* were taken by WEAVER *et al.* (1961) in 1960. Judging at least from the numerous specimens secured by Major CHAPMAN GRANT and others on Mona, the snake must be common there. Interestingly, ROLLE, HEATWOLE, LEVINS & TORRES (1964) did not secure *Alsophis* on Monito Island, which lies only three miles northwest of Mona. Although *Alsophis* is apparently still common on Culebra to the east of Puerto Rico, Mr. THOMAS did not encounter any snakes in half a day's collecting in the vicinity of Dewey.

Alsophis sancticrucis, fortunately, is an eminently distinct form, and presents no nomenclatorial nor biological problems; the only question involving this species is its relationships to other members of the genus in the West Indies. The nomenclatorial problems involved, however, with the names *portoricensis*, *anegadae*, *variegatus*, *nicholsi* and *richardi* are complex, and have at their base the biological relationships of these named (and other unnamed) populations of *Alsophis*. A brief historical summary of the use of these names is complex but necessary to understand the problems involved. The reader should be aware, in perusing the following information, that the name *antillensis*, as explained above, is no longer applicable to snakes from this region; its use below is confusing but mandatory historically.

BOULENGER (1894, 2, p. 122-123) recognized two species of *Alsophis* (= *Dromicus sensu* Boulenger) from the Puerto Rico - Virgin Islands area: *sanctaecrucis* (sic) and *antillensis*. The former was known from St. Croix, Puerto Rico, and Santo

Domingo, and was characterized as having scales in 17 rows, 170 to 198 ventrals, and 120 to 147 subcaudals. As is evident from the distribution noted above, BOULENGER included three species in his "*sanctaerucis*": *sancticrucis*, *melanichnus* from Hispaniola, and *portoricensis*. All are considered as synonyms of "*sanctaerucis*" by him. However, BOULENGER listed as specimens in the British Museum only four snakes from St. Croix, so it is evident that his inclusion of *melanichnus* and *portoricensis* is due to his lack of knowledge of these two species. *Alsophis antillensis* on the other hand was characterized by having scales in 19 rows, 172 to 189 ventrals, and 116 to 142 subcaudals. This species was attributed to Vieques, St. Thomas, and St. John in the area under discussion, Martinique, Dominica, and Guadeloupe in the Lesser Antilles, and Hispaniola. BOULENGER had actually examined specimens only from St. Thomas, Vieques, and Dominica, however. As BOULENGER used the name *antillensis*, it was likewise a composite, since both Dominica and Guadeloupe have (or have recently had) the species *A. antillensis* (*sensu stricto* BRONGERSMA), Martinique lacks *Alsophis* (its only colubrid snake, *Dromicus cursor*, has 17 scale rows), and the Hispaniolan record may have applied to *Dromicus parvifrons* which has 19 scale rows at midbody. (Parenthetically, other than *A. melanichnus* noted above for Hispaniola, *A. anomalus* is also known from that island; it has, however, 21 scale rows (*vide* COCHRAN 1941, p. 349)). In summary, then, BOULENGER recognized two species in the area under study, one with 17 and the other with 19 scale rows; it is this basic difference which has clouded the problem for the last three-quarters of a century.

STEJNEGER (1904, p. 700 *et seq.*) studied *Alsophis* from Puerto Rico and adjacent islands, and distinguished two species, *portoricensis* and *antillensis*, the former with 17 scale rows and without any distinctive pattern on the fifth scale row, the latter with 19 scale rows and with every second or third scale in the fifth row particolor dark below and light above. He attributed *portoricensis* to Puerto Rico, Mona and Desecheo islands, although he examined only three specimens (two from Humacao and one from Desecheo). STEJNEGER recorded *antillensis* from Culebra, Vieques (*vide* BOULENGER), and St. Thomas; he examined material only from Culebra and St. Thomas. STEJNEGER also (*loc. cit.*) briefly discussed BOULENGER's subsequent use of the combination "*Dromicus* (= *Alsophis*) *sanctaerucis portoricensis*", and felt that the two forms *portoricensis* and *sancticrucis* merited specific rank, a situation which has persisted until today.

SCHMIDT (1928, p. 139 *et seq.*) again studied the Puerto Rican and Virgin Islands *Alsophis*. Once more two species are distinguished on the basis of STEJNEGER's (and BOULENGER's) midbody scale row counts; additionally SCHMIDT had previously (1926) described *A. variegatus* from Mona, so that there were three species recognized from the area. Also, BARBOUR had named *A. anegadae* in the intervening period, and although the Virgins were not studied in a detailed manner by SCHMIDT, he mentioned *anegadae*.

The counts and distributions of the three species may be briefly summarized as follows:

1) *antillensis* – scales usually in 19, occasionally in 17, rows, ventrals 170 to 189, subcaudals 116 to 144; known from St. Thomas, St. John, Virgin Gorda, Anegada (thus *A. anegadae* is regarded as a synonym of *antillensis*), Vieques, Culebra, and Puerto Rico. The Puerto Rico record is based upon two specimens taken at Coamo Springs, a male with 17 scale rows and a female with 19, both with "nearly typical *antillensis*" coloration and a high number (184 and 185) ventral scales.

2) *portoricensis* – scales in 17 rows, ventrals 169 to 179 in males, 175 to 183 in females, subcaudals 125 to 134 in males, 115 to 128 in females; known from Puerto Rico, Desecheo, and Caja de Muertos. SCHMIDT commented on the reduction of scale rows in this species to 13, 14 or 15 scales posteriorly (with 14 the modal condition on Puerto Rico), and on the pale coloration of a single Caja de Muertos specimen. Desecheo snakes (two) were regarded as close to Mona material in coloration, but in scale counts they were “evenly divided” between Mona and Puerto Rico specimens.

3) *variegatus* – scales in 17 rows, ventrals 170 to 181, subcaudals 112 to 126. The preanal reduction of dorsal rows to 15 scales afforded “the most constant distinction from *Alsophis portoricensis*.” Finally, while speaking of *A. antillensis*, SCHMIDT (1928, p. 141) noted that his two Coamo Springs specimens “agree closely in coloration with the color variety described by BARBOUR from Anegada and, as I do not wish to admit of a discontinuous distribution of *A. anegadae*, it seems best to include both Puerto Rican and Anegadian specimens with *A. antillensis*.”

The work of Major CHAPMAN GRANT in the Puerto Rican region added greatly to the knowledge of the fauna of that area. In a long series of papers between 1931 and 1946, Major GRANT published extensively on the herpetology of this region; as far as *Alsophis* is concerned, the following data were presented. GRANT (1931) collected 28 specimens of *A. antillensis* on Culebra, but (1932a) did not collect any member of the genus on Vieques, where he regarded it as “probably nearly extinct except on outlying keys or possibly the eastern tip of the Island.” Later, GRANT (1932b) reported four specimens of *A. portoricensis* from Caja de Muertos, and noted that “The *Alsophis* do not resemble the series of eight *A. portoricensis* in the Grant collection, but resemble the series of thirty *A. antillensis* in the same collection, in color and pattern but not in squamation.” In a brief but interesting summary of the Puerto Rican members of the genus, GRANT (1932c) stated that there were two distinct species in the Puerto Rico region. Although these are characterized as having 17 and 19 scale rows at midbody, GRANT did not clearly associate names with these counts, although by inference the 17 scale row snake is *portoricensis* (Puerto Rico, Caja de Muertos, Desecheo, Mona – thereby including *variegatus* with *portoricensis* but making no concomitant nomenclatorial change) and the 19 scale row snake is *antillensis* (Virgin Islands, Culebra and Pinero Island; the latter is presently shown on Puerto Rican maps as Isla Pineros). In criticising SCHMIDT for recording *antillensis* from Puerto Rico on the basis of the two Coamo Springs specimens, GRANT effectively removed this species from the Puerto Rican list. GRANT felt that the three forms involved (*portoricensis*, *variegatus*, *antillensis*) were primarily distinguished on the basis of pattern, although specimens with the pattern of one form within the range of another were known by him. The four Caja de Muertos specimens were regarded as *portoricensis*, although they were “about equally divided between the three patterns.” The Isla Piñeros series of seven was assigned to *antillensis*, although they “seemed at first to be slightly aberrant *A. portoricensis*.”

In a series of papers dealing with faunal lists of the various Virgin Islands, GRANT (1932d) regarded *A. antillensis* as probably extinct on St. John, collected two specimens on Dog Island, and considered its occurrence probable on Congo and Lovango Keys between St. John and St. Thomas, (1932e) noted *A. antillensis* on Salt and Peter Islands and considered it very rare on Tortola, (1936) reported a series of twelve *A. antillensis* from Jost van Dyke, and (1937) considered *A. antillensis* extinct on St. Thomas, reporting the species as still occurring on Water Island,

(Little) Saba Island, Savana Island, Cockroach Island – all islets associated with St. Thomas, – and on Salt Island (off of Tortola) and Virgin Gorda. GRANT also mentioned taking two *A. anegadae* on Anegada.

In the latter paper GRANT (1937, p. 516) described *Alsophis nicholsi* on the basis of three specimens from Buck Island off St. Thomas. This species was diagnosed as “a pale form with the squamation of antillensis but the pattern of portoricensis, namely differing from typical antillensis” in having the lateral stripe on scale rows 4 and 5 faintly indicated only on the neck, dorsal longitudinal band obscured, and chin, throat, and anterior portion of body immaculate without any trace of mottling or spotting. The ventral scales varied between 181 and 185, and all snakes had incomplete tails; the scale rows are presumably 19, although this is not expressly stated. The coloration was pale olive green in life, which faded to pale brown in alcohol. GRANT stated also (*loc. cit.*) that *nicholsi* varied more from *antillensis* than did *variegatus* from *portoricensis*.

After the publication of BRONGERSMA's paper (1937) concerning the allocation of the cotypes of *A. antillensis*, GRANT (1946) again reported on the *Alsophis* of the Virgin Islands. Since SCHLEGEL apparently had not used specimens from the northern Virgin Islands in his description of *antillensis*, this left nameless the populations which previously had been called *antillensis*. GRANT showed, however, that one of the cotypes of *A. antillensis*, labeled as having come from St. Thomas, had very likely indeed come from that island, but since BRONGERSMA had already restricted the name *A. antillensis* to the species occurring on Guadeloupe by selection of a lectotype from the cotypical series, this name was no longer available for Virgin Islands snakes. GRANT then proceeded to describe *Alsophis nicholsi richardi* from St. Thomas, this form having a distribution of the Virgin Islands except Anegada and St. Croix, and occurring also on the islands and islets east of Puerto Rico except Vieques.

At the same time GRANT commented on the resemblances between *antillensis* (= *nicholsi*) and *anegadae*, but made no nomenclatorial changes. He mentioned as well the great diversity of pattern of *A. nicholsi richardi* on St. Thomas (the type locality) and regarded this form as a subspecies of the previously described *A. nicholsi* on the basis of the occurrence of a *nicholsi*-patterned snake on St. Thomas, and the finding of a snake on Water Island (immediately south of, and adjacent to, St. Thomas) which approached *A. nicholsi* in general appearance. The St. Thomas race *richardi* was considered closest to *anegadae*, which is smaller and paler and has reduced dorsal scale pores, and differs from *n. nicholsi* in having a lateral pattern, and from *A. portoricensis* in lacking a reticulate pattern.

More recently, UNDERWOOD (1962, p. 105) has confused the issue somewhat, by returning to the old nomenclature and attributing *A. antillensis* to Puerto Rico, Vieques, Culebra, and the Virgin Islands and later (p. 121) stating that *A. antillensis* occurs on St. Thomas, Water Island, St. John, Dog Island, Tortola, Peter Island, Salt Island, Virgin Gorda, and Anegada, and *A. sancticrucis* (!) on Culebra, St. Thomas, St. John, Jost van Dyke, Tortola, and Anegada (although on the earlier page he correctly assigned *A. sancticrucis* to St. Croix only). I am disregarding these allocations.

VARIATION

I have examined 252 *Alsophis* from the Puerto Rico-Virgin Islands area, as follows: MONA, 9 ♂, 10 ♀, 1 unsexed; DESECHEO, 1 ♀; PUERTO RICO, 25 ♂, 35 ♀, including one specimen from CAYO SANTIAGO; CAJA DE MUERTOS, 4 ♂, 15 ♀; ISLA PIÑEROS, 3 ♂, 4 ♀; VIEQUES, 2 ♂, 1 ♀; CULEBRA, 21 ♂, 23 ♀; ST. THOMAS, 17 ♂, 14 ♀; WATER ISLAND, 3 ♂, 2 ♀; HANS LOLLICK ISLAND, 3 ♀; SABA ISLAND, 1 ♂; SAVANA ISLAND, 2 ♂; DOG ISLAND, 2 ♂; GREAT ST. JAMES, 1 ♀; LITTLE ST. JAMES, 1 ♂; LOVANGO CAY, 2 ♀; BUCK ISLAND, 3 ♂; GUANA ISLAND, 1 ♀; PETER ISLAND, 7 ♀; SALT ISLAND, 1 ♀; VIRGIN GORDA, 13 ♂, 14 ♀; NECKER ISLAND, 1 ♀; ANEGADA, 1 ♂, 3 ♀; ST. CROIX, 6 ♀.

For convenience, hereinafter the islands of Saba, Savana, Dog, Great and Little St. James, and Lovango will be grouped together and referred to as the St. Thomas satellite islands; all are closely associated with St. Thomas or lie between that island and St. John. Hans Lollick, Water and Buck are likewise associated with St. Thomas, but for various reasons these three islets will be discussed separately.

Since *A. sancticrucis* is so very distinctive, it will not be treated in the present context of variation.

