

# Article XI.—THE AMPHIBIANS AND REPTILES OF LOWER CALIFORNIA AND THE NEIGHBORING ISLANDS

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PLATES XLVII TO LVII

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## INTRODUCTION

A general account of the "Albatross Expedition" of 1911 has been given by Dr. C. H. Townsend in the first paper of the Scientific Results (1916, Bull. Amer. Mus. Nat. Hist., XXXV, pp. 399-476, 45 figs., 1 map). That paper contains the itinerary of the expedition, many valuable notes on habitat conditions, and especially photographs illustrating the topography and vegetation at the localities where collections of amphibians and reptiles were made. The additional photographs showing habitat conditions in the present paper have been kindly furnished by Dr. Townsend.

As has already been stated in other papers, the expedition was made possible largely through the generous support of Mr. Arthur Curtiss James, Trustee of The American Museum of Natural History, to whom the Museum is consequently indebted for the splendid Lower Californian collections discussed below.

The collections made by the Albatross Expedition in 1911 contain four hundred and forty-eight specimens of reptiles and seven amphibians, representing two species of amphibians and sixty-one species of reptiles. In a previous paper, Dickerson (1919, Bull. Amer. Mus. Nat. Hist., XLI, pp. 461-477) has described a new genus and twenty-three new species from the Albatross collection, of which sixteen are recognized in the present paper. To these must be added three forms described below, making a total of nineteen forms new to science contained in the collection. Perhaps the most important part of the collection is the material

secured on the islands of the Gulf of California, many of which had not been visited previously by a scientist, while some additions are made to the faunæ of even the better known islands.

In connection with the work on the Albatross collection, the Field Museum of Natural History in Chicago has kindly loaned a part of the Heller collection from the northern part of the peninsula, which has been especially valuable for comparison with the distinct fauna of southern Lower California. The United States National Museum has loaned the valuable collection of Lower Californian amphibians and reptiles, consisting of one hundred and sixty specimens, made by Dr. E. W. Nelson and A. E. Goldman in the course of the Lower Californian explorations of the Bureau of Biological Survey, for study in connection with the Albatross material. My heartiest thanks are due to Dr. Leonhard Stejneger, Head Curator of Biology, for information on other specimens in his charge and for many courtesies in connection with this loan. The specimens from this collection have been listed in a separate paragraph in the discussion of the species. Valuable specimens loaned by the Museum of Vertebrate Zoology of the University of California and by the Academy of Natural Sciences of Philadelphia, chiefly in connection with other studies, have been drawn upon to some extent in the preparation of the present paper, and my thanks are due to these institutions.

I am greatly indebted to Mr. Charles L. Camp for important suggestions and corrections drawn from his intimate knowledge of Californian herpetology. Miss M. C. Barnett has assisted in many details of the manuscript and bibliography.

It was the purpose of Miss Mary C. Dickerson to follow her paper on the new species of the Albatross collection with a more detailed study of the lizard fauna of the southwestern United States in which the Lower Californian fauna was to be included. I originally hoped to be able to extract from her manuscript, which has been in my hands, an account of the reptiles of the Albatross collection; but I find myself so frequently at variance with her conclusions on the taxonomy of the fauna concerned that it has seemed preferable to drop the plan of editing her work and present an entirely independent paper. Many of the illustrations in the present paper, however, were prepared under Miss Dickerson's direction, and much bibliographical work was done under her direction by Dr. W. B. Veazie.

For the adequate study of the herpetological collections of the Albatross Expedition, it has been necessary to consider the fauna of the whole peninsula and adjacent islands. The 'Herpetology of Lower California'

by Van Denburgh, published in 1895, with numerous subsequent papers by the same author, and especially the recent papers by Van Denburgh and Slevin on the unrivalled Lower Californian collections of the California Academy of Sciences, form an excellent introduction to this fauna, greatly facilitating systematic work, and I have had constant reference to them in the course of the work on the present paper. Several points have been cleared up by correspondence with Dr. Van Denburgh and by reference to specimens received in exchange from the California Academy of Sciences. In order to make clear the cases in which I have differed from these authors, and especially to corroborate or place definitively in the synonymy the species proposed by Dickerson, I have given a new "complete list" of the species recognized. As I have been compelled to make preliminary revisions of several genera concerned, I have included keys to the peninsular species of the remaining genera and have prefixed artificial keys to the genera, in the hope of increasing the usefulness of the paper to amateurs and especially to students of other departments of science who may have occasion or opportunity to deal with the herpetological fauna of Lower California. Too large a proportion of the species in the Lower Californian fauna are unrepresented in the material available to me for study at the present time to warrant a more complete account. I have not included the geographically unrelated Tres Marias Islands off the west coast of Mexico, but have included the reptiles found in the Revilla Gigedo Islands, following the limits of the 'Check List of North American Amphibians and Reptiles,' Stejneger and Barbour, 1917. This extremely useful list has been constantly at hand. As it establishes the nomenclature of the North American species more satisfactorily than any other authority, I have included a reference to it under each species and, in all cases in which I have not followed its nomenclature, I have quoted the authority made use of or have stated my own reasons for such divergence.

The recent monograph of Lower California by Dr. Edward W. Nelson, Chief of the Bureau of Biological Survey, U. S. Dept. of Agriculture (1921, Mem. Nat. Acad. Sci., XVI, pp. 1-194, Pls. 1-xxxv) describes the physical conditions of the peninsula of Lower California, illustrates the character of every part of the peninsula in a fine series of plates, and gives an account of the distribution of its plant and animal life. Unfortunately, no complete account of the amphibians and reptiles subsequent to that of Van Denburgh in 1895 was available for the discussion of the distribution of the reptile fauna in Dr. Nelson's paper, and I have no hesitation, therefore, in presenting a new account of the distribu-

tion of the Lower Californian amphibians and reptiles in the present paper. His important conclusions on the faunal subdivisions and life zones of the peninsula are, of course, independent of his discussion of the reptile fauna. In the present account, I have applied his subdivisions into faunal districts to the more complete and accurate list of the reptiles now available.

#### LIST OF NEW FORMS PROPOSED IN THE PRESENT PAPER

	Type Locality
<i>Crotaphytus dickersonæ</i> .....	Tiburon Island
<i>Phrynosoma nelsoni</i> .....	San Quintin
<i>Phrynosoma jamesi</i> .....	San Bartolome Bay
<i>Crotalus atrox elegans</i> .....	Angel de la Guardia Island
<i>Crotalus goldmani</i> .....	El Piñon

#### LIST OF NEW FORMS IN THE ALBATROSS COLLECTION, 1911<sup>1</sup>

(Described by Dickerson, 1919,<sup>2</sup> and below)

##### NEW GENUS

*Sator* Dickerson; type, *S. grandævus*.