Scale rows. The basic differences between Puerto Rican and Virgin Islands snakes has always been considered to be, in addition to coloration and pattern, the possession of 17 scale rows at midbody by Puerto Rican *Alsophis* and 19 scale rows at midbody by Virgin Islands snakes. Thus the former comprise the species *portoricensis* and the latter the species *nicholsi*. The modal condition of dorsal scale row formula for snakes from Mona (and Desecheo?) is 17-17-15; no other population has almost all snakes with this formula, and all but one (17-19-15) of the Mona snakes examined have counts of 17-17-15. On Puerto Rico and Caja de Muertos, the modal count is 17-17-14. Puerto Rican snakes have the following dorsal counts, with incidence in parentheses in each case: 17-17-14 (36); 17-17-15 (15); 17-17-13 (6); 17-19-15 (1); and 18-19-15 (1). The same data for Caja de Muertos *Alsophis* are: 17-17-14 (13); 17-17-15 (4); 17-15-13 (1); and 19-17-14 (1). Note that two Puerto Rican snakes and one Mona snake have 19 scale rows at midbody, and one Caja de Muertos snake has 19 scale rows on the neck.

On Culebra, St. Thomas, Water, Buck, Hans Lollick, St. Thomas satellites, Guana, Peter, Salt, Virgin Gorda, and Anegada, the modal dorsal scale formula is 19-19-15 (or may be one of two formulae with the same frequency). However, this count is far from constant on each island. Two examples will suffice. On Culebra, the dorsal formulae vary as follows: 19-19-15 (25); 17-19-15 (9); 20-19-15 (2);

19-17-15 (2); 17-17-15 (1); 19-19-16 (1); 19-19-17 (1); 18-19-15 (1); on Peter and Salt islands combined, the formulae are: 19-19-15 (2); 17-19-15 (2); 17-19-14 (1); 19-17-13 (1); 17-17-14 (1). Note that there is one specimen from Culebra and another from Peter and Salt which have "typical" *portoricensis* counts of 17-17-14 or 15. Snakes from other of these eastern islands show the same sort of variations about a theme (19-19-15 or 17-17-15) with various combinations of these modal conditions, especially on the neck and at midbody.

Specimens from Isla Piñeros, just off the east coast of Puerto Rico, and Vieques, between Puerto Rico and Culebra but farther to the south, show still another situation. The modal condition on Isla Piñeros, despite its very close proximity to Puerto Rico, is 19-19-15 (5 specimens), whereas 19-19-14 and 17-19-15 each occurs in a single snake. On Vieques, two snakes have counts of 18-19-15, and the other 17-17-15.

From the above, it is obvious that midbody scale rows or dorsal scale row formulae, while suggestive, are by no means absolute, and to regard a snake as either *portoricensis* or *nicholsi* simply because of its having 17 or 19 scale rows at midbody may be extremely misleading.

Ventrals. Ventrals have been counted in the manner proposed by DOWLING (1951). Despite statements to the contrary (SCHMIDT 1928, p. 146), there are differences between the means of number of ventrals in the two sexes, females regularly having a few more ventral scales than males, both in extremes and means. These differences, however, are indeed slight. Considering snakes from all islands involved, the ventrals in males vary from 163 (Puerto Rico) to 184 (Buck, St. Thomas satellites, Virgin Gorda), and in females from 166 (Puerto Rico) to 187 (Vieques). Considering the wide geographic range occupied by these snakes in this region, the relative lack of extreme variation in ventrals is striking; thus, in twenty-five males from Puerto Rico, the ventrals vary by only 14 scales, and in a series of fifteen females from Virgin Gorda, they vary by only 9 scales.

The highest mean for males (181.7) is for the small series from

Buck Island; this mean is outstanding among all series of males. The lowest mean for males (170.0) is for Puerto Rican snakes. Considering males from Culebra east to Anegada (and with the exception of Buck Island), there is a very gradual increase in mean number of ventrals. There is, on the other hand a rather sharp break between Puerto Rican males and Culebra males.

The highest mean for females (182.7) is for the small series from Anegada. The lowest mean for females (174.3) is once again from Puerto Rico. The general trend in ventrals in females from Puerto Rico eastward is low in Puerto Rico, higher in Isla Piñeros, decreasing to the St. Thomas satellites, and then increasing to Anegada. A sharp break in number of ventrals in females occurs between Salt and Peter islands (176.5) and Virgin Gorda-Anegada (182.5 and 182.7).

Subcaudals. As in so many long-tailed snakes, specimens of *Alsophis* with complete tails are few. When these few are once again divided into two groups by sexes, it is hardly practicable to compare data between various series. Of the entire Puerto Rican series, for example, only thirty one snakes have complete tails (11 males, 20 females). In the series from Culebra, only sixteen (8 males, 8 females) have complete tails. In general, males have longer tails than females. In general, there seems to be an increase in number of subcaudals from west to east; thus Mona males have from 115 to 125 subcaudals and Mona females 113 to 122 subcaudals, whereas Virgin Gorda males have from 132 to 138 subcaudals and Virgin Gorda females from 124 to 132 subcaudals. Populations which are geographically intermediate between these two extremes have roughly intermediate ranges of subcaudals. The lowest count (106) is from a female from Caja de Muertos, and the highest count (143) is for a St. Thomas male.

Coloration and pattern. Perhaps the most subjective – and therefore most difficult – aspect of the present problem is a discussion of coloration and pattern. Preserved *Alsophis*, like many other colubrids, have a strong tendency to lose epidermis when being handled. GRANT (1946, p. 121, and errata sheet insert) has shown

quite clearly that SCHMIDT's illustration (1928, p. 145) of *A. variegatus* is misleading since the artist depicted a section of the snake upon which the epidermis was missing from many scales, thus giving the impression of a false "pattern" on the dorsum. With loss of scales, the entire dorsum achieves a much lighter hue. However, the basic pattern of these snakes is not lost by such epidermal sloughing, and even in snakes which presently lack most of their dorsal scales, the pattern is quite clearly discernible. What is lost is any concrete notion as to depth of dorsal pigmentation; what may have been a rather dark brown snake is currently rendered much paler by loss of scales.

Except the snakes from Buck Island (*nicholsi*), which were said to be pale olive green (GRANT 1937, p. 516) in life and some snakes from Puerto Rico, all *Alsophis* from the Puerto Rico-Virgin Islands area are some shade of brown in life. I have not seen living specimens from Mona or Desecheo, but have seen living material from Puerto Rico and several of the Virgin Islands (including Water, Hans Lollick, Guana, Peter, Virgin Gorda, and Anegada). The shade of brown involved varies from a pale sandy-brown on Caja de Muertos and Hans Lollick, to a rich dark purplish-brown on Puerto Rico. Specimens from Virgin Gorda and Anegada are dark brown as well.

Patternwise, there are two distinct types of pattern involved.

1) On most of Puerto Rico, the snakes are dark with all dorsal scales outlined posteriorly with black, and with the ventrals having their posterior margins usually very heavily outlined with black or dark brown. There is a faint dorsolateral dark line indicated on scale rows 4 and 5, although this is not obvious. Some specimens also are transversely banded with dark and slightly paler zones; this condition appears more often on young or subadult snakes. The supra- and infralabials are unicolor reddish-brown without stippling or dark markings; the chin and throat are also mostly unmarked, although there may be dark pigment in this region, usually more as blotching or clouding rather than discrete and bold spots.

COCHRAN (1941, p. 348) noted that members of the genus *Alsophis* may have a groove along the upper border of the posterior supralabials, and that this groove may be pigmented. Along with the above-

mentioned pattern is associated a diffusely and darkly pigmented supralabial groove; this is not to be confused with a dark mask which occurs with the following pattern. The remainder of the head is reddish-brown to brown, and usually without dorsal pattern of any sort. On the neck there is an inconspicuous median dark streak which soon disappears posteriorly.

2) The second basic pattern occurs on the Virgin Islands, southern Puerto Rico, and Caja de Muertos. In this pattern, every third or fourth scale in the fifth dorsal scale row is more or less particolored, the upper half being pale and the lower half dark brown to black. There may or may not be a prominent lateral dark neck line; if present, it may be fragmented or entire. There is a black face mask over the canthal area and posteriorly along the supralabial groove. The ventrals usually have dark posterior margins, but these markings are not black or dark brown and are not boldly conspicuous as in Puerto Rican snakes. Additionally, the belly is stippled with brown, and there are a series of longitudinal dashes on the sides of the ventrals corresponding to the angle of these scales when the snake is alive. The supra- and infralabials, as well as the chin and throat, are heavily marked with discrete and bold flecks or spots of dark brown. The top of the head is usually marbled or flecked with dark, and there is a dark median neck line which cuts off between itself and the lateral dark neck lines a pair of roughly triangular pale blotches behind the head.

I have discussed these two patterns as if they were completely separable. In actuality, this is not so. Thus specimens from Mona have a dorsal pattern which is roughly like that of Puerto Rican snakes (although highly modified from that condition), while they have a bold black mask. On Culebra, both patterns occur, although pattern (2) is by far the commoner. Finally, there are all sorts of intermediate conditions in any large sample. These intermediates and variants defy any sort of rational analysis into the above two patterns, and are intermediate in the sense that they seem randomly to combine features from both pattern types.

Structural and scale differences. Treating the whole series of *Alsophis* as a single unit, I am unable to differentiate

between the various populations on any single scale feature or combination of features. The head scalation in all is usually 1/1 loreals, 1/1 preoculars, 2/2 postoculars, the lower such smaller than the upper, and 1 + 2 temporals. The temporals are especially subject to variation, due to additional partition of the temporals themselves (for instance, the first temporal may divide vertically to give two temporals instead of one) or fusings, especially between the upper of the second row of temporals with neck scales above it. All these variants are uncorrelated with geography. The supralabials are usually 8 and the infralabials 10; again, counts of 11 infralabials are not uncommon, either unilaterally or on both sides, and some snakes have 9 supralabials. This is likewise uncorrelated geographically.

One feature is suggestive; the snakes with pattern (1) above seem to have the head shorter and blunter than those with pattern (2). I cannot determine if this is a real difference, a condition due to preservation techniques, or an illusion due to the pigmentation associated with snakes with pattern (2). This is a tenuous difference at best, and one which cannot be really determined.

Hemipenis. The hemipenes are extruded on many males from various localities, including Puerto Rico and Caja de Muertos on the west and Virgin Gorda on the east. Specimens from Puerto Rico and Virgin Gorda are identical. The hemipenis may be described as follows (based on ASFS V3853, Virgin Gorda): the hemipenis is moderately long, extending to the level of the eighth or ninth subcaudal, distinctly bilobed, and has the sulcus very deeply forked, each fork ending in a tear-shaped zone of papillate flounces with some calyces. The sulcate surface is covered with tiny spines. The non-sulcate surface is likewise covered with tiny spines (although it appears naked in gross examination), and there are four rows of seven to nine large spines, increasing in size distally, and proximally becoming lost in an area of spinelets and papillae on the pedicel. A specimen from Puerto Rico (ASFS X7530) shows the same structure precisely; these two snakes represent the two color patterns as described above.

Apical pits. All dorsal scales, with exception of the lowermost row on each side, have from one to three (usually two) apical pits. On the tail, the usual condition is three apical pits per scale, except on the lowermost row on each side which may have less or even none on some scales. The lowermost body row may have a few scales with one or two pits, although generally this row lacks pits entirely. There is no difference in distribution of pits between specimens from the extremes of the region under discussion.

In summary then, considering the entire series of snakes from Mona to Anegada, there seem either to be no differences between snakes from the two extremes in some characters (hemipenis, apical pits) or a more or less graded series of characters (ventrals, subcaudals, dorsal scales) or a situation where the character appears in a random, although geographically correlated, manner (coloration and pattern).

I have striven to find even one single all-or-none character which will divide these snakes into the two time-honored species, and have failed. Although various populations are quite distinct in coloration and pattern from other populations, and although various populations differ from one another on the basis of average number of ventrals or modal dorsal scale formulae, on the other hand there are regions where these characters intergrade. Under these circumstances there can be little justification for maintaining these populations under four specific names (*portoricensis*, *variegatus*, *nicholsi*, *anegadae*).

Perhaps the crux of the entire matter lies in the two specimens cited by SCHMIDT (1928, p. 141) as *A. antillensis* from Coamo Springs, Puerto Rico. I have examined these two snakes (AMNH 13305-06); both are females rather than a pair as SCHMIDT stated. They are without a doubt very different from the majority of Puerto Rican specimens in dorsal and ventral pattern (both represent pattern type (2) as described above), and show no approach to pattern type (1) which is usual for Puerto Rican snakes. The ventrals (182, 185) are slightly above other Puerto Rican females (166-181). The dorsal scale formulae are 17-17-15 and 17-19-15. The question is whether these two snakes (1) really represent a

Puerto Rican population of the otherwise Virgin Islands *nicholsi*, and thus *portoricensis* and *nicholsi* are two distinct species with the latter having a somewhat peculiar distribution, or (2) represent a peculiar variant or, at best, a subspecies of *portoricensis* on Puerto Rico.

Evidence for the latter alternative is two-fold. During the course of the present investigation I have examined, in addition to these Coamo Springs specimens, three other specimens from Puerto Rico with the same sort of coloration and pattern, all with 17 midbody scale rows, and all from southern localities (Guánica, Guánica Insular Forest, and Maricao). From Maricao and Adjuntas there are additional specimens which show at least ventral patterns intermediate between *portoricensis* and the paler southern form; these will be discussed in detail later. It thus seems that there is in xeric southern Puerto Rico a subspecies of *portoricensis*, presently represented by a very few specimens, which intergrades with *portoricensis* farther north.

Secondly, Caja de Muertos, which lies off Ponce off the southern coast of Puerto Rico, has a population which to varying degrees includes individuals which are primarily like the southern mainland specimens noted above and others which are more like *portoricensis*, the one category blending gradually and almost imperceptibly into the other. Thus, although the extremes of the Caja de Muertos series might be separated into pale, *nicholsi*-like specimens and other more *portoricensis*-like snakes, the majority are intermediate between these two, and all are quite different as a group from the northern Puerto Rican snakes.

In these two cases, it is perhaps arguable that the supposed intergrades at Maricao and Adjuntas, as well as the Caja de Muertos conglomerate, are hybrids between two species. To anyone with this inclination, I can only say that it is impossible to reach any sort of logical arrangement of the various forms involved by presupposing the occurrence in this assemblage of two (or more) full species. One quickly encounters such a non-concordance of characters, such a variety of patterns, such a host of intermediates between what are assumed at the outset to be distinctive patterns, that the whole picture becomes confused and unreasonable. With a very few

specimens, the picture can be simply resolved. With more adequate series, the situation increases in complexity. In some ways I am not satisfied with the arrangement as proposed below, but, considering the fact that I have had access to far more material than any previous worker on these snakes, it is the only arrangement which does not violate too many concepts at the same time.

SYSTEMATIC TREATMENT

***Alsophis portoricensis* Reinhardt & Lütken, 1863**

Alsophis portoricensis REINHARDT & LÜTKEN, 1863, Vid. Meddel. Naturh. Foren. Copenhagen 1862, p. 221.

Alsophis anegadae BARBOUR, 1917, Proc. Biol. Soc. Washington 30, p. 102.

Dromicus variegatus SCHMIDT, 1926, Publ. Field Mus. Nat. Hist., Zool. 12, p. 160.

Alsophis nicholsi GRANT, 1937, Jour. Dept. Agri. Puerto Rico 21, p. 516.

Type locality: PUERTO RICO.

Description: A large (males to 794 mm, females to 923 mm snout-vent length) colubrid snake with either 17 or 19 scale rows (occasionally 15 or 18) at midbody; 163 to 184 ventrals in males, 166 to 187 ventrals in females; dorsal scales smooth with from one to three apical pits; anal divided; head scalation of the normal unspecialized colubrid type with 1/1 loreals, 1/1 preoculars, 2/2 postoculars, and usually 1 + 2/1 + 2 temporals; supralabials usually 8/8, infralabials 10/10; subcaudals paired, 114 to 143 in males, 106 to 140 in females; pattern various, ranging from dark purplish-brown dorsum and pale venter with each dorsal scale and each ventral scale edged in dark brown to black, to a pale brown dorsum and creamy venter with heavy stippling and traces of dark ventral margins, and with an at least indicated line on the fifth scale row, made up every third or fourth scale with its upper half pale and its lower half dark brown to black; hemipenis as previously described; head and neck pattern various and as described for each subspecies below.

***Alsophis portoricensis portoricensis* Reinhardt & Lütken, 1863**

Type locality: PUERTO RICO.

Diagnosis: A subspecies of *A. portoricensis* characterized by a combination of large size (males to 794 mm, females to 923 mm snout-vent length), dorsum unicolor dark purplish-brown to olive, each scale edged with black to dark brown (Fig. 44); venter pale, each ventral scale edged posteriorly with dark brown to black in strong contrast to the rest of the scale which is immaculate; top of head reddish-brown to brown; supra- and infralabials usually immaculate pale reddish-brown (Fig. 52), chin and throat usually immaculate, but if marked, only with diffuse dark to dusky blotches; ventral scales few in number, 163 to 176 in males (mean 170.1), 166 to 181 in females (mean 174.3); subcaudals 114 to 134 in males, 115 to 133 in females; dorsal scales most often 17-17-14.

Distribution: Puerto Rico, except the southern section; known in the south from Maricao, Adjuntas, and Cayey (Fig. 56).

Variation and discussion: The black-edged dorsals and ventrals are a common recognition feature of *A. p. portoricensis*.

The ventral black edging is variable in intensity and may be extremely dark and contrasting (MCZ 58805) or may be reduced to a very few dark discrete dots or dashes on the posterior ventral edges (MCZ 61487). The usual condition is heavy ventral markings, however, and only one snake (MCZ 6140) lacks these marks entirely. The ventral ground color varies (notes in life from four specimens from Bosque de Río Abajo, ASFS X7530-32, RT 555) from white anteriorly to grayish posteriorly, or white to yellowish or pinkish posteriorly in subadult specimens. The dorsal ground color varies from olivaceous to rich purplish-brown, and all dorsal scales have black posterior margins. This latter feature is somewhat variable, however, with a resulting dorsal dark reticulum (much like that which distinguishes the *Mona* subspecies); MCZ 6140 from Bayamón has this condition. Usually the dark scale edges on the fourth and fifth scale rows are more extensive than those elsewhere, and these then form a diffuse lateral band, especially on the neck (UMMZ 74383) but at times extending the length of the entire body (UMMZ 74367). The dorsum in juveniles and some subadults is rather inconspicuously transversely banded with wide (3 to 4 scales) dark and narrow (1 to 2 scales) whitish lines which give the snake an obscurely banded appearance. This condition is apparently lost with adulthood since it occurs in no large snakes. The dark dorsal and ventral scale edging continues onto both the dorsal and ventral surfaces of the tail, so that on the tail each scale is outlined by dark brown or black.

The head is regularly reddish-brown to brown, without pattern. A dark median line, involving as many as three adjacent scale rows, proceeds posteriorly from the parietals for a short distance along the neck; if lateral scale rows 4 and 5 are conspicuously darker, a slightly paler area is thus enclosed between the dark median and dark lateral lines. In many specimens, due to the dark hue of the dorsal scales, the median nuchal line is not apparent. The labials, chin and throat are all usually unmarked; if there is any dark pigment present, it is a brownish to dusky clouding

and is confined to the chin and throat. Such dark pigmentation is not a constant feature of the series, and most specimens have the throats immaculate. There is some dark pigment in the supralabial groove, but this is almost restricted to the groove itself and in no way approaches the formation of a mask or a dark canthal line.

There are two juveniles (MCZ 57898-99); the smaller (snout-vent length 322 mm) is so discolored dorsally that it is presently an entirely dark brown snake with faintly indicated posterior pale crossbands; ventrally the scutes are dark gray and there is a suggestion of lateral angle-following longitudinal dashes on the ventrals. The ventrals lack posterior dark margins. The second specimen is considerably larger (snout-vent length 444 mm) and is colored like the adults, although anteriorly this particular individual has a more than usual reticulate pattern; if there were pale crossbands on this small snake, they are no longer apparent.

The modal dorsal scale row formula is 17-17-14, although as indicated in the introduction, there are several other variants. Only a single snake (CM 28126) has 19 scale rows at midbody. Except for this individual, all other specimens have formulae of 17-17-13, -14, or -15. The supralabials are 8/8 in all but one snake which has 8/9. The infralabials are 10/10, with 9/10 as the most common variant (six specimens), and 9/9 (three), 10/11 (three), and 11/11 (one) also occurring. One snake has 1/2 postoculars instead of the customary 2/2. The temporals are especially variable; the normal arrangement of 1 + 2/1 + 2 is varied to 1 + 1 unilaterally in fifteen specimens, and four snakes have 1 + 1/1 + 1. Other conditions include 1 + 3 on both sides (two specimens), 1 + 3/1 + 1 (one), and 1 + 3 unilaterally (one).

I cannot detect any geographic variation in coloration or scalation in the material before me. To the south there are indications of influence of the pale and more heavily and distinctly marked southern subspecies; these intergradient specimens are discussed later.

Specimens examined: PUERTO RICO, no other locality, 4 (USNM 12447); 4 km SE Isabela, 1 (ASFS V3241); 2 mi. S Pueblito de Ponce, Bosque de Guajataca, 1 (ASFS V3239); Bosque de Río Abajo, 2.5 mi. SW Dos Bocas, 4 (ASFS X7530-32, RT 555); Utuado, 1 (CM 1332); Adjuntas, 3 (CM 1333, AMNH 8434-35; see discussion beyond); Maricao, 2 (UMMZ 74366, MCZ 37328; see discussion beyond); 2.3 mi. W Dorado, 1 (ASFS X7702); Bayamón, 1 (MCZ 6140); San Juan, 1 (MCZ 6144); 10 mi. S Canóvanas, 1 (UMMZ 74367); headwaters, Río Mameyes, 1 (MCZ 37329); 3 mi. N Playa de Humacao, 1 (MCZ 37327); Playa Santiago (= Playa de Humacao), 23 (MCZ 58773-74, 59796-97, 58799-16, 61487); Cayo Santiago, 1 (MCZ 58798); Humacao, 3 (UMMZ 74365, USNM 27766-67); District of Humacao, 1 (CM 28126); Cayey, 5 (UMMZ 74368, UMMZ 74383, USNM 86521, MCZ 37301, MCZ 37332).

***Alsophis portoricensis prymnus*, new subspecies**

Holotype: MCZ 77226, CAJA DE MUERTOS, PUERTO RICO, one of a series taken 13 May 1961 by David C. Leber and Albert Schwartz. Original number 12509.

Paratypes (all from Caja de Muertos except as indicated): ASFS 12511-17, same data as type; UMMZ 74369-70, 20 August 1931 and November 1931, C. Grant; UMMZ 125569, 10 December 1960, H. Heatwole; MCZ 37330-31, 20 August 1931, C. Grant; MCZ 66422, 27-30 May 1959, Jordan and Martorell; MCZ 37302, May 1932, C. Grant; AMNH 32986, May-June 1926, Anthony and Goodwin; UMMZ 74381, islet south of Caja de Muertos, May 1932, C. Grant.

Associated specimens (all from PUERTO RICO): AMNH 13305-06, Coamo Springs; MCZ 61486, Guánica Insular Forest; ANSP 19622, Guánica; MCZ 61488, Maricao.

Diagnosis: A subspecies of *A. portoricensis* characterized by moderate size (males to 555 mm, females to 580 mm snout-vent length), dorsum tan to light brown; dorsal scales with dark edging much reduced to almost absent (Fig. 4); ventrals without conspicuous dark edges but usually with longitudinal dashes at the region of the ventral angle and occasionally with some general tan stippling; top of head variegated; supra- and infralabials, chin, throat and even first eight ventrals with heavy and conspicuous discrete markings (Fig. 53); ventrals averaging higher than *p. portoricensis*, 172.8 in males and 177.8 in females; subcaudals 122 to 129 in males, 106 to 132 in females; dorsal scales most often 17-17-14.

Distribution: Known only from Caja de Muertos (and its associated islet) and the southern portion of Puerto Rico, from Guánica east to Coamo Springs, and inland to the vicinity of Maricao and Adjuntas (Fig. 56).

Description of type: An adult male, snout-vent length 542 mm, tail length 269 mm, not quite complete; ventral scales 179; anal divided; subcaudals in 131 + pairs; supralabials 8/8; infralabials 10/10; loreals 1/1; preoculars 1/1; postoculars 2/2; temporals 1 + 3/1 + 1; dorsal scale rows 17-17-14.

The dorsal coloration is a pale tannish-brown; many scales have dark brown to blackish edging, although this is not conspicuous nor constant for every dorsal scale. The result is that the anterior portion of the body especially is almost reticulate with a fine dark network which additionally gives the appearance of zigzag cross-banding, the faint darker bands two scales in width, the pale bands involving only one scale. About every third, fourth or fifth scale of the fourth scale row is particolored, dark brown below and

slightly paler than the ground color above. Both this particular row and the transverse bands are slightly more conspicuous posteriorly than anteriorly. The ventral surface was white in life, each ventral having only the faintest remnant of the dark marginal edging; the same condition holds for the subcaudals. Whatever edging is present is brownish and not dark brown and conspicuous. The head is brown, with some black smudging which is indistinct, and the median neck line is rather bold and extends posteriorly about the first six median dorsals. There is an ill-defined but nonetheless definite mask remnant from the rostral through the eye and onto the temporals, blending thence into a faint lateral neck stripe on scale row 4, which continues posteriorly and is ultimately lost in the dark scale edgings on the body. The supralabials are unicolor reddish-brown with only very faint indications of markings; the infralabials, chin shields and throat, including the first nine ventrals, have brown markings, those on the chin shields and infralabials being the darkest. The hemipenes are extruded.

Variation: The paratypes include five males and eighteen females.

The largest male measures 555 mm in snout-vent length, and the largest female 580 mm. The ventrals range from 169 to 179 (mean 172.8) in males, and from 173 to 185 (mean 177.8) in females. Two males with complete tails have 122 and 129 subcaudals, and four females have from 106 to 132. The scale row formulae are 17-17-14 modally, but counts of 17-17-15 (five snakes), 17-15-13(one), 17-19-15 (one), and 19-17-14 (one) occur. Variation in head scales includes one snake with 8/9 supralabials, one snake each with 10/11 and 9/10 infralabials, and one snake which has only one postocular on one side (the other side has been destroyed). The type is unique in its temporal formula; aside from the usual formula of 1 + 2 on both sides (16 specimens), counts of 1 + 1 (unilaterally) occur in five snakes and 2 + 2 unilaterally in two snakes.

The entire lot of specimens from Caja de Muertos and its associated islet presents a bewildering array of patterns, as noted in the introduction. Some specimens (MCZ 66423, ASFS 12516) at least dorsally resemble *p. portoricensis* to a great extent, but such specimens ventrally have the scale margins not so dark or regular as does the northern mainland race. These snakes also have the lips, chin and throat heavily marked with dark brown to black. At the other extreme are specimens which are virtually patternless and pale dorsally (UMMZ 74381, ASFS 12513) but which have mottled lips, chin and throat, faint indication of a dark lateral stripe on scale row four, and longitudinal markings at the angulate portion of the ventrals. The major portion of the series is intermediate between the two pattern extremes, but intermediate in varying degrees, so that the gap between the two extreme color patterns is rather nicely bridged by the material. A single juvenile male (UMMZ 125569) is

distinctly crossbanded with wide dark and narrow pale bands, and the venter is dark gray.

The five mainland specimens vary in no significant way from the Caja de Muertos series; the pale dorsal ground color, the reduced dorsal and ventral scale edging, the stippled venters, the dark mask stripe following the supralabial groove and continuing onto the neck, the prominent median neck stripe, the heavily marked labials, chins, and throats (in all except the two juveniles – MCZ 61488 and ANSP 19630), all align these snakes with the Caja de Muertos series and not with the balance of material from the remainder of Puerto Rico.¹⁾

Of the two other Maricao specimens (UMMZ 74366, MCZ 37328), both are much closer to *p. portoricensis* than to *prymnus*; however, both have one feature which is unusual in the former subspecies and characteristic of the latter – the occurrence of dark dashes at the angle of the ventrals, especially anteriorly. One also has the labial and chin spotting more prominent and evident than is customary for the northern race. Finally, of three specimens from Adjuntas, one (CM 1333) has a very heavily marked venter (although the ventrals have the dark marginal border much reduced) and prominent angulate markings. An Adjuntas juvenile (AMNH 8434) has the venter gray and heavily stippled and likewise has angulate markings very well developed. The final Adjuntas specimen is typical of *portoricensis*.