##### NEW SPECIES AND SUBSPECIES

	Type Locality
<i>Sauromalus townsendi</i> Dickerson.....	Tiburon Island
<i>Sauromalus varius</i> Dickerson.....	San Esteban Island
<i>Crotaphytus dickersonæ</i> , new species.....	Tiburon Island
<i>Callisaurus ventralis inusitatus</i> Dickerson.....	Tiburon Island
<i>Callisaurus splendidus</i> Dickerson.....	Angel de la Guardia Island
<i>Sceloporus lineatulus</i> Dickerson.....	Sta. Catalina Island
<i>Sator angustus</i> Dickerson.....	Sta. Cruz Island
<i>Sator grandævus</i> Dickerson.....	Cerralvo Island
<i>Uta concinna</i> Dickerson.....	Cedros Island
<i>Uta squamata</i> Dickerson.....	Sta. Catalina Island
<i>Phrynosoma jamesi</i> , new species.....	San Bartolome Bay
<i>Cnemidophorus celeripes</i> Dickerson.....	San José Island
<i>Cnemidophorus disparilis</i> Dickerson.....	Tiburon Island
<i>Cnemidophorus estebanensis</i> Dickerson.....	San Esteban Island
<i>Cnemidophorus punctilinealis</i> Dickerson.....	Tiburon Island
<i>Cnemidophorus bartolomas</i> Dickerson.....	San Bartolome Bay
<i>Cnemidophorus vandenburghi</i> Dickerson.....	Carmen Island
<i>Verticaria cærulea</i> Dickerson.....	Carmen Island
<i>Crotalus atrox elegans</i> , new subspecies.....	Angel de la Guardia Island

<sup>1</sup>The United States National Museum numbers assigned to the types from the Albatross collection will be found in the text of the present paper.

<sup>2</sup>*Ctenosaura insulana*, *C. conspicuosa*, *Sauromalus interbrachialis*, *Callisaurus carmenensis*, *C. plasticus*, *Uta mannophorus*, and *U. parva* described by Dickerson in 1919 are referred to synonymy in the present paper.



## GEOGRAPHIC ANALYSIS OF THE FAUNA

The herpetological fauna of Lower California is relatively well known and the number of species which further search may be expected to add to the list, aside from insular forms, is probably small. Nevertheless, a serious gap in our knowledge of the distribution of the amphibians and reptiles is the inadequacy of the collections from the middle of the peninsula. Only one considerable collection comes from this area, that made by Diguët and reported on by Mocquard (1899, p. 297, ff.), although Van Denburgh records a few specimens from San Ignacio, Comondu, and San Xavier. Unfortunately, the material available to Mocquard was not critically examined and many of his identifications are uncertain. I need only cite *Chrysemys elegans*, *Uta stansburiana*, and *Cnemidophorus grahamii* listed by him, to indicate this uncertainty. *Holbrookia propinqua* is recorded by him from Santa Rosalia; but the genus is almost certainly absent from Lower California. The most important contributions to Lower Californian herpetology which remain to be made are a thorough exploration of this central part of the peninsula, to determine the southern limit of the distribution of the northern forms and the northern limits of the San Lucan fauna, and further studies of the northeastern corner of the peninsula, where a number of additions to the fauna may be expected from its close relations with the Colorado Desert. It is possible to give a general review of the fauna, but the limits of the ranges of the majority of the species are still undefined in one direction or another. The chief defect of the present review is the absence of complete and accurate data bearing on the habitat associations of the species concerned.

An investigation of the herpetology of the State of Sonora on the east side of the Gulf of California could not fail to add greatly to our understanding to the origin and relations of the Lower Californian reptile fauna.

The general conclusion of all who have dealt with the Sonoran reptile fauna is that the Lower Californian fauna in its main features is directly derived from the areas to the north. This conclusion I can fully confirm.

The Lower Californian herpetological fauna as listed below contains 149 species and subspecies, 11 amphibians and 138 reptiles, the latter composed of 90 lizards, 47 snakes and one turtle. Of this number, 39 lizards and 7 snakes are insular species, not found on the peninsula, leaving a total of 92 species of reptiles at present known from the peninsula of Lower California.

With the exception of the genus *Sator*, all of the insular forms are more or less directly allied to those of the peninsula or the Mexican mainland. The faunæ of the individual islands are considered below. *Sator* appears to be a relict form, its survival on two islands (Cerralvo and Santa Cruz) being a fairly conclusive proof of its former presence on the peninsula, probably as a distinct form. Its relations are with a generalized *Uta* and with *Sceloporus utiformis* of western Mexico.

Of the amphibians, all the genera and species have a fairly wide range outside and to the north of Lower California, with the exception of the insular *Batrachoseps leucopus*. *Aneides* is not yet known from the mainland of the peninsula, but may be expected in the northwestern corner as it reaches the Coronados Islands. *Plethodon croceator* is probably confined to this area also, Cope's statement (1889, p. 151) that he has seen a specimen from Cape San Lucas being unverified and improbable. *Rana aurora draytonii*, *Scaphiopus hammondii*, and *Bufo boreas halophilus* belong to this northwestern fauna and do not range far to the south in Lower California. *Hyla arenicolor* is known in Lower California only from Ensenada. Four species remain which range throughout the peninsula but with very discontinuous distribution, occurring where suitable habitat conditions exist: *Batrachoseps attenuatus*, *Scaphiopus couchii*, *Bufo punctatus*, and *Hyla regilla*. *Batrachoseps* and *Hyla* are members of the Pacific fauna, not present in the Sonoran subregion, and the *Scaphiopus* and *Bufo* are Sonoran forms, absent from the Pacific subregion. The origin of this mixture of faunæ will be considered below.

The genera of lizards (exclusive of the insular *Sator*) found in Lower California are the following.