From these data it appears that *portoricensis* intergrades with *prymnus* in the vicinity of Maricao, and some *prymnus* characters are still evident in the region of Adjuntas, although Adjuntas appears to be north of the actual area of direct *prymnus* influence.

Remarks: The occurrence of two races of *A. portoricensis* on Puerto Rico was predicted by SCHMIDT (1928, p. 144) who stated that "It is not unlikely that a pale form of true *portoricensis* formerly occurred in the arid district of southwestern Puerto Rico, and the Muertos Island specimen is evidence to this effect." On the mainland, *A. p. prymnus* seems to be rather rare, since there are very few specimens of *Alsophis* available from the southern section of the island. On Caja de Muertos, on the other hand, the race is

¹⁾ Since the present paper was submitted for publication, additional specimens of *A. p. prymnus* were collected during the spring of 1965 in Puerto Rico by DONALD W. BUDEN, RICHARD THOMAS and myself. These include a series of eleven specimens from Caja de Muertos (ASFS V4803-12, ASFS V5849), and two snakes from the southwestern Puerto Rican mainland: ASFS V5728, 7.0 km E Guánica, and ASFS V5754, 8.5 km SE Guánica. All these specimens agree very well with my concept of *A. p. prymnus*, and the mainland snakes reinforce my interpretation of the differences existing between the Caja de Muertos snakes, along with those from southwestern Puerto Rico, and *A. p. portoricensis*. New localities for the latter subspecies include: ASFS V4520, 17.7 km NE Utuado, Hacienda Roses, 1100 feet; ASFS V5439, Ramey Air Force Base, Rifle Range Beach; V5874, 4 mi. W Las Llanadas, 600 feet; and ASFS V5931-32, 1 mi. SW Regadura. None of the new localities for *portoricensis* and *prymnus* is shown on Fig. 56, and all new localities are enclosed within the known ranges of the two subspecies.

extremely common; Mr. LEBER and I secured the series of type and paratypes in about eight hours general collecting on the island and without any special search for snakes.

Alsophis p. portoricensis and *A. p. prymnus* require little comparison; the former is a dark, well marked snake with bold dark margins to the ventrals, whereas *prymnus* is much paler with much reduced dorsal and ventral markings. In contrast to *portoricensis*, bellies of *prymnus* were noted as being white to tan anteriorly, becoming more reddish posteriorly. In scalation, both subspecies have 17-17-14 as the modal dorsal formula, but in both sexes the extremes and means of ventrals are higher in *prymnus*.

***Alsophis portoricensis variegatus* Schmidt, 1926**

Type locality: MONA ISLAND.

Diagnosis: A subspecies of *A. portoricensis* characterized by small size (males to 535 mm, females to 510 mm snout-vent length), dorsum medium to dark brown, with some dorsal scales edged in black, giving a reticulate appearance, especially prominent on the neck and anterior part of the body which is usually very darkly marked (Fig. 46); venter pale and with dark margins of ventrals much reduced or absent and usually some additional dark stippling; top of head variegated with black; supra- and infralabials usually heavily flecked with dark brown, as are chin and throat and anterior ventrals; dark canthal-ocular-temporal mask prominent and black in most specimens; ventrals moderate in number, 171 to 177 in males (mean 173.4), 174 to 179 (mean 177.2) in females; subcaudals 115 to 125 in males, 113 to 125 in females; dorsal scales almost always 17-17-15.

Distribution: Isla Mona (and doubtfully Isla Desecheo) off of western Puerto Rico (Fig. 46).

Variation and discussion: The characteristics which most readily distinguish *variegatus* from *portoricensis* and *prymnus* are the dorsal and ventral patterns, as well as the almost constant 17-17-15 formula (one exception in seventeen specimens examined).

The irregular dark edging to the dorsal scales gives a distinctly reticulate appearance; this is especially true on the neck and anterior body. In UMMZ 74373F, which

displays this condition, the neck scales are heavily marked with black, so much so that the neck immediately behind the parietals is almost black, with two lateral patches of ground color cut off by the very dark median neck line, and the black pigment extensively deposited above the fourth scale row. More posteriorly this snake has a black median dorsal line and black lines on the sides on the fourth and fifth rows, all of which become slightly less bold even more posteriorly. Although this snake is exceptionally dark anteriorly, all specimens from Mona have the same sort of pattern, with dark scale edgings more prominent on the lower sides and middorsum. The pair of lateral neck blotches behind the parietals is always present and obvious, even in snakes with a paler ground color and somewhat less intense black pigmentation (AMNH 31909). Ventrally the series varies from being completely patternless, to having the ventrals heavily stippled and with longitudinal angulate markings, to moderately heavy but interrupted dark posterior ventral margins. In the latter case, the ventrals are marked only on the posterior two-thirds of the body, the anterior third lacking this pattern. A black mask is present, its intensity correlated with the intensity of the black dorsal markings. In all specimens except a small juvenile, the labials, chin and throat scales, as well as the anterior ventrals, are heavily and clearly marked with dark brown to black, so much so that in one individual (UMMZ 74372) the whole area shows more very dark brown than pale areas.

There is one juvenile (UMMZ 74371) with a snout-vent length of 218 mm. Except for the absence of labial, chin and throat markings, this small snake is patterned much like the adults; anteriorly the dark dorsal scale edges form a series of four laterally almost ovate blotches, which blend gradually into more obscure dorsal dark markings. The small snake is not crossbanded in the fashion of *portoricensis* or *prymnus* juveniles. The apparently larger size reached by males rather than females is presumed to be an artifact of the sample.

All but one specimen (UMMZ 74372) have a dorsal scale formula of 17-17-15; the exception has 17-19-15. One snake has 8/9 supralabials, and all others have 8/8 supra- and 10/10 infralabials. Only two snakes are exceptional as regards temporals; these two snakes have 1 + 1 unilaterally.

The heavy anterior dorsal markings and reticulate pattern of *variegatus* will distinguish it at once from *portoricensis* and *prymnus*. In dorsal ground color it seems intermediate between the other two races, but closer to *prymnus* than to *portoricensis*. The reduced ventral pattern distinguishes *variegatus* from *portoricensis*; both *variegatus* and *prymnus* are comparable in ventral pattern reduction. The heavy black mask separates *variegatus* from the other two races, and the heavily marked labials, chin, and throat distinguish the Mona race from *portoricensis*. In scalation, *prymnus* and *variegatus* are comparable, and both average higher than *portoricensis* in number of ventrals. Although both *portoricensis* and *prymnus* have snakes with dorsal formulae of 17-17-15, this is not the modal condition in these two subspecies.

There is a single specimen (USNM 29356) from Isla Desecheo available to me. This is a female with 181 ventrals and 17-17-15 dorsal rows. The number of ventrals is higher than that of *variegatus* females, but within the range of ventrals of female *prymnus*. The specimen is old and much faded; the pattern is much more similar to *prymnus* than to *variegatus*, since it is reduced, there being very little black. The ventrals lack posterior dark margins, but do have lateral angulate longitudinal dashes. For want of a better name for this specimen, I am grouping it with *variegatus*, although this assignment is almost surely incorrect. I suppose that Isla Desecheo is inhabited by another subspecies, characterized by high number of ventrals and pallid coloration with little or no dorsal markings. Only additional material will solve the problem.

Specimens examined: Isla MONA, 19 (UMMZ 74371 (3), UMMZ 74372 (5), UMMZ 74373 (6), USNM 12086, ANSP 24607, AMNH 13773-74, AMNH 31909); Isla DESECHEO, 1 (USNM 29356).

***Alsophis portoricensis aphantus*, new subspecies**

Holotype: BMNH RR1964.944, VIEQUES, taken before April 1890 by A. H. Riise.

Paratypes: BMNH RR1964.943, RR1964.945, same data as type.

Diagnosis: A subspecies of *A. portoricensis* characterized by moderate size (males to 634 mm, females to 670 mm snout-vent length), dorsum tan to light brown; dorsal scales with dark edging prominent but somewhat irregular although not giving a reticulate appearance; a moderately to very prominent dark lateral stripe on scale rows four and five, each particolored scale in this stripe subtending above it a pale rosette of from two to four scales (Fig. 47); ventrals with dark posterior margins reduced but usually present and moderately dark, and dark longitudinal dashes present at the ventral angle, at least anteriorly; top of head plain to variegated; supra- and infralabials, chin and throat heavily marked, the markings rather diffuse and not especially clear-cut; ventrals very high in the single female (187) and high in the two males (177); subcaudals 130 in the single specimen (a male) with a complete tail; dorsal scale counts variable, two specimens having 18-19-15, and one 17-17-15.

Distribution: Known only from Isla Vieques, off the eastern end of Puerto Rico; presumed to be presently extinct (Fig. 56).

Description of type: An adult female, snout-vent length 670 mm, tail not complete; ventral scales 187, anal divided; subcaudals 98 + pairs; supralabials 8/8; infralabials 10/10; loreals 1/1; preoculars 1/1; postoculars 2/2; temporals 1 + 2/1 + 2; dorsal scale rows 17-17-15.

The dorsal coloration is brown, most scales having a narrow dark brown to black margin, thereby giving a more or less uniformly marked dorsum. Starting on scale rows four and five on the neck, a black lateral line proceeds posteriorly, breaking gradually into a series of particolored scales on the anterior trunk. These scales at first are separated from each other by one or two scales, but more posteriorly all scales in the fourth and fifth rows are particolored, giving a somewhat zigzag black lateral line. Most particolored scales in the fourth row subtend small but very conspicuous white rosettes of three to four scales which are most obvious on the posterior two-thirds of the body, and continue onto the top of the tail as a series of white scales on the second scale row. The top of the head is suffused with dusky, and there is a moderately prominent median dark nuchal line, one scale in width, which, in conjunction with a dark patch laterally behind the temporals, cuts off two rather triangular patches of brown ground color on the neck. The ventral scales have their posterior margins outlined in medium brown, but the edgings are irregular and often broken; these ventral scale edges are fainter on the anterior quarter of the body. The lateral angulate markings on the ventrals are restricted to occasional dark dots. The supra-, infralabials, chin, and throat are diffusely marbled with darker, the markings on the chin and throat being the more discrete. There are some brown vague markings on the first ten ventrals. The subcaudals are irregularly margined with brown. The dark face mask is limited to a short dark canthal line, a black supralabial groove line, and a rather large black posttemporal patch which blends into the dark lateral neck lines mentioned above.

Variation: The two male paratypes (snout-vent lengths 560 mm and 634 mm) both have 177 ventrals, and the smaller has a complete

tail with 130 pairs of subcaudals. The only exceptional head scalation is that one snake has 1 + 3 temporals unilaterally; all other head scale counts are as for the species. Both males have dorsal formulae of 18-19-15. On a population level I imagine that the Vieques snakes are 19-19-15 row snakes like the Virgin Islands *Alsophis*.

The smaller male (BMNH RR 1964.945) resembles the type very closely in most pattern features; it does lack, however, a prominent dark lateral line, but the pale rosettes are present. Ventrally, in addition to the brown scale margins, the lateral angular markings are prominent and consistent the length of the body; lip and chin markings are present. The larger male (BMNH RR1964.943) lacks dark dorsal scale edges or has them at least much reduced anteriorly, lacks a lateral dark line, and apparently lacks rosettes as well. The ventral markings likewise are much reduced and there are only very fine ventral scale edges and the very faintest of lateral angular markings. The throat and chin are, however, very profusely marked with darker and the labials have suture-following dark lines and smudges.

Remarks: *Alsophis p. aphantus* is represented by only three specimens, and thus comparison of the meristic characters of this subspecies with others is difficult and uncertain. The presence of 19 scale rows at midbody will differentiate *aphantus* from most specimens of *portoricensis*, *prymnus*, and *variegatus*. The very dark lateral line (when present) and the white rosettes are features which *aphantus* shares with no other subspecies, although *variegatus* does have a dark lateral line in many specimens. Absence of a dark mask separates *aphantus* from *variegatus*, as well as the former lacking a reticulate dorsal pattern. Ventrally, *aphantus* is much like *prymnus* and *variegatus*, and quite different from the boldly marked *portoricensis*. The high number of ventrals in the single female *aphantus* is higher than that of any other specimen of the species. Of the described subspecies, it is most closely approached by female *prymnus*. The male counts of 177 ventrals are within the known ranges of ventrals in male *prymnus* and *variegatus*, and one scale higher than the large series of male *portoricensis*.

Before leaving the environs of Puerto Rico, there is a short series of seven snakes from Isla Piñeros (UMMZ 74380 (4), MCZ 37306-08) which requires some comment. These are the specimens about which GRANT (1932c, p. 149) said that they "seemed at first to be slightly aberrant *A. portoricensis*, but they were *A. antillensis*." They are indeed a confusing lot. There are three males and four females; all are adult. The ventrals in the males range from 174 to 175 (mean 174.4) and in the females

from 173 to 185 (mean 179.5). The dorsal scale formulae are 19-19-15 in five snakes, 19-19-14 in one, and 17-19-15 in another. All thus have 19 scales at midbody. Only one specimen, a female, has a complete tail, with 131 pairs of subcaudals. These snakes as a group are distinctly unlike any other Puerto Rican specimens in having 19 scale rows at midbody. The four specimens from the University of Michigan could very easily be regarded as aberrant *A. p. portoricensis* in pattern, since they have the ventral markings reduced or absent, two have angular longitudinal dashes, the dorsal scales have reduced dark edges, the tops of the heads are variegated, and lips, chin, and throats are very heavily marbled with dark brown. The three Harvard specimens on the other hand are much paler in dorsal coloration, have prominent partcolored scales in the fifth row, have somewhat stippled venters, and lack almost completely any indication of ventral dark scale edging.