<i>Phyllodactylus</i>	<i>Uta</i>
<i>Coleonyx</i>	<i>Phrynosoma</i>
<i>Ctenosaura</i>	<i>Gerrhonotus</i>
<i>Dipsosaurus</i>	<i>Anniella</i>
<i>Crotaphytus</i>	<i>Xantusia</i>
<i>Sauromalus</i>	<i>Cnemidophorus</i>
<i>Callisaurus</i>	<i>Verticaria</i>
<i>Uma</i>	<i>Plestiodon</i>
<i>Sceloporus</i>	<i>Bipes</i>

Of these, *Phyllodactylus*, *Ctenosaura*, and *Bipes* are of Mexican affinity, each with a distinct species in Lower California absent from northern Lower California, while *Phyllodactylus tuberculosus* is identical on the peninsula and in west Mexico. *Uma* enters the peninsula only in the northeastern area, which is continuous with the Colorado Desert. *Coleonyx* also, although ranging farther south on the Gulf side of the

peninsula, may be considered as directly derived from the Colorado Desert. *Anniella* enters the peninsula only a short distance on the Pacific side. The remaining twelve genera reach the southern part of the peninsula. *Verticaria* is nearly confined to Lower California, ranging to the north only a short distance into the San Diegan area. Of the remaining eleven genera, *Dipsosaurus*, *Sauromalus* and *Callisaurus* form a group whose distribution is very similar, ranging through the whole of Lower California except the northwestern part, the Colorado and Mohave deserts in California, southern Nevada, extreme southwestern Utah, and southwestern Arizona, entering Sonora probably in the desert areas bordering the Gulf of California. *Xantusia*, with a restricted distribution in California, is represented by a distinct species (*X. gilberti*) in southern Lower California, by one in the San Diegan area (*X. henshawii*, not yet recorded from Lower California), and by one in the Mohave Desert (*X. vigilis*) which enters northeastern Lower California. *X. gilberti* appears to be most closely related to the Mohave Desert species.

The remaining genera have a wide distribution in North America. Of *Crotaphytus*, only the widely distributed *C. wislizenii* reaches southern Lower California. The Lower Californian *Plestiodon* is scarcely distinct from the northern *P. skiltonianus*, which is a Pacific form. *Gerrhonotus* has a distinct species in southern Lower California and one in the San Diegan area, while it is also absent from the Colorado Desert, reappearing on the Mexican plateau. *Sceloporus*, *Uta*, *Phrynosoma*, and *Cnemidophorus*, each with several species in the peninsula and others on the adjacent islands, are the best developed genera in the fauna of Lower California. Each has one or more species confined to the southern part of the peninsula. *Uta* is remarkable for the two species, *Uta thalassina* and *Uta mearnsi*, respectively of the southern and northern half of the peninsula. If *mearnsi* were extinct, *thalassina* could be considered as forming a distinct monotypic genus; but *mearnsi* is so exactly intermediate between *thalassina* and typical *Uta* that it is impossible to place it with either.

The eighteen genera of snakes in Lower California are the following.

<i>Siagonodon</i>	<i>Rhinocheilus</i>
<i>Lichanura</i>	<i>Hypsiglena</i>
<i>Coluber</i>	<i>Natrix</i>
<i>Salvadora</i>	<i>Thamnophis</i>
<i>Phyllorhynchus</i>	<i>Sonora</i>
<i>Elaphe</i>	<i>Chilomeniscus</i>
<i>Arizona</i>	<i>Tantilla</i>
<i>Pituophis</i>	<i>Trimorphodon</i>
<i>Lampropeltis</i>	<i>Crotalus</i>

Of these, the water snake *Natrix* shows especial Mexican relations, the same species occurring in western Mexico and Lower California. *Lichanura*, *Phyllorhynchus*, and *Chilomeniscus* are nearly confined to the peninsula, but range into southern California and southwestern Arizona at the north. The distribution of *Trimorphodon lyrophanes* appears to be discontinuous, a wide gap separating the records in southern Arizona from the Lower Californian localities, a distribution paralleled by *Phrynosoma solare* among the lizards. The single species of *Elaphe* is also without a representative in either the San Diegan or Colorado Desert fauna, its nearest relative geographically being west Mexican. The twelve remaining genera are all wide-ranging North American forms. *Thamnophis* enters Lower California from the North and is absent from the southern end of the peninsula, as probably also is *Rhinocheilus*.

The single fresh-water turtle is apparently closely related to the Mexican species, *Pseudemys ornata*.

To repeat, of the thirty-eight genera of reptiles in Lower California, six are absent in the Pacific area and in the Sonoran deserts of the United States, and by their presence in western Mexico, as allied or identical species, suggest a "Mexican element" in the Lower Californian fauna; these genera are *Ctenosaura*, *Sator*, *Bipes*, *Natrix*, *Elaphe*, and *Pseudemys*. The three last are widespread in North America, and their absence in the Sonoran deserts of the United States is due to absence of suitable habitat conditions. The aquatic forms may have entered the peninsula directly from Mexico, though this is improbable. Their northward range on the coast of Sonora is, unfortunately, not satisfactorily known. *Ctenosaura* is a characteristically Mexican and Central American genus. A species reaches the Arizonan border from Mexico, and it is not impossible that the genus may formerly have ranged farther into the Sonoran deserts to the north and so may have found access to Lower California, where subsequent isolation is shown by the specific distinctness of the west Mexican and Lower Californian forms. *Bipes* and *Sator* I regard as examples of relict distribution, their present restriction being due to the extinction of the intermediate Sonoran forms. The genus of geckos, *Phyllodactylus*, has a characteristically erratic distribution, and not much importance can be ascribed to its presence in both Lower California and Mexico. *P. tuberculosus* has recently been discovered in southern California. Without knowing the relations of *Elaphe rosalix* within the genus, it is impossible to form an opinion as to its geographic relations. It is not improbable that it belongs with *Ctenosaura* in the history of its distribution. The range of certain other

genera and species suggests a different and somewhat earlier stage in this distributional process, *Trimorphodon lyrophanes* and *Phrynosoma solare* being the best examples (see below).

Nelson (*loc. cit.*, p. 117, Pl. xxxi) finds a division of the peninsula into faunal districts, independent of the "life zones," useful in discussing the fauna. The extent of his divisions is shown in the accompanying copy of his map (Fig. 1). The San Diegan, the San Pedro Martir, and the Colorado Desert districts at the north are continuous with faunally similar areas in California. The Cape district, occupying nearly the southern half of the peninsula, has by far the most distinct fauna. The Vizcaino Desert, intermediate in position between the Colorado Desert and San Diegan districts at the north and the Cape district at the south, has an intermediate fauna, with a number of peculiar forms. In the northward extension of the San Lucas fauna to nearly the middle of the peninsula and the adoption of an intermediate district, these faunal subdivisions appear to present a distinct advance. Their agreement with the distribution of the herpetological fauna can now be examined in detail.

The San Pedro Martir district of Nelson, coinciding very nearly with the transitional zone, is characterized herpetologically by the extreme poverty of its fauna. *Sceloporus graciosus vandenburgianus* appears to be confined to this area in Lower California, but otherwise it is scarcely more than an impoverished appendage of the San Diegan fauna. This area is therefore united with the San Diegan for the present discussion.

The San Diegan and San Pedro Martir faunæ, so far as recorded from Lower California, consist of the following forty-three species.

#### Amphibians

<i>Plethodon croceater</i>	<i>Bufo boreas halophilus</i>
<i>Aneides lugubris lugubris</i>	<i>Hyla regilla</i>
<i>Batrachoseps attenuatus</i>	<i>Hyla arenicolor</i>
<i>Batrachoseps leucopus</i>	<i>Rana aurora draytonii</i>
<i>Scaphiopus hammondi</i>	

#### Reptiles

<i>Crotaphytus wislizenii</i>	* <i>Lichanura roseofusca</i>
<i>Callisaurus ventralis gabbii</i>	<i>Coleuber flagellum piceus</i>
<i>Sceloporus occidentalis bi-seriatus</i>	<i>Coleuber lateralis</i>
* <i>Sceloporus graciosus vandenburgianus</i>	<i>Salvadora hexalepis</i>
* <i>Sceloporus rufidorsum</i>	<i>Arizona elegans</i>
* <i>Sceloporus orcutti</i>	<i>Pituophis catenifer rutilus</i>
* <i>Uta mearnsi?</i>	* <i>Pituophis catenifer annectens</i>

\*Species confined, or nearly so, to the area discussed.



* <i>Uta stansburiana hesperis</i>	<i>Diadophis amabilis</i>
<i>Uta microscutata</i>	<i>Lampropeltis getulus boylii</i>
* <i>Phrynosoma blainvillii blainvillii</i>	* <i>Lampropeltis californiæ californiæ</i>
* <i>Phrynosoma nelsoni</i>	<i>Rhinocheilus lecontei</i>
* <i>Gerrhonotus scincicauda webbii</i>	<i>Hypsiglena ochrorhynchus ochrorhynchus</i>
* <i>Anniella pulchra</i>	<i>Thamnophis ordinoides vagrans</i>
* <i>Cnemidophorus tessellatus stejnegeri</i>	* <i>Thamnophis ordinoides hammondi</i>
* <i>Verticaria hyperythra beldingi</i>	<i>Crotalus oreganus</i>
<i>Verticaria hyperythra schmidtii</i>	* <i>Crotalus exsul</i>
<i>Plestiodon skiltonianus</i>	* <i>Crotalus goldmani</i>

Of the amphibians, only *Hyla regilla* and *Batrachoseps attenuatus* range to the south of this area; *Hyla arenicolor* reappears in the mountains of Arizona, but is absent in the Colorado Desert proper, as is the wide ranging *Scaphiopus hammondi*. *Batrachoseps leucopus* is confined to the Coronados Islands. The remaining four species are all typical members of the Pacific fauna which reach their southern limits in the San Diegan district.

The reptile fauna is much more heterogeneous. A number of species have a wide range to the north or south of the San Diegan district proper, such as *Sceloporus occidentalis bi-seriatus*, *Uta microscutata*, *Verticaria hyperythra schmidtii*, *Plestiodon skiltonianus*, *Coluber lateralis*, *Diadophis amabilis*, *Lampropeltis getulus boylii*, *Rhinocheilus lecontei*, *Hypsiglena ochrorhynchus ochrorhynchus*, *Thamnophis ordinoides vagrans*, and *Crotalus oreganus*. Of these, *Uta microscutata* and *Verticaria hyperythra schmidtii* do not range to the north of the area, and *Sceloporus occidentalis bi-seriatus*, *Thamnophis ordinoides vagrans*, and *Crotalus oreganus* do not range south of it. A number of species range south to Cedros Island: *Sceloporus rufidorsum*, *Uta stansburiana hesperis* (to San Bartolome Bay), *Verticaria hyperythra beldingi*, and *Crotalus exsul*. A few forms cross over from the Colorado Desert: *Crotaphytus wislizenii*, *Callisaurus ventralis gabbii*, *Coluber flagellum piceus*, *Salvadora hexalepis*, *Pituophis catenifer rutilus*, and *Arizona elegans*.

The seventeen species of reptiles starred in the list above may be considered characteristic of the San Diegan fauna. *Phrynosoma nelsoni*, however, known only from San Quintin, may prove to be more properly a Vizcaino Desert form. This includes the four species which range south to Cedros Island; and *Uta stansburiana hesperis*, *Gerrhonotus scincicauda webbii*, *Anniella pulchra* and *Lichanura roseofusca* range slightly outside the limits of the San Diegan district to the north. *Xantusia henshawi* may be named as a characteristic San Diegan form not yet recorded from

\*Species confined, or nearly so, to the area discussed.

Lower California, and *Clemmys marmorata* is a wide ranging Pacific form which may be expected in the San Diegan area in Lower California. *Uta mearnsi* is included in this list, but it seems probable that it is in fact a relict Sonoran form with a unique distribution; it is recorded chiefly from the desert side of the Coast range, and the record from "75 miles southeast of San Diego" is somewhat indefinite.

The Colorado Desert fauna is a highly peculiar one, with two distinctive groups of habitat associations, the desert and the riparian (Grinnell, 1914). In southeastern California, the following amphibians and reptiles are represented.

#### Amphibians

*Bufo cognatus cognatus*  
*Bufo punctatus*  
*Bufo alvarius*

*Bufo woodhousii*  
*Rana pipiens*

#### Reptiles

*Phyllodactylus tuberculatus*  
*Coleonyx variegatus*  
*Dipso-saurus dorsalis dorsalis*  
*Uma notata*  
*Callisaurus ventralis gabbii*  
*Crotaphytus wislizenii*  
*Crotaphytus collaris baileyi*  
*Sauromalus obesus*  
*Uta mearnsi*  
*Uta stansburiana stejnegeri*  
*Uta ornata symmetrica*  
*Uta graciosa*  
*Sceloporus magister*  
*Phrynosoma platyrhinos*  
*Phrynosoma m'callii*  
*Xantusia vigilis*  
*Cnemidophorus tessellatus tessellatus*

*Kinosternon sonoriense*  
*Siagonodon humilis*  
*Thamnophis marcianus*  
*Chilomeniscus ephippicus*  
*Sonora occipitalis*  
*Sonora episcopa*  
*Lampropeltis getulus yumensis*  
*Lampropeltis getulus boylii*  
*Phyllorhynchus decurtatus*  
*Salvadora hexalepis*  
*Coluber flagellum piceus*  
*Arizona elegans ?*  
*Pituophis catenifer deserticola*  
*Crotalus mitchellii*  
*Crotalus atrox atrox*  
*Crotalus cerastes*  
*Testudo agassizii*

*Pituophis catenifer rutilus*, *Thamnophis megalops*, and *Chilomeniscus cinctus* may be added to this list from Arizonan records, making forty-two species in the Colorado Desert fauna.