Here is a particular instance where the investigator is really beset with confusion. Do these two series represent two species which differ in the time-honored dorsal and ventral patterns? If so, we must then assume that the *portoricensis*-like individuals differ from their mainland relatives by 19 rather than 17 midbody scale rows. At the same time, the pale snakes with distinct partcolored fifth scale rows are much like specimens to the east on Culebra and the Virgins. Another possibility is that these snakes represent an intergradient population between two subspecies—*portoricensis* and the race next to the east. Geographically this seems implausible, since Isla Piñeros lies only about 1 kilometer off the shore of Puerto Rico, but some 45 kilometers from Culebra and about 12 kilometers from Vieques; the Isla Piñeros snakes are not *aphantus*. Since there is a certain amount of "intergradation" in the sample between the two extreme conditions, I prefer to regard these snakes as very aberrant *A. p. portoricensis*, at least for the moment, while admitting at the same time that they may represent a distinct race from Isla Piñeros.

***Alsophis portoricensis richardi* Grant, 1946**

Alsophis nicholsi richardi GRANT, 1946, Jour. Agri. Univ. Puerto Rico 30(2), p. 124.

Type locality: ST. THOMAS, American Virgin Islands.

Diagnosis: A subspecies of *A. portoricensis* characterized by a combination of large size (males to 648 mm, females to 790 mm snout-vent length), dorsum sandy to dark brown, with usually every two to four scales in the fifth scale row partcolored pale above and dark brown below (Fig. 48); venter heavily stippled with brown, but ventral scales usually without conspicuous dark posterior margins; longitudinal dashes on ventrals at angle regularly present; top of head variegated; supra- and infralabials, chin and throat spotted or marked with dark brown, this pattern extending onto the first few ventrals; a dark brown mask present or at least

indicated; ventrals moderate in number, 172 to 179 in males (mean 175.4), 175 to 183 in females (mean 179.0) – data from St. Thomas material only; subcaudals 135 to 143 in males, 130 to 135 in females (St. Thomas); dorsal scales most often 19–19–15.

Distribution: Known from the islands of Culebra, St. Thomas (and its satellites, except Buck), Peter and Salt Islands in the British Virgin Islands (Figs. 56 and 57); doubtless occurring on many smaller islands and islets in the American Virgins and the western British Virgins, but unknown to me (by specimens) from St. John or Jost van Dyke (whence it has been recorded by GRANT 1936, p. 9–11).

Variation and discussion: Perhaps the best way of attacking *A. p. richardi* is to discuss variation on the various islands which it inhabits. There are long series available from Culebra and St. Thomas, and less adequate material from other islands.

1) **St Thomas.** In the series of 30 snakes from St. Thomas, the ventrals in males vary between 172 and 179 (mean 175.4) and between 175 and 183 in females (mean 179.0). Subcaudals vary in males (three) from 135 to 143 and in females (three) from 130 to 135. The dorsal coloration is extremely variable, including specimens which are presently at least very pale sandy (USNM 66523) to those which are very dark brown (MCZ 5429). The modal coloration seems to be medium brown. The particolored fifth scale row is always present, and, by inclusion of the fourth scale row as well, may make up a dark lateral line (BMNH 60.4.18.3). A dark brown mask, often hollowed centrally, is always present and is more prominent in paler individuals. Dorsal scales may be outlined with dark brown, especially posteriorly (MCZ 5426), or all body scales may lack this condition (USNM 12403). The ventrals always have some brown stippling, which may be very dense (BMNH 60.4.18.1) or may be almost absent (USNM 13857). A few specimens (MCZ 5426) have remnants of dark brown posterior margins on the ventrals, but this is the exception rather than the regular condition. The modal dorsal scale formula is 19–19–15 (25 individuals), but formulae of 19–19–14 (2), 19–19–17 (2), 17–19–15 (1), and 19–18–15 (1) also occur.

Five juveniles are all light sandy in color, lack lip or chin markings, and show the particolored scale row rather clearly; their bellies are all stippled with grayish-brown, for the most part heavily so.

2) **Culebra.** In 44 snakes from Culebra, the ventrals in males vary from 170 to 181 (mean 174.6) and in females from 174 to 185 (mean 179.8). Subcaudals vary in males (eight) from 125 to 135, and in females (eight) between 127 and 132. The dorsal

coloration and its variants are much as described for St. Thomas; the same can be said about the pattern. Attention should be called to two snakes (MCZ 37310 and UMMZ 74378) which resemble *A. p. portoricensis* in most features, and were at first regarded by me as evidence for the occurrence of two species on Culebra. Once again, however, these two *portoricensis*-like snakes are imperceptibly joined by a series of intermediates to snakes which are typical of *richardi* at the other extreme. Unless it is assumed that Culebra is populated principally by hybrids, the conclusion that this *portoricensis*-like pattern and the *richardi* pattern are but extremes of an insensibly grading series is inescapable. The modal dorsal formula is 19-19-15 (25 specimens), with other counts of 17-19-15 (9), 20-19-15 (2), 19-17-15 (2) 17-17-15 (1), 19-19-16 (1), 19-19-17 (1) and 18-19-15 (1). The presence of three snakes with midbody counts of 17 (in contrast to none from St. Thomas) is of special interest; whether these three snakes represent residual genetic influence from the mainland of Puerto Rico is of course unknown.

3) **Water Island.** Water Island is a satellite of St. Thomas and lies just west of the harbor of Charlotte Amalie; the maximum width of the channel separating Water from St. Thomas is 0.5 kilometers and the maximum depth is 8 fathoms. Ventrals in three males range between 175 and 177 (mean 175.7) and in two females between 175 and 180 (mean 177.5); no snake has a complete tail. In coloration these individuals as a group seem somewhat darker than St. Thomas specimens but show the same sort of variation in dorsal pattern.

4) **St. Thomas satellites.** The islands of Savana, Dog, Saba, and Great and Little St. James are all satellites of St. Thomas; of them, Dog and the St. James's are arranged in a series off the southeastern tip of St. Thomas with a maximum depth of 8 fathoms between them. Savana and Saba are western and the channel between them and St. Thomas is 16 fathoms in the former case and 14 in the latter. Saba is the farther removed from St. Thomas at a distance of 4 kilometers. Lovango, on the other hand, is closer to St. John, and is one of a linear group of islands (Thatch, Grass, Mingo, and Lovango) which cross the northern reaches of Pillsbury Sound. Lovango is 2 kilometers off the northwest corner of St. John and is separated from it by a maximum depth of 13 fathoms. Since none of these islands is represented by more than two specimens, they are grouped together.

Six males (Savana, Saba, Little St. James, Dog) have from 173 to 184 (mean 177.0) ventrals and three females (Great St. James, Lovango) have between 177 and 179 (mean 178.3). One male (Saba) has 125 paired subcaudals, and one female (Lovango) has 128 paired subcaudals. The modal dorsal scale formula is 19-19-15; only one specimen (Savana) is exceptional in having 19-19-14. The only outstanding variants in pattern and coloration are two specimens (KU 45669, Lovango, and KU 45672, Little St. James) which are unusually heavily stippled ventrally, and also have dark brown ventral scale margins.

5) **Hans Lollick.** This island lies off the northeastern shore of St. Thomas, at a distance of 2.5 kilometers and with a maximum channel depth of 16 fathoms. Three females are known, of which one, the only full adult, is damaged and a ventral count cannot be taken. The remaining two females both have 178 ventrals. Two have complete tails with 125 and 140 subcaudals. All are rather pale dorsally, and two have prominent and continuous dark brown lateral lines. The adult has remarkably unmarked labials, chin and throat.

6) **Salt and Peter.** These two islands are part of the British Virgin Islands, and lie to the southeast, 7 and 6 kilometers respectively, of Tortola. They represent

a string of islets which extends to the southwest from Virgin Gorda and historically are likely more closely associated with Virgin Gorda than with Tortola, from which they are separated by the Sir Francis Drake Channel which reaches a maximum depth of 27 fathoms between Tortola and Peter. All eight specimens are females, with ventrals varying between 175 and 181 (mean 176.5); four with complete tails have from 126 to 136 subcaudals. The dorsal scale formulae are extremely variable for such a small series, with both 19-19-15 and 17-19-15 each represented by two specimens, and 17-19-14, 17-17-13, and 17-17-14 by one snake each. The high incidence of 17 rows on the neck is noteworthy, and two snakes have 17 scale rows at midbody.

In color and pattern, these snakes are not unusual; Grant (1932e) noted that the specimens from Peter were peculiarly marked, and that the three specimens he had seen from Salt and Peter had straw-yellow throats in life. A juvenile and subadult which were collected in 1964 on Peter indeed did have the throat and both supra- and infralabials yellow. This condition occurs elsewhere (Virgin Gorda; Culebra - Grant, 1932c, p. 150), and I do not attach undue importance to it.

Treating all specimens of *A. p. richardi* as a unit, it is at once obvious that this race is especially variable. Aside from more or less constant features of dorsal scale row formulae (although Peter and Salt specimens are exceptional in having such a high incidence of 17 scale row snakes), and certain pattern and coloration features, there is little to ally all these islands populations with one another. I do so principally on the very close ventral means of both sexes on the various islands. As will be seen shortly, there is a distinct break in number of ventrals to the northeast on Virgin Gorda and Anegada. The specimens from Hans Lollick are especially interesting because of their pale coloration and conspicuous dark lateral line, but it is likely that even these features would vanish in larger series from that islet. Another fact of note, since it is important in reference to the following subspecies, is that of all the specimens from St. Thomas and its satellites and Culebra (46 individuals), only one male (from Dog Island) has ventrals as high as 184; Culebra has the next highest counts of 181.

Exceptions to the normal head scalation are as follows: supralabials 9/9 (1 snake), 8/9 (4); infralabials, 8/9 (1), 9/9 (1), 9/10 (4), 10/11 (7), 11/11 (2); preoculars 1/2 (1); postoculars, 1/2 (2), 1/3 (1), 2/3 (3); temporals 1 + 3 (unilaterally) (15), 1 + 3/1 + 3 (2), 2 + 2 (unilaterally) (1); 1 + 1 (uni laterally) (13), 1 + 1/1 + 1 (2). None of the above head scale irregularities shows any correlation with a particular island.

The absence of specimens of *A. portoricensis* from St. John is most unusual; although these snakes have been reported from there (BOULENGER 1893), there seem to be no readily available specimens in any of the larger collections. I have also been unable to locate the series of twelve specimens from Jost van Dyke reported upon by GRANT (1936); although these were stated to be in the Museum of Zoology of the University of Michigan, they are not there now. Unfortunately, GRANT gave no ventral or subcaudal counts or any detailed color descriptions, so at present I am unable to say whether Jost van Dyke specimens are *richardi* or not. Since this large island is 6 kilometers to the northwest of Tortola (another island which is unrepresented by specimens) and 7 kilometers north of St. John (likewise unrepresented) and stands on its own platform, separated by channels with maximum depth of 17 fathoms from the adjacent large islands, it is possible that the subspecies there is not *richardi*. Geographically Jost van Dyke seems more closely related to Tortola, and it is possible that the postulated occurrence of the more western race on Tortola applies equally well to Jost van Dyke.

Comparison of *A. p. richardi* with the remaining races of *A. portoricensis* is hampered somewhat by the rather extensive color and pattern variation in the former. From the races *portoricensis* and *variegatus*, *richardi* differs in lacking the regularly black margined dorsals and ventrals of the former and the reticulate dorsum of the latter. From *prymnus*, *richardi* may be differentiated by having a more heavily stippled venter. From these three subspecies, *richardi* differs in having the modal dorsal formula 19-19-15, rather than 17-17-14 or 15. From *aphantus*, *richardi* differs in lacking white lateral rosettes and in having less ventrals, at least in the females. Only a single specimen from Culebra, of all the *richardi* examined, has the peculiar modal dorsal formula of 18-19-15 shown by *aphantus*.

Specimens examined: CULEBRA, 44 (UMMZ 74374 (5), UMMZ 74375 (3), UMMZ 74377 (7), UMMZ 74378 (2), USNM 25554-57, USNM 26102, USNM 56438, MCZ 37309-26, AMNH 32983-85); St. THOMAS, 31 (USNM 13857, USNM 75866, USNM 115831, USNM 12403 (2), USNM 66522-25, BMNH 57.6.4.6, BMNH 60.4.19.1-7, BMNH 65.3.31.1-2, ANSP 5577, MCZ 3297, MCZ 5426, MCZ 5427, MCZ 5428 (4), MCZ 5429 (4)); WATER ISLAND, east side, 1 (ASFS V7423); no other locality, 4 (UMMZ 74379,

UMMZ 80644, USNM 52547, MCZ 37305); HANS LOLLICK Island, east side, 2 (ASFS V7459-60); no other locality, 1 (CM 23779); SAVANA Island, 2 (UMMZ 80646, MCZ 42363); SABA Island, 1 (UMMZ 80642); DOG Island, 2 (UMMZ 74376); GREAT ST. JAMES, west end, 1 (KU45671); LITTLE ST. JAMES, south end, 1 (KU45672); LOVANGO Cay, northeast end, 2 (KU45669-70); PETER Island, Little Harbour, 3 (ASFS V7870-72); no other locality, 4 (UMMZ 74412, UMMZ 80645, MCZ 37303-04); SALT Island, 1 (UMMZ 74382).

***Alsophis portoricensis nicholsi* Grant, 1937**

Type locality: BUCK ISLAND (of Capella Islands), off southern coast of St. Thomas, American Virgin Islands.

Diagnosis: A subspecies of *A. portoricensis* characterized by a combination of large size (males to 795 mm snout-vent length), dorsum pale olive green (*vide* GRANT 1937, p. 516) in life but very pale tan in preservative; black or dark dorsal scale edgings almost or completely absent (Fig. 49); venter pale, practically immaculate, without either extensive stippling or dark ventral margins; top of head tan, with very limited dusky variegations; supra- and infralabials pale tan, without conspicuous markings, chin and throat almost immaculate; dark mask absent (Fig. 54); ventrals (in males) high in number, 180 to 184 (mean 181.7); subcaudals unknown; dorsal scales 19-19-15.

Distribution: Known only from Buck Island, the north-westernmost of two islands jointly called Capella Islands, 3.5 kilometers off the south-central coast of St. Thomas, and separated by a channel of 16 fathoms maximum depth (Fig. 57).