Twenty-two of these species have been recorded from northeastern Lower California as follows: *Coleonyx variegatus*, *Dipso-saurus dorsalis dorsalis*, *Crotaphytus collaris baileyi*, *Uma notata*, *Callisaurus ventralis gabbii*, *Uta mearnsi*, *Uta stansburiana stejnegeri*, *Uta graciosa*, *Uta ornata symmetrica*, *Sceloporus magister*, *Phrynosoma platyrhinos*, *Xantusia vigilis*, *Cnemidophorus tessellatus tessellatus*, *Coluber flagellum piceus*, *Lampropeltis getulus yumensis*, *Pituophis catenifer rutilus*, *Phyllorhynchus decur-*



*tatus*, *Thamnophis megalops*, *Crotalus atrox atrox*, *Crotalus mitchellii*, and *Crotalus cerastes*. Nine more have been recorded from the Cape district but are as yet unknown from the Colorado Desert district in Lower California: *Bufo punctatus*, *Phyllodactylus tuberculosus*, *Crotaphytus wislizenii*, *Sauromalus obesus*, *Siagonodon humilis*, *Chilomeniscus ephippicus*, *Chilomeniscus cinctus*, *Sonora episcopa*, and *Salvadora hexalepis*. Eleven species remain unrecorded from this area in Lower California, most of which may be expected as additions to its fauna in the future: *Bufo cognatus cognatus*, *Bufo alvarius*, *Bufo woodhousii*, *Rana pipiens*, *Phrynosoma m'callii*, *Thamnophis marcianus*, *Sonora occipitalis*, *Lampropeltis getulus boylii*, *Arizona elegans*, *Testudo agassizii* and *Kinosternon sonoriense*.

The occurrence of *Xantusia vigilis* at San Matias Pass, where it is associated with a species of tree yucca as in the Mohave Desert, indicates a more or less distinct fauna bordering the Colorado Desert district in Lower California on the eastern slopes of the San Pedro Martir Mountains. The distribution of *Uta mearnsi* has been mentioned above. The peculiar case of *Phrynosoma solare*, which is absent in California and reappears at Las Animas Bay, Lower California, a third of the distance down the Gulf side of the peninsula, seems to indicate a somewhat recent "invasion" of the Colorado Desert into a less arid area. Unfortunately, the eastern escarpment of the Sierra Juarez and San Pedro Martir is so precipitous that there is little hope of tracing a continuous zone through this area.

The Vizcaino Desert district of Nelson's map occupies the area between the three districts just discussed and the Cape district. It should include, in my opinion, the Magdalena Plain. Its fauna is imperfectly known and this area quite certainly offers a most interesting field for further herpetological exploration.

In view of this lack of information, it is not possible to present a list of the amphibians and reptiles of this area. Four species are characteristic of and confined to it, as far as known: *Callisaurus crinitus*, *Phrynosoma jamesi*, *Cnemidophorus bartolomas*, and *Cnemidophorus rubidus*.

There is a "crossing over" of the Sonoran desert fauna in this area, cutting off a remnant of the San Diegan fauna on Cedros Island. My inference that the fauna of the Magdalena Plain is to be directly associated with that of the Vizcaino Desert is based primarily on the distribution of *Callisaurus crinitus*, the close relations between *Cnemidophorus rubidus* and *C. bartolomas*, and the presence of *Verticaria hyperythra beldingi*. It would be of great interest to know whether *Cnemidophorus*

*bartolomas* and *Phrynosoma jamesi* are confined to the Pacific Coast, as appears at present, or to what extent these species range into this district. The occurrence of certain species at La Paz (*Crotaphytus wislizenii*, for example) may indicate a route of migration via the Vizcaino Desert and the Magdalena Plain of the undifferentiated Sonoran elements in the fauna of the Cape district.

The San Lucan fauna is the most characteristic and the most differentiated of the four Lower Californian herpetological faunæ though scarcely more distinct from the Colorado Desert fauna than the latter is from the San Diegan. Five, possibly seven, species of the Vizcaino Desert fauna are distinct from the species of the two northern districts. The Cape district has no less than twenty-nine species strictly confined to it. The total number of species recorded from it is fifty-two, as follows.

#### Amphibians

*Batrachoseps attenuatus*  
*Scaphiopus couchii*

*Bufo punctatus*  
*Hyla regilla*

#### Reptiles

*Phyllodactylus tuberculosus*  
\**Phyllodactylus unctus*  
\**Ctenosaura hemilopha*  
\**Dipsosaurus dorsalis lucasensis*  
*Crotaphytus collaris baileyi*  
*Crotaphytus wislizenii*  
\**Sauromalus ater*  
\**Callisaurus draconoides*  
*Callisaurus ventralis gabbii*  
\**Sceloporus zosteromus*  
\**Sceloporus licki*  
\**Uta thalassina*  
*Uta mearnsi*  
\**Uta elegans*  
*Uta microscutata*  
\**Uta nigricauda*  
\**Phrynosoma coronatum*  
\**Gerrhonotus multi-carinatus*  
\**Xantusia gilberti*  
\**Cnemidophorus maximus*  
\**Verticaria hyperythra hyperythra*  
*Verticaria hyperythra schmidtii*  
*Plestiodon skiltonianus*  
\**Bipes biporus*

*Siagonodon humilis*  
\**Lichanura trivirgata*  
*Coluber flagellum piceus*  
*Coluber lateralis*  
\**Coluber aurigulus*  
*Salvadora hexalepis*  
*Phyllorhynchus decurtatus*  
\**Elaphe rosalix*  
\**Pituophis vertebralis*  
\**Lampropeltis getulus conjuncta*  
\**Lampropeltis californiæ nitida*  
*Rhinocheilus lecontei*  
*Hypsiglena ochrorhynchus ochrorhynchus*  
*Natrix valida*  
*Sonora episcopa*  
\**Chilomeniscus stramineus*  
\**Chilomeniscus punctatissimus*  
*Chilomeniscus cinctus*  
\**Tantilla planiceps*  
*Trimorphodon lyrophanes*  
\**Crotalus atrox lucasensis*  
\**Crotalus enyo*  
\**Crotalus mitchellii*  
\**Pseudemys ornata nebulosa*

The species starred are confined to this area. The degree of peculiarity is much increased if the insular species are included. Since most of these simply represent peninsular forms, I have not included them in

the discussion; but the two insular species of *Sator*, which is not represented on the peninsula, may be mentioned in this connection, especially as *Sator* is the only genus of reptiles entirely confined to Lower California (cf. *Verticaria*, etc., above).