Variation and discussion: The only specimens of *A. p. nicholsi* are those available to GRANT at the time of the description, the type (UMMZ 80648) and two paratypes (UMMZ 80641 and MCZ 46503). All are males, with ventrals varying between 180 and 184; none has a complete tail, the longest being that of the type with 95 + pairs of subcaudals. All specimens have 19-19-15 dorsal scale rows, and none has any variants of the head scales.

If GRANT's annotation of "pale olive green" coloration is correct,

this alone will serve to distinguish *nicholsi* from any other race except *portoricensis*, which has some individuals which are olive. An attempt to collect more material of *nicholsi* in the summer of 1964 failed, and further attempts on Major GRANT'S part did not succeed as well; apparently these snakes are not common on Buck Island. The island itself, although rather easily accessible from Charlotte Amalie, is somewhat inhospitable, and except for partial fringes of sea-grapes along the limited lower coastal areas, is almost completely covered with tall grass enclosing small copses of dwarf trees and shrubs – altogether not a very easy place to collect fast-moving snakes.

The separation of *nicholsi* from *richardi* rests primarily on two characters: 1) the much reduced and pale dorsal markings, lip, chin, and throat mottling, and ventral pigmentation, and 2) the higher ventral scale counts. As for the former, such common *richardi* features as the dark mask and the particolored fifth scale row are completely suppressed in *nicholsi*; the same is true of head mottling and dark lip spotting. The higher ventrals of *nicholsi* are also apparent upon comparison with *richardi*. As noted previously, only one male *richardi* has a count of 184 (the high count for *nicholsi*), and no specimen of *richardi* from St. Thomas has a count which overlaps that of the three specimens of *nicholsi*. Interestingly, the single high-count male *richardi* is from Dog Island, which is a St. Thomas satellite 8 kilometers east of Buck Island. This snake shows no tendencies toward reduced pigmentation and pattern, and should not be interpreted as intergradient. Surely additional specimens of *nicholsi* will show ventral overlap between it and *richardi*, but almost certainly the mean for *nicholsi* ventrals will remain consistently higher than that of *richardi*.

GRANT (1937, p. 124) noted that a specimen he collected on Water Island approached *nicholsi* in general appearance; examination of a larger series (five) shows that snakes from this island are in no way closer to *nicholsi* than are some other occasional specimens of *richardi* from Culebra or Hans Lollick, for example, which are pale. Certainly the extreme reduction of the lateral dark line in *nicholsi* can hardly be matched by any *richardi*.

Comparison with the other races of *A. portoricensis* is rather

simple. From the nominate form, *variegatus* and *prymnus*, *nicholsi* differs not only in extreme reduction of pattern but in having 19-19-15 scale rows. From *aphantus* it differs in reduced pigmentation and in 19-19-15 rather than 18-19-15 or 17-17-15 scale rows. The high counts of male *aphantus* ventrals (177 in two specimens) surely would overlap the counts of *nicholsi*, if adequate series of both forms ever become available.

Specimens examined: Buck Island, 3 (UMMZ 80641, UMMZ 80648, MCZ 46503).

***Alsophis portoricensis anegadae* Barbour, 1917**

Type locality: ANEGADA, British Virgin Islands.

Diagnosis: A subspecies of *A. portoricensis* characterized by a combination of moderate size (males to 645 mm, females to 605 mm snout-vent length), dorsum brown to very dark brown, dark scale edging much reduced (Fig. 50); venter moderately to heavily pigmented with dark brown stippling and margins of ventrals with a heavy dark brown border; top of head brown, variegated with darker brown; supra- and infralabials pale, moderately to heavily marked with brown, chin and throat usually heavily marked with dark brown, extending onto the first eight ventrals; dark mask present but obscured because of dark dorsal coloration (Fig. 55); fifth scale row particolored but not especially conspicuous since the upper halves of these scales are brown, the lower halves dark brown, the whole blending into the dark dorsal coloration; ventrals high in number, in males between 174 and 184 (mean 177.5) and in females between 178 and 186 (mean 182.5) on Virgin Gorda; dorsal scales usually 19-19-15.

Distribution: Anegada, Virgin Gorda, Necker, and Guana islands in the British Virgin Islands, and very probably Tortola as well (Fig. 57).

Variation and discussion: *Alsophis anegadae* was described by BARBOUR (1917, p. 102) on the basis of two specimens (MCZ 12083 and 12098) as differing from *A. "antillensis"* by "being pale ashy gray in color, the fifth scale row not parti-colored, but

with a median streak of black. The upper lips are immaculate white, unspotted." I have examined these two specimens, and although they are presently very pale (through loss of most of their epidermis) and although the lips are indeed unspotted white, the fifth scale row is strongly particolored. Both are young snakes, and this doubtless accounts for the immaculate labials. The venters are heavily stippled with brown but lack dark posterior margins; the angulate markings are obvious. GRANT (1937, p. 521) reported the taking of two small specimens, one of which was a gravid female; GRANT (1946, p. 123) later noted that these two snakes were light tan rather than gray, and that they too had particolored fifth scale rows. GRANT also (1937, p. 521) stated that one of his *anegadae* had only one small obscure scale pit on the dorsals, whereas the other had two large scale pits. From this he deduced that "Anegada may be a point of intergradation between these two genera" – i.e., *Alsophis* and *Dromicus*, since these genera are in part differentiated by the number of apical pits.

Collection of two fresh specimens on Anegada in the summer of 1964 indicates that *A. anegadae* is in no way different from *A. portoricensis*, and is closely related, as may be imagined, to the Virgin Islands race *richardi*. The use by BARBOUR (1937, p. 160) of the combination *Dromicus anegadae* is indefensible; these snakes are only subspecifically differentiable from the balance of the Virgin Islands snakes, and in no way represent an isolated species of the genus *Dromicus*.

Specimens from Anegada and Virgin Gorda appear to be indistinguishable; the following data are based on the far more adequate series available from the latter island, but comments will be made on the short Anegada series.

The dark brown dorsal coloration is a common character of *anegadae*. The dorsal scales lack extensive dark dorsal scale edging. The fifth scale row is particolored (brown below and buff above), but this condition is obscured by the depth of the dorsal pigmentation; old specimens, however, show the condition quite clearly, both on Virgin Gorda and Anegada. Ventrally these snakes are very dark – darker than most specimens of *richardi* – due to the heavy brown stippling and the dark brown margins to the ventrals. This ventral coloration is somewhat variable, and two fresh specimens from Anegada are slightly less dark ventrally than are most of the Virgin Gorda specimens. The lateral angulate line is bold and conspicuous and often forms a continuous line down each side of the ventral scutes. In life, the ventral

coloration of a Virgin Gorda specimen was noted as white anteriorly becoming browner posteriorly with some pink and orange added; a juvenile was noted as having a yellow throat. Two specimens from Anegada had the bellies cream anteriorly grading to pale orange on the posterior two thirds; the labials and throats were white with brown flecks.

The head is brown with some darker suffusions; the labials, chin and throat are always heavily marked with very dark brown in adults, but this feature is lacking in the type and paratype (both juveniles) of *anegadae*. There is a pair of diagonal paler spots on the neck which are bordered medially by a dark brown nuchal line and laterally by the post-temporal extension of the dark brown mask. These spots are the homologues of pale areas noted in specimens of most other races, and which are especially prominent in *variegatus*. The two Anegada specimens have a series of pale chevronate markings on the neck which are not so apparent in the Virgin Gorda specimens.

The modal dorsal scale row formula is 19-19-15, with variants of 19-19-17 and 18-19-15 (one specimen each). The ventral scales range in males (Virgin Gorda and Necker Island) from 174 to 181 (mean 177.5) and in females from 178 to 186 (mean 182.5). A male from Anegada has 176 ventrals, and three females from Anegada have 182 to 184 ventrals (mean 182.7). Four Virgin Gorda males have between 132 and 138 paired subcaudals and four females from the same island have between 124 and 132 subcaudals. The single Anegada female with a complete tail has 118 subcaudals. Two snakes have 8/9 supralabials; infralabials may be 9/10 (2), 10/11 (6), or 11/11 (4), in addition to the usual count. Variation in temporals includes one snake with 1 + 1 on both sides, one snake with 1 + 1 unilaterally, four snakes with 1 + 3 unilaterally, and one snake with 2 + 2 unilaterally. The apparently large size reached by males rather than females may well be real, considering the large sample. Only in *anegadae* and *variegatus* (which is represented by a smaller sample), does this condition occur.

The single specimen (a male) from Guana Island, which lies off the northeast tip of Tortola, is just as dark dorsally and ventrally as are snakes from Anegada and Virgin Gorda. I assign it for this reason to *anegadae*, although because of its ventral count (178) it might with equal propriety be considered a specimen of *richardi*. The single individual from Tortola which I examined casually while in Roadtown was likewise very dark; from these meagre data I suspect that Tortola is inhabited by *anegadae* rather than *richardi*. Additional specimens may well prove this assumption incorrect.

Anegada, which lies about 24 kilometers to the north of Virgin Gorda across a channel which is 13 fathoms deep at its maximum depth, is quite different geologically from the balance of the Virgin Islands; Anegada is low and flat (maximum elevation 10 meters) and much of it is inundated. It does however lie on the same bank

as the other Virgins. The fauna is Puerto Rican, and only two forms are known to be endemic, *Cyclura pinguis* Barbour (although it may be related to the extinct *C. mattea* of St. Thomas) and *Typhlops richardi catafontus* Thomas. The fact that both Anegada and Virgin Gorda are both inhabited by the same race of *A. portoricensis* may indicate that this snake is a relatively recent invader from the south, and that it has not differentiated on Anegada from its more southern relative.

Alsophis portoricensis anegadae differs from the races *portoricensis*, *variegatus*, and *prymnus* in having 19-19-15 rather than 17-17-14 or 15 dorsal scale rows. Its style of coloration is quite different from that of *p. portoricensis*, although its depth of pigmentation is similar to that of the Puerto Rican race. From *variegatus* and *prymnus*, *anegadae* differs in much darker coloration and in lacking the reticulated dorsum of the former. From the Virgin Island races *richardi* and *nicholsi*, *anegadae* differs in much darker coloration dorsally and in a more heavily pigmented venter; *nicholsi* and *anegadae* represent two extremes of coloration in the Virgins. The higher average ventral counts in both sexes help in separating *anegadae* from *richardi*; as noted previously, the break in average number of ventrals falls between Peter and Salt on one hand and Virgin Gorda on the other. The race *aphantus* is larger in size and much more differently patterned dorsally; the bellies of *anegadae* are consistently darker than are those of the Vieques subspecies.

Specimens examined: ANEGADA, vicinity of The Settlement, 2 (ASFS V3944-45); no other locality, 2 (MCZ 12083, 12098); VIRGIN GORDA, north of Pond Bay, 2 (ASFS V3665, RT 944); hillside above Pond Bay, 3 (ASFS V3695-96, V3738); Pond Bay to Mahoe Bay, 3 (ASFS V3752-54); Mahoe Bay, 2 (ASFS V3811, DRP 3201); above Mahoe Bay, 1 (ASFS V3810); between Little Dix Bay and Savana Bay, 1 (ASFS V3697); just north of Garden Rock, 4 (ASFS V3733, ASFS V3791-93); inland margin of Salt Pond back of St. Thomas Bay, 5 (ASFS V3755, ASFS V3853-56); no other locality, 7 (UMMZ 80643, UMMZ 80647 (3), MCZ 12094-96); NECKER ISLAND, 1 (AMNH 90517); GUANA ISLAND, White Bay, 1 (ASFS V4005).

Alsophis sancticrucis Cope, 1862

Alsophis sancticrucis COPE, 1862, Proc. Acad. Nat. Sci. Philadelphia, p. 76.

Type locality: ST. CROIX, American Virgin Islands.

Description: A very large (females to 1025 mm snout-vent length) colubrid snake with 17 scale rows at midbody; 191 to 198 ventrals in females, male unknown (two males cited by Boulenger, 1894, p. 122, are females); dorsal scales smooth with two apical pits, two or three on dorsal caudal scales; anal single or divided; head scalation of the normal unspecialized colubrid type with 1/1 loreals, 1/1 preoculars, 2/2 postoculars, and 1 + 2 (or 1 + 1) temporals; supralabials 8/8, infralabials 10/10; subcaudals 140 to 145 in two females, unknown in males; dorsum (in preservative) very dark bluish-black with a series of 15 to 20 transverse pale bars, less than one scale in width, on the neck, the remainder of the body with pale flecking or pale anterior scale edges, giving a rather regularly mottled or marked appearance (Fig. 51); venter pale with the margins of the ventrals heavily marked with blue-black, the remainder of each scale with some smudges connected to the dark ventral margins, and with some indication of the lateral angular marking on ends of each ventral, at times forming a rather distinct line down each side of the ventrals; hemipenis undescribed; head dark with snout and lores pale (yellowish), thereby making even more conspicuous the black mask which is also outlined above by clear yellow postocular stripe.

Distribution: Known only from the island of St. Croix, American Virgin Islands (Fig. 51).

Variation and discussion: The blue-black dorsum and pale venter easily distinguish *A. sancticrucis* from *A. portoricensis*.

The dorsum is usually marked with a series of pale transverse bands anteriorly, sharply set off from the ground color. Posteriorly, these bands persist but become more obscure, finally being indicated by transverse series of small pale H-shaped markings, each H being composed of the adjacent pale portions of three scales (BMNH 59.3.14.22). In another specimen, there is a wide, pale, diffuse dorsolateral band, separating dark below and a rather dark-and-light mottled middorsal band in which remnants of the pale crossbars are still discernible. Some specimens (i.e., ANSP 5542) have the dorsal scale slightly flecked with paler so that they are diffusely

salt-and-pepper in aspect. In this same specimen the fifth scale row is particolored, its lower half black and its upper pale, although the pale sections are isolated from one another by the black ground and form only the vaguest of lateral lines. The ventral ground color is pale, with very heavy and prominent black scale margins; the subcaudals are similarly marked. The margins may be clearcut or may be smudged anteriorly on each ventral, especially in the lateral angular area, giving at times almost a complete ventrolateral dark line. The black ventral margins are absent anteriorly, and may even be incomplete posteriorly (BMNH 59.3.14.24), although each margin is still at least partially and boldly represented. The top of the head is black, and the snout pale; there is invariably a black mask, more or less outlined above from the eye posteriorly by a bold yellow stripe which disappears behind the temporals.