Of the species occurring outside the Cape district, only *Natrix valida* and possibly *Gerrhonotus multi-carinata* (cf. Stejneger and Barbour, 1917, p. 61) are West Mexican and not found in northern Lower California, although *Ctenosaura hemilopha*, *Bipes biporus*, and possibly *Elaphe rosaliae* are most closely allied to West Mexican forms at present. The relations of the San Lucan fauna with the San Diegan and the Colorado Desert faunæ are very unequal.

Of the fifty-two species, fifteen occur also in the Colorado Desert fauna and seven more are obviously closely allied to Colorado Desert forms; ten are identical with San Diegan forms, but of these, two are found also in the desert; while five more species are more closely allied to San Diegan forms than to desert forms; the proportion of Colorado Desert element to San Diegan element is therefore about 22 to 13. The San Lucan forms in the San Diegan district, however, appear to be largely derived forms, as with the exception of *Hyla regilla*, *Plestiodon skiltonianus*, and *Rhinocheilus lecontei*, these find their northern limit in this area, while the San Lucan forms which reach the desert for the most part (generically if not specifically) have a wide range. This I have shown more fully above in discussing generic ranges.

#### SAN LUCAN SPECIES OCCURRING IN THE COLORADO DESERT OR ALLIED SONORAN FAUNÆ

##### (a). As Identical Species

<i>Scaphiopus couchii</i>	<i>Siagonodon humilis</i>
<i>Bufo punctatus</i>	<i>Coluber flagellum piceus</i>
<i>Phyllodactylus tuberculosus</i>	<i>Salvadora hexalepis</i>
<i>Crotaphytus collaris baileyi</i>	<i>Phyllorhynchus decurtatus</i>
<i>Crotaphytus wislizenii</i>	<i>Sonora episcopa</i>
<i>Callisaurus ventralis gabbii</i>	<i>Chilomeniscus cinctus</i>
<i>Uta mearnsi</i>	<i>Trimorphodon lyrophanes</i>
	<i>Crotalus mitchellii</i>

##### (b). As Related Species

San Lucan	Colorado Desert
<i>Dipso-saurus dorsalis lucasensis</i>	<i>Dipso-saurus dorsalis dorsalis</i>
<i>Sauromalus ater</i>	<i>Sauromalus obesus</i>
<i>Sceloporus zosteromus</i>	<i>Sceloporus magister</i>
<i>Uta elegans</i>	<i>Uta stansburiana stejnegeri</i>
<i>Xantusia gilberti</i>	<i>Xantusia vigilis</i>
<i>Tantilla planiceps</i>	<i>Tantilla nigriceps</i>
<i>Crotalus atrox lucasensis</i>	<i>Crotalus atrox atrox</i>

## SAN LUCAN SPECIES OCCURRING IN THE SAN DIEGAN FAUNA

## (a). As Identical Species

<i>Batrachoseps attenuatus</i>	<i>Plestiodon skiltonianus</i>
<i>Hyla regilla</i>	<i>Coluber lateralis</i>
<i>Uta microscutata</i>	<i>Rhinocheilus lecontei</i>
<i>Verticaria hyperythra schmidtii</i>	<i>Hypsiglena ochrorhynchus ochrorhynchus</i>

## (b). As Related Species

San Lucan	San Diegan
<i>Sceloporus licki</i>	<i>Sceloporus occidentalis bi-seriatus</i>
<i>Gerrhonotus multi-carinatus</i>	<i>Gerrhonotus scincicauda webbia</i>
<i>Lichanura trivirgata</i>	<i>Lichanura roseofusca</i>
<i>Lampropeltis getulus conjuncta</i>	<i>Lampropeltis getulus boylii</i>
<i>Lampropeltis californiae nitida</i>	<i>Lampropeltis californiae californiae</i>

As there are no important additions to be made to the faunæ of the Revilla Gigedo Islands and islands off the Pacific coast of Lower California, with the exception of Cedros Island, they may be omitted from the present résumé. Van Denburgh and Slevin (1914) have given a complete account of these insular faunæ.

The fauna of Cedros at present known consists of eleven species:

<i>Hyla regilla</i>	<i>Verticaria hyperythra beldingi</i>
<i>Crotaphytus wislizenii</i>	* <i>Cnemidophorus multiscutatus</i>
* <i>Uta concinna</i>	* <i>Cnemidophorus labialis</i>
<i>Sceloporus rufidorsum</i>	<i>Siagonodon humilis</i>
* <i>Phrynosoma cerroense</i>	<i>Crotalus exsul</i>
* <i>Phrynosoma schmidtii</i>	

The five species starred are peculiar to the island. *Hyla regilla*, *Sceloporus rufidorsum*, the *Verticaria*, and *Crotalus exsul* are San Diegan forms reaching Cedros. It is not impossible that they are cut off by a considerable gap from their nearest mainland occurrence, as the *Crotaphytus* and *Siagonodon* apparently represent an invasion of the desert forms. The relations of the peculiar forms are not fully established, but it seems certain that *Uta concinna* and *Cnemidophorus multiscutatus* are most closely allied to San Diegan forms, while the remaining three are representatives of the adjacent Vizcaino Desert fauna.

The islands of the Gulf of California appear to fall simply enough into two groups, those nearest the peninsula having a non-Mexican and strictly Lower Californian fauna, while those nearer the mainland have a fauna derived from Mexico.

The fauna of the island of Angel de la Guardia consists of the following seven forms:

* <i>Sauromalus hispidus</i>	* <i>Cnemidophorus dickersonæ</i> (Isla Partida)
* <i>Crotaphytus insularis</i>	* <i>Crotalus atrox elegans</i>
* <i>Callisaurus splendidus</i>	<i>Crotalus mitchellii</i>
<i>Uta stansburiana stejnegeri</i>	

Of these, the five starred are peculiar to the island. As far as our present knowledge of these species goes, they are equally related to Lower Californian and West Mexican representatives.

From Sal Si Puedes Island, only one species, *Cnemidophorus canus*, is known.

A single species, *Crotalus tortugensis*, is known from the island of Tortuga.

From San Marcos Island, only *Verticaria hyperythra schmidtii* is known, a form widely distributed on the peninsula.

Five species are known from Carmen Island:

<i>Callisaurus ventralis gabbii</i>	* <i>Verticaria cærulea</i>
<i>Uta elegans</i>	* <i>Cnemidophorus vandenburghi</i>
<i>Uta microscutata</i>	

Of these, the two last are peculiar to the island; the other three are found on the adjacent shores of the peninsula. *Verticaria cærulea* is interesting as an insular representative of the more plastic peninsular form, *Verticaria hyperythra schmidtii*.

From Monserrate Island, only two species, *Sceloporus monserratus* and *Verticaria picta*, are known.

Five species are known from Santa Catalina Island:

<i>Dipsosaurus dorsalis lucasensis</i>	* <i>Cnemidophorus catalinensis</i>
* <i>Sceloporus lineatulus</i>	* <i>Lampropeltis catalinensis</i>
* <i>Uta squamata</i>	

The peculiar species of *Sceloporus* differs very slightly from the mainland form, while the *Uta*, *Cnemidophorus*, and *Lampropeltis* are much more distinct from their peninsular allies.

Only a single highly peculiar species, *Sator angustus*, is known from Santa Cruz Island.

Six species are now known from San José Island:

<i>Callisaurus ventralis gabbii</i>	<i>Uta microscutata</i>
<i>Sceloporus zosteromus</i>	* <i>Cnemidophorus celeripes</i>
<i>Uta elegans</i>	* <i>Verticaria sericea</i>

The latter two are peculiar to the island, the *Verticaria* being most closely allied to the species on Carmen Island, while the similarity to the Carmen Island fauna is increased by the species in common with it and the peninsula.

San Francisco Island has a single peculiar species, *Verticaria franciscensis*.

The fauna of Espiritu Santo Island comprises seven species:

*Sauromalus ater*

*Uta elegans*

*Sceloporus zosteromus*

*Sceloporus licki*

\**Verticaria espiritensis*

*Chilomeniscus punctatissimus*

\**Coluber barbouri*

The peculiar species of snake is, I believe, more closely related to the mainland form from which it is obviously derived than is the case with the species peculiar to other islands.

From Ceralvo Island, three species are known, *Verticaria ceralbensis*, *Sator grandævus*, and *Ctenosaura hemilopha*. The occurrence of a related but highly distinct species of *Sator* on the island of Santa Cruz indicates that this genus was formerly present on the peninsula, while the divergence shown by these two insular species indicates a considerable antiquity for the genus. I am unable to distinguish the *Ctenosaura* from the peninsular species.

Turning to the islands which I believe to be more closely related to the Mexican mainland than to the Lower Californian peninsula, San Esteban Island, in the middle of the gulf, has three species, *Ctenosaura hemilopha*, *Cnemidophorus estebanensis* and *Crotalus molossus*, at present known from it besides the peculiar *Sauromalus varius*. Of these, the first is found in Lower California, the *Cnemidophorus* is almost identical with the *C. melanostethus* of Sonora, and the *Crotalus* is identical with a Mexican form not found in Lower California. The relations of the *Sauromalus* are not evident. As the question of relations stands, therefore, it is two to one in favor of a Mexican relation of the island. From the soundings of the gulf north and south of San Esteban, it is evident that this is the most probable location of a connection of Lower California with Sonora, if such a connection ever existed.

The species known from Tiburon Island are the following:

\**Sauromalus townsendi*

*Crotaphytus wislizenii*

\**Crotaphytus dickersonæ*

\**Callisaurus ventralis inusitatus*

\**Cnemidophorus punctilinealis*

\**Cnemidophorus disparilis*

*Micrurus euryxanthus*

While five of these are at present known only from the island, it seems probable that they occur on the adjacent coast of Sonora. The appearance of *Micrurus euryxanthus* is a striking evidence of the non-Californian character of the Tiburon fauna.

The two species of lizards known from San Pedro Martir Island, *Uta palmeri* and *Cnemidophorus martyris*, are highly peculiar but the relations of the latter with *C. disparilis* of Tiburon Island lead me to associate this island with the Mexican mainland.

Only two species, *Uta nolascensis* and *Cnemidophorus bacatus*, are known from the island of San Pedro Nolasco.

A large number of species confined to islands in the Gulf of California are now known, the total (to January 1, 1922) being thirty-four, with sixteen islands represented. As no less than fourteen of these are known to me only from the preliminary diagnoses, I am unable to form definite opinions as to their relations. The mere list, however, is instructive:

<i>Crotaphytus dickersonæ</i>	<i>Cnemidophorus disparilis</i>
“ <i>insularis</i>	“ <i>martyris</i>
<i>Sauromalus hispidus</i>	“ <i>catalinensis</i>
“ <i>townsendi</i>	“ <i>dickersonæ</i>
“ <i>varius</i>	“ <i>canus</i>
<i>Callisaurus splendidus</i>	“ <i>bacatus</i>
“ <i>ventralis inusitatus</i>	<i>Verticaria ceralbensis</i>
<i>Sceloporus lineatulus</i>	“ <i>espiritensis</i>
“ <i>monserratisensis</i>	“ <i>sericea</i>
<i>Sator angustus</i>	“ <i>cærulea</i>
“ <i>grandævus</i>	“ <i>franciscensis</i>
<i>Uta palmeri</i>	“ <i>picta</i>
“ <i>squamata</i>	<i>Coluber barbouri</i>
“ <i>nolascensis</i>	<i>Lampropeltis catalinensis</i>
<i>Cnemidophorus vandenburghi</i>	<i>Crotalus tortugensis</i>
“ <i>celeripes</i>	“ <i>atrox elegans</i>
“ <i>estebanensis</i>	
“ <i>punctilinealis</i>	

There are thirty species of lizards and only four snakes. Of the thirty lizards, sixteen are teiids belonging to the two genera *Cnemidophorus* and *Verticaria*. The ten insular *Cnemidophorus* compare with five peninsular species, the six insular *Verticarias* with three on the peninsula. The great majority of all of the species will certainly be found to be very closely allied to the peninsular or Mexican forms from which they are derived. In contrast to these stands a small number of very distinct forms, such as the species of *Sauromalus*, the *Sators*, and possibly *Verticaria ceralbensis*. The latter group of species I believe to have been differ-

entiated at a much earlier stage than the former, and I regard their present isolation as "relict distribution." They were probably elements of the older Lower Californian fauna co-existing with the earlier and more widely differentiated species of the peninsula, such as *Uta thalassina*, while the less distinct forms have become differentiated since the relatively recent faulting or submergence which has separated the islands from the peninsula.