All specimens have 17-17-15 scale rows, 8/8 supralabials, 10/10 infralabials, 1/1 loreals, 1/1 preoculars, and 2/2 postoculars. One snake has 1 + 1/1 + 1 temporals, and two have 1 + 1 unilaterally. The anal is divided in four snakes and entire in three; the ventrals vary from 191 to 198, including counts made from the type (ANSP 5404) by Mr. EDMOND V. MALNATE - the type having the count of 198. Two females with complete tails have 140 and 145 subcaudals.

A. sancticrucis is the only *Alsophis* which has ever been reported from St. Croix. The British Museum has two snakes (1922.6.16.28-.29) which are ostensibly from St. Croix, and were received from the Christiana Museum. These snakes are *A. portoricensis richardi*, having 19-19-15 scale rows. I do not regard these *Alsophis* as representing a record for this species on St. Croix; doubtless the specimens were originally carelessly labeled. They originated elsewhere in the Virgin Islands.

St. Croix lies 58 kilometers south of St. Thomas, separated by the southwestern end of the Anegada Passage, with a maximum intervening depth of 2040 fathoms. SCHUCHERT (1935, p. 475-481) suggested that St. Croix was at one time part of the Puerto Rico-Virgin Islands land mass, but that its separation through "profound block faulting" took place in the Pliocene. Certainly its present fauna includes a number of endemics (*Ameiva polops* Cope, *Sphaerodactylus beattyi* Grant, *Anolis acutus* Hallowell) none of which is closely related to the present fauna of the Virgin Islands or Puerto Rico.

A. sancticrucis does not differ structurally from *A. portoricensis* in any obvious way, with the possible exception of having in a fairly regular manner an entire, rather than double, anal. In dorsal scale rows, its formula of 17-17-15 occurs as the norm in *p. variegatus*, and occurs with some regularity in *p. portoricensis*

and *p. prymnus*. On the other hand, the coloration and pattern of *sancti-crucis* are very different from that of any race of *A. portoricensis*; features in common are the black mask (which is much more prominent and outlined above with pale in *sancti-crucis*) and the presence of a particolored fifth scale row (the net effect of which is practically lost in *sancti-crucis*, due to the black ground color, rather than forming a prominent part of the dorsal pattern as in *portoricensis*). Likewise, the dark-margined ventrals occur in both species.

It may be profitable to compare *sancti-crucis* with members of the genus *Alsophis* from islands on the south side of the Anegada Passage – i.e., the northern Lesser Antilles. Of these, the Anguilla Bank islands are occupied by *A. rijgersmai* Cope, the St. Kitts Bank and Saba by *A. rufiventris* Duméril & Bibron, and the islands between Montserrat and Dominica, and including Antigua, by *A. antillensis* Schlegel.

BRONGERSMA (1959), in his excellent summary of two of these species, recorded 23–21–19 or 17 for specimens of *rijgersmai*; PARKER (1936, p. 230) noted 21–21–17 and 21–23–19 for the same species. In any event, *A. rijgersmai* has 21 or 23 scale rows at midbody. BRONGERSMA (1959, p. 55) reported *rufiventris* as having scale row formulae of 23 or 25 – 21 or 23 – 17 to 19 (the modal condition being 23–23–19). PARKER (*loc. cit.*) noted that *rufiventris* has 21–23–17 or 23–23–19 dorsal rows. *A. rufiventris* is thus another species with typically 23 scale rows at midbody. The ventrals in both *rijgersmai* and *rufiventris* are high, 198 to 207 in the former and 204 to 220 in the latter (PARKER, *loc. cit.*). Finally, PARKER considered all the races of *A. antillensis* as 19 scale row snakes, although the races *manselli* Parker (Montserrat) and *antiguae* Parker (Antigua) may have 21 scales at midbody. None of these three species is thus a 17 row snake as is *A. sancti-crucis*. The ventrals in the races of *A. antillensis* range from 191 to 209; in these counts the species *antillensis* is comparable to *A. sancti-crucis*.

In coloration and pattern, neither *rijgersmai* nor *rufiventris* bear special resemblances to *sancti-crucis*; both for example are brown (rather than black) snakes. *A. rufiventris* is sexually dichromatic and females do not particularly resemble female *A. sancti-crucis*.

cis. Of the races of *A. antillensis*, at least *manselli* and *sibonius* Cope are dark brown to black. Of these two, *manselli* is black with a yellow pattern consisting of rather large pale blotches grading into yellow H-shaped spots, all on the anterior half of the body. The posterior dorsum is solid black. The sides are variously marbled or marked with yellow or yellowish. The yellow ventrals are spotted with black, and there is a tendency to have the ventral margins black also. On the posterior half of the belly, the ventrals are usually solid black. Although *manselli* and *sancti-crucis* are similar in having a combination of black and yellow in the pattern, they differ in many details. I do not consider them to be closely related. The pattern of *sibonius* bears little detailed resemblance to that of *sancti-crucis*.

Considering the history of St. Croix, and considering the features which *sancti-crucis* and *portoricensis* (especially the nominate race) have in common, it seems most likely that *sancti-crucis* represents a derivative of *A. portoricensis*, derived directly from the Puerto Rican mainland (rather than via the Virgin Islands) in the distant past, and has had a very long and independent history on St. Croix. The degree of divergence from the basic stock is of so much greater magnitude than that of the other subspecies of *A. portoricensis* that I regard *sancti-crucis* as a separate species, although its *portoricensis* affinities are acknowledged.

Specimens examined: ST. CROIX, 6 (BMNH 59.3.14.22-24, BMNH RR1964.946, ANSP 5541-42).

TAXONOMIC ARRANGEMENTS

There may still be those who will feel that the old and time-honored arrangement of the *Alsophis* of the Puerto Rico-Virgin Islands region into two species (exclusive of *A. sancti-crucis*) on the basis of midbody scale rows either 17 or 19 is more to their liking than the one which I have proposed. Now that the snakes from this area have been discussed in detail, it seems appropriate to make some defense of the present arrangement; the reader is referred to the systematic treatments for details.

If two species are accepted, the names are *A. portoricensis* with

17 scale rows at midbody and *A. anegadae* (this name having priority over any other based on Virgin Islands snakes) with 19 rows at midbody. On the basis of midbody scale rows, *portoricensis*, *variegatus*, and *prymnus* would be associated as races of *A. portoricensis*, and *aphantus*, *richardi*, *nicholsi*, and *anegadae* as races of *A. anegadae*. The most trenchant criticism of this system is the obvious pattern similarity between *variegatus*, *prymnus*, and *richardi*, for instance, despite differences in midbody counts. In such an arrangement, *aphantus* would be placed with *anegadae* although it is more closely related to *portoricensis*.

Another possibility is the association of *variegatus* and *prymnus* as one species (*variegatus*), *portoricensis* and *aphantus* as another (*portoricensis*), and *richardi*, *nicholsi*, and *anegadae* as a third (*anegadae*). This system then would have one species characterized by 17 scale rows (*variegatus*), a second with 19 (*anegadae*), and a third with either 17 or 19 (*portoricensis*). The problem of the intergrades between *prymnus* and *portoricensis* might be answered by considering these few specimens as hybrids. Such a course of arrangement has something to recommend it, but it seems to multiply basic entities to an unnecessary degree.

Still a third possibility is to regard *A. portoricensis* as monotypic, and all other forms as races of *A. anegadae*; I originally subscribed to this system. This arrangement groups together both 17 and 19 row snakes as does mine, and separates the two species principally on the basis of coloration and pattern. Objections to this arrangement are the presence of specimens in southern Puerto Rico which are intermediate between *portoricensis* and *prymnus*, and the occurrence on various islands of individual snakes which resemble *portoricensis* but which can be observed to be one extreme of a series of intermediates, at the other extreme of which are snakes resembling *anegadae*. Thus there seems to be no real advantage to separating *portoricensis* from the balance of the assemblage, considering the very close affinities of the snakes involved.

When all material is assembled, and these various hypotheses are tested, it becomes gradually clear that the only reasonable arrangement of these snakes is as races of a single species. Any other system quickly runs afoul of the material itself. Unless addi-

tional material demonstrates to the contrary, the present solution to the problem seems the most rational and the most consistent.

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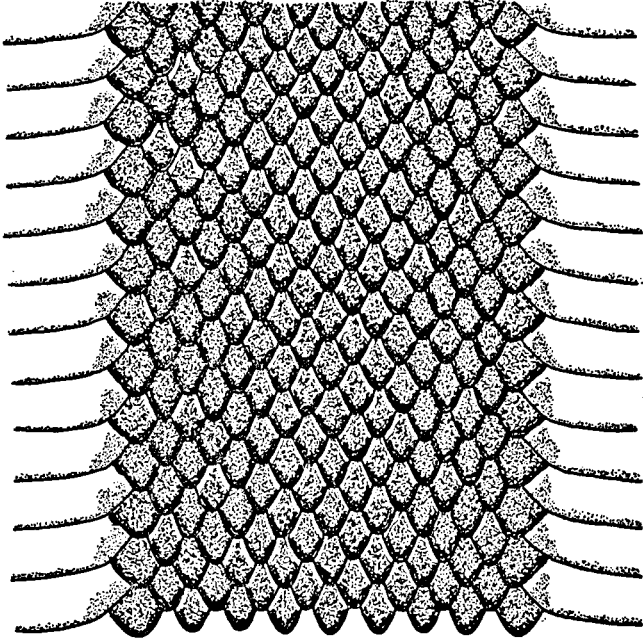


Fig. 44. *Alsophis portoricensis portoricensis*, midbody pattern (ASFS X 7702),
2.3 mi. W. Dorado, PUERTO RICO.

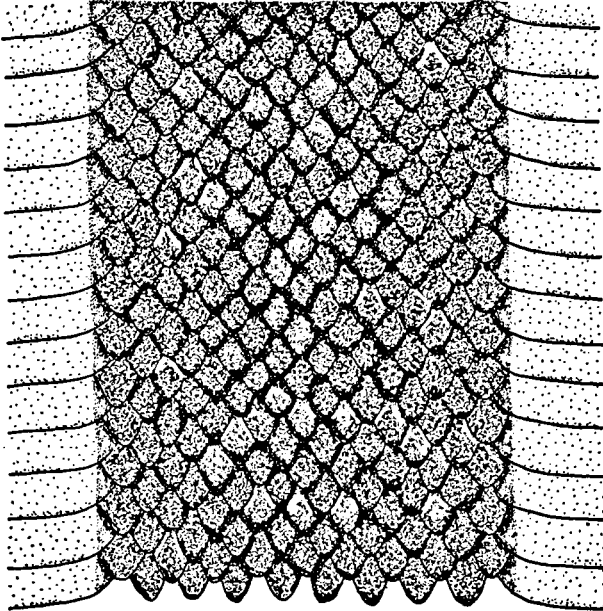


Fig. 45. *Alsophis portoricensis prymnus*, midbody pattern (type, MCZ 77226),
CAJA DE MUERTOS, P.R.

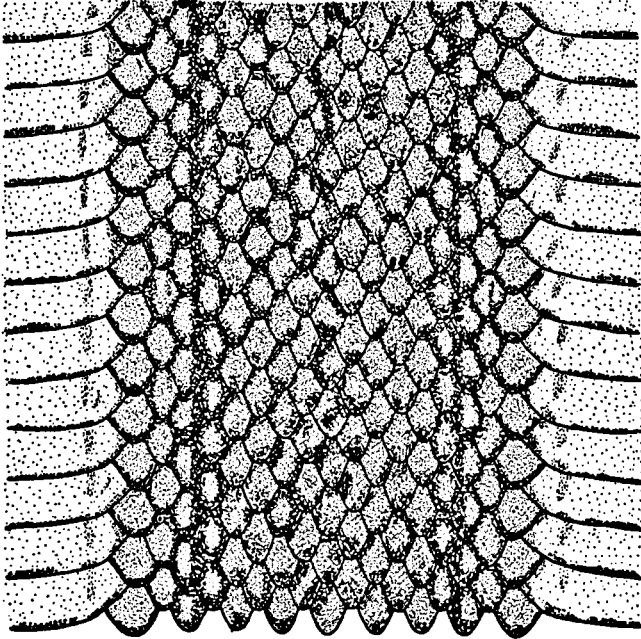


Fig. 46. *Alsophis portoricensis variegatus*, midbody pattern (UMMZ 74373), Isla MONA.

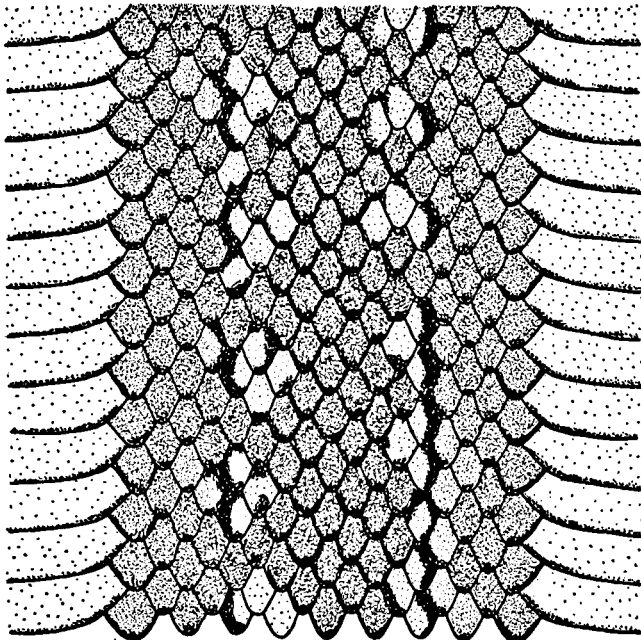


Fig. 47. *Alsophis portoricensis aphantus*, midbody pattern (type, BMNH RR1964.944), Isla VIEQUES.

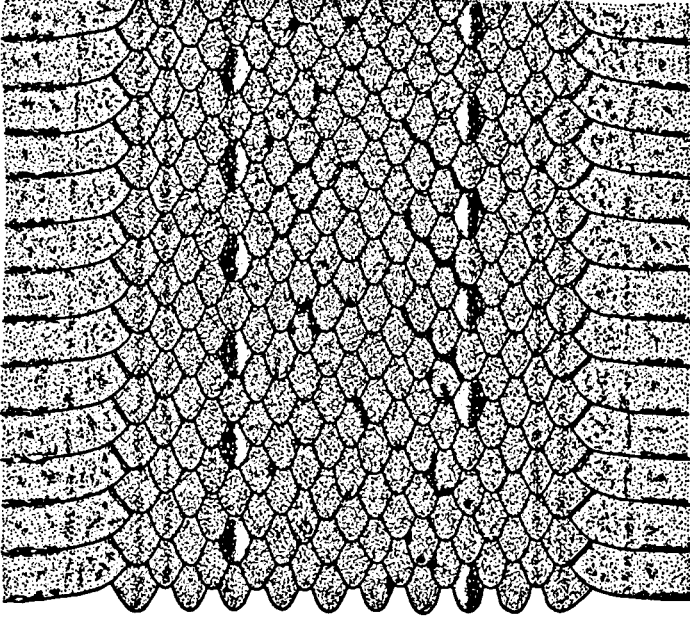


Fig. 48. *Alsophis portoricensis richardi*, midbody pattern (BMNH 60.4.18.3)
ST. THOMAS.

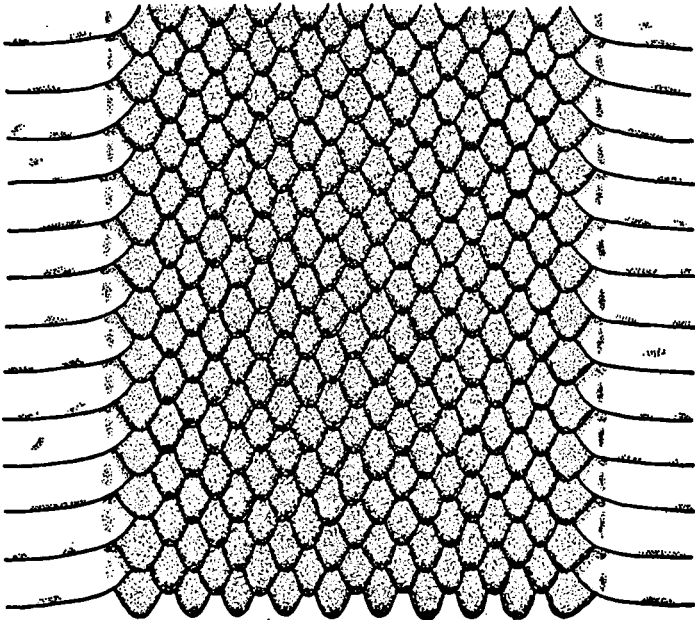


Fig. 49. *Alsophis portoricensis nicholsi*, midbody pattern (type, UMMZ 80648)
BUCK ISLAND, V.I.

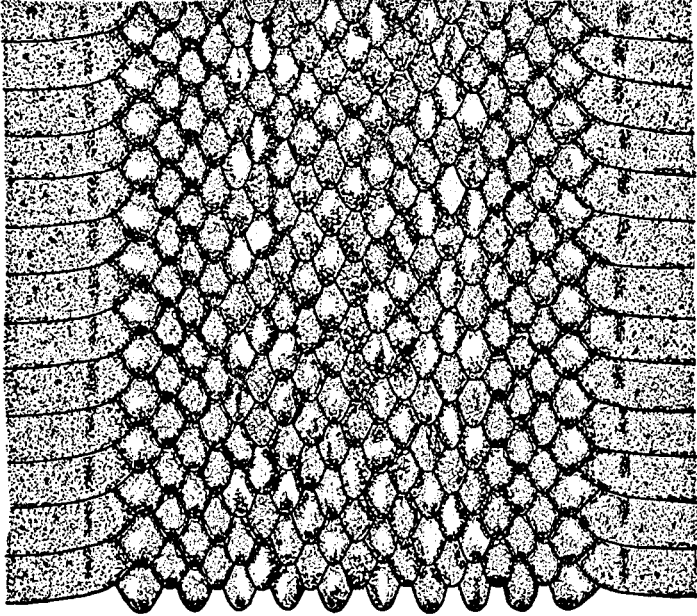


Fig. 50. *Alsophis portoricensis anegadae*, midbody pattern (ASFS V3810), above Mahoe Bay, VIRGIN GORDA.

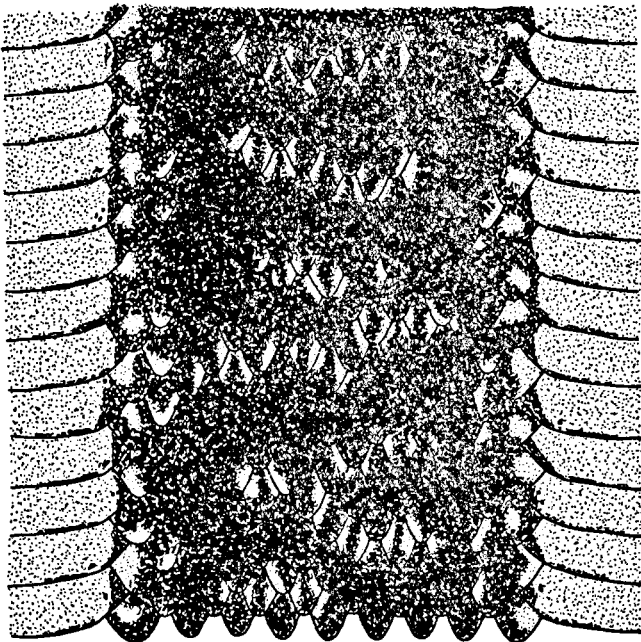


Fig. 51. *Alsophis sancticrucis*, midbody pattern (BMNH 59.3.14.22), St. Croix.

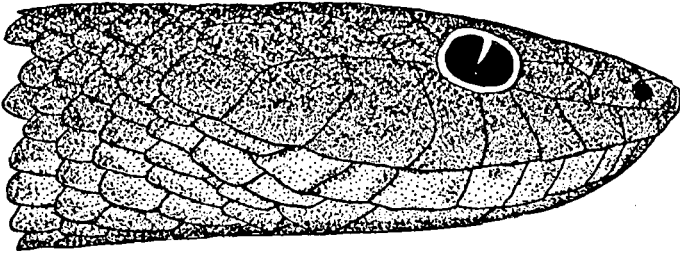


Fig. 52. *Alsophis portoricensis portoricensis*, lateral view of head (ASFS X7702)
PUERTO RICO.

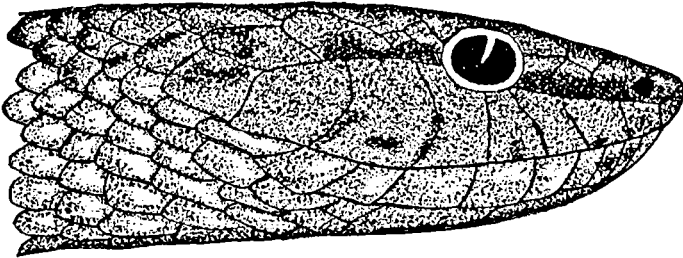


Fig. 53. *Alsophis portoricensis prymnus*, lateral view of head (MCZ 77226), CAJA
DE MUERTOS.

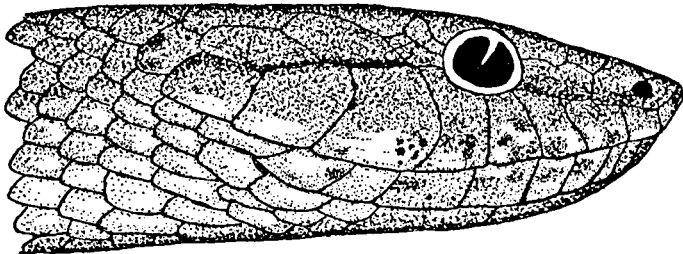


Fig. 54. *Alsophis portoricensis nicholsi*, lateral view of head (UMMZ 80648), BUCK
ISLAND.

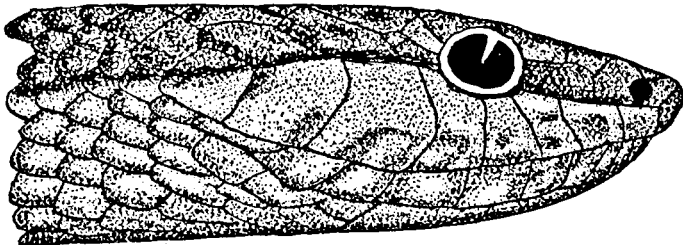


Fig. 55. *Alsophis portoricensis anegadae*, lateral view of head (ASFS V3810), VIRGIN
GORDA.

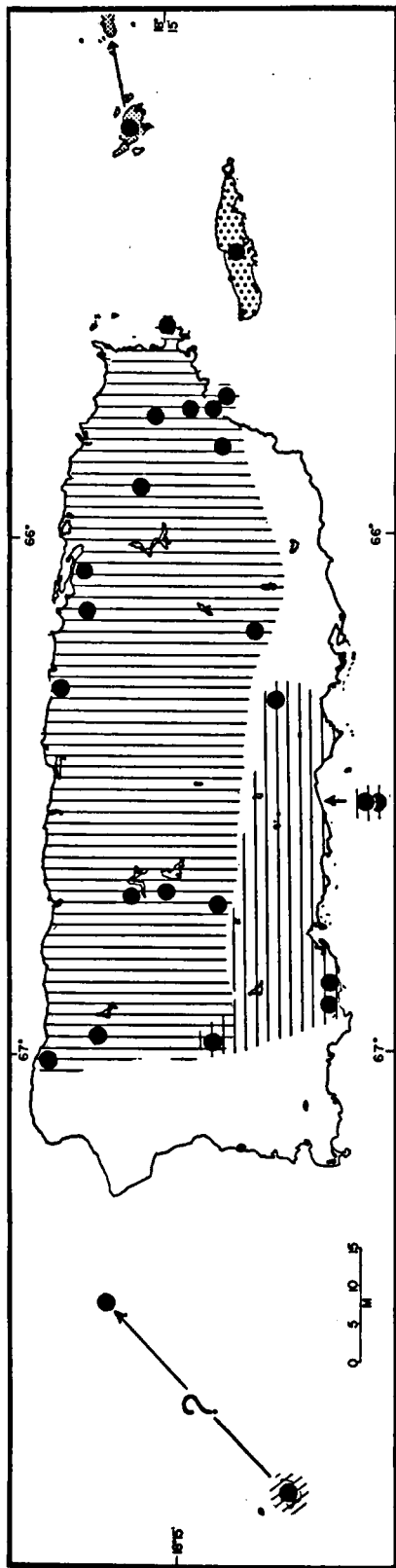


Fig. 56. PUERTO RICO and associated islands. — Subspecies of *Alsophis portoricensis* as follows: 1) vertical lines, *portoricensis*; 2) horizontal lines, *prymus* (overlap of *portoricensis* and *prymus* indicates intergradation; arrow indicates occurrence of *prymus* both on Caja de Muertos and Puerto Rico); 3) diagonal lines, *variegatus* (questioned arrow indicates doubtful occurrence of *variegatus* on Isla Desecheo); 4) heavy stippling, *aphantus*; 5) fine stippling, *richardsi* (arrow indicates occurrence of *richardsi* on other islands to the east). Lack of symbols in western and southeastern Puerto Rico indicates only that the race(s) inhabiting these areas is presently unknown by specimens.

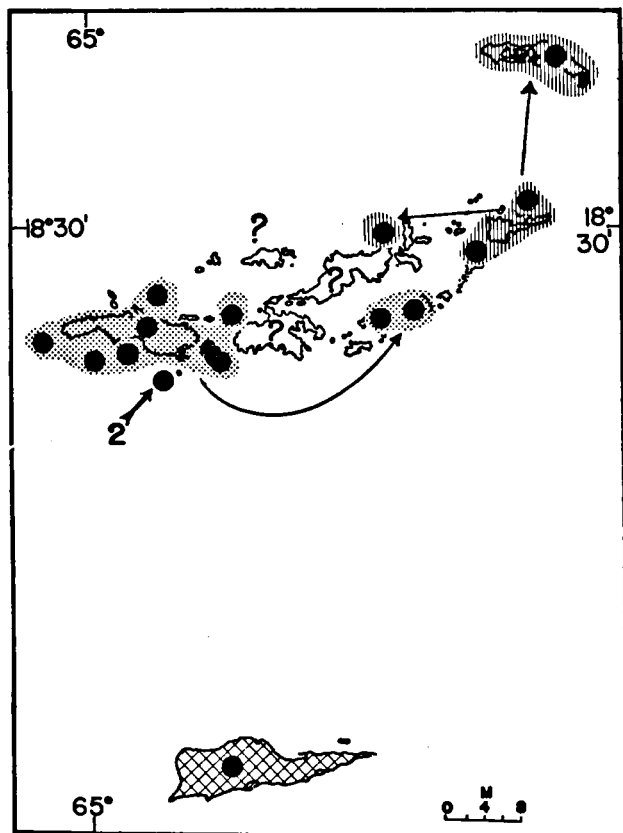


Fig. 57. VIRGIN ISLANDS. — Subspecies of *Alsophis portoricensis* as follows: 1) fine stippling, *richardi* (arrow indicates occurrence of this subspecies on Peter and Salt islands to the east); 2) *nicholsi*; 3) fine vertical lines, *anegadae* (arrows indicate occurrence of *anegadae* on Virgin Gorda, Anegada, and Guana Island). Jost van Dyke, Tortola, and St. John are questioned, since none is presently represented by specimens, although the species has been reported from two (St. John, Jost van Dyke) and a specimen from Tortola was cursorily examined, *A. sancticrucis*.