#### SPECULATIONS ON THE ORIGIN OF THE FAUNA

The factors in the geologic history of Lower California which seem to bear most directly on the origin of its present fauna are: (1) the ancient (pre-Cretaceous) granitoid character of the southern tip of the peninsula; (2) the extensive Miocene lava-flows of the middle of the peninsula; and (3) the recent (post-Pliocene) submergence of the middle of the peninsula, where marine fossils and beaches are found to a height of over 3000 feet.

Although recent beaches are not recorded from the immediate vicinity of La Paz, the submergence to the north indicates that the hypothesis of Eisen (1895, p. 755) and Nelson (1921, p. 53), that the Cape area south of La Paz has been separated from the peninsula at a relatively recent date, is probably correct. I believe, however, that Nelson is right in regarding this separation as of comparatively little importance in the history of the fauna. The islands which parallel the gulf coast of the peninsula were quite certainly part of the peninsula at a fairly recent date. The topographical similarity of many of the islands with isolated capes and mountains of the adjacent coast is very strikingly illustrated in Nelson's map (*loc. cit.*, Pl. xxxv).

As the bulk of the middle part of the peninsula consists of Miocene deposits with extensive late Miocene lava-flows (Darton, 1921, p. 720, ff.) it is evident that, if there are remnants of a pre-Miocene fauna in Lower California, they must be looked for in the southern tip of the peninsula.

It is possible that the apparently oldest element in the fauna (see below) antedates the Miocene igneous activity. The larger part of the fauna, and that with a more characteristically desert facies, however, must have entered the peninsula from the north subsequent to the late Tertiary volcanic activity. It is possible that another element of the fauna might be dated from the most recent submergence (late Pleistocene) and this probably consists of the Colorado Desert species (such as *Crotaphytus wislizenii*, *Callisaurus ventralis gabbii*, *Coluber flagellum*



*piceus*, and *Salvadora hexalepis*) which reach the Cape area without having been differentiated from the northern stock.

The Lower Californian amphibians and reptiles are accordingly divisible into groups or "faunal elements" which seem to represent successive invasions from the continental fauna at the north. These may be arranged in a very tentative order as shown in the accompanying table.

I. The "Mexican" forms	Middle or Pre-Miocene	Early Tertiary immigration
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Extensive Destruction of Fauna by Igneous Activity

II. The forms in common with the San Diegoan area and Mexican Plateau	Post-Miocene and Pliocene	} Late Tertiary and Pleistocene immigration
III. The forms bordering the Colorado Desert	Pleistocene	
IV. The Colorado Desert forms which have become differentiated in the Cape area		

Last Extensive Submergence

V. The Colorado Desert forms which reach the Cape unchanged	Subsequent to the last submergence	} Recent immigration in process
VI. The desert forms which have not yet spread beyond the borders of the Colorado Desert proper	Contemporary	

The most important consideration bearing on the history of the Lower Californian fauna is the discontinuity of the ranges of numerous genera and species at the Colorado Desert to the north, which appears to be inserted like a wedge separating closely related forms in Arizona and Lower California. It may be supposed that an increasing aridity in this area during Pleistocene and post-glacial time has led to the evolution of forms specifically adapted to desert conditions in this area, their ancestors, where they continue, being forced to follow their migrating

habitat, both through their lack of adaptation to the increasing aridity and through the pressure exerted on them by their better adapted derivatives. This accordingly parallels on a small scale the large-scale process of climatic evolution of faunæ elaborated by Matthew (1915). On the theory that this has been a long-continued and fairly uniform process, the composite character of the fauna may be quite simply explained. The numerous species confined to the Colorado Desert proper and extending only into the northeastern part of Lower California represent the most recent faunal development, i.e., are the most recent element in the Lower Californian fauna. The only genus peculiar to this fauna is *Uma*, which is closely restricted in habitat. A slightly older element consists of the genera confined to the Colorado and adjacent desert areas, which reach southern Lower California; these are *Dipso-saurus*, *Sauromalus*, *Callisaurus*, *Phyllorhynchus*, and *Chilomeniscus*. With the exception of *Phyllorhynchus*, they have developed a distinct species in the Cape district. The desert species which range into southern Lower California without differentiation may represent the intermediate stage between these two elements. A "highway" for their immigration seems to be present in the Vizcaino Deserts and the Magdalena Plain. Correlated with the development and spread of this strictly desert fauna is the distribution of the species which in some sense border the desert. *Scaphiopus couchii*, *Hyla arenicolor*, *Phrynosoma solare*, *Rhinocheilus lecontei*, *Hypsiglena ochrorhynchus ochrorhynchus*, and *Trimorphodon lyrophanes*, which are apparently absent from the Colorado Desert but present in Lower California, reappear in Arizona at the border of the Mexican Highland (Physiographic nomenclature of Fenneman, 1916, p. 34). *Natrix valida*, which probably ranges into the State of Sonora in Mexico, may be included with this list, and, somewhat more doubtfully, the fresh-water turtle, *Pseudemys ornata nebulosa*, which is sub-specifically distinct in Lower California. A number of other species which border the Colorado Desert on one side only are in full accord with the distribution of the above, *Uta mearnsi*, *Xantusia vigilis*, and *Lichanura roseofusca*, being examples. In the light of the discontinuity of the ranges of the foregoing list of species, it seems logical to interpret the oldest element in the fauna in the same way. This element consists of genera absent in the strictly desert areas to the north but present in the Cape district or the San Diegan district and reappearing in southern Arizona or farther south in Mexico, such as *Gerrhonotus*, *Ctenosaura*, *Plestiodon*, *Bipes*, *Elaphe*, and *Tantilla*. The section of the genus *Uta* with an entire frontal (*Uta nigricauda* and *microscutata*) belongs here, and probably the

genus *Sator*, now entirely restricted to islands in the Gulf of California. *Uta thalassina*, restricted to southern Lower California, also may be placed with this "older" element. Finally, the species common to the Cape district and the San Diegan district are believed to represent a radiating migration antedating the present conditions, as it is difficult to see how migration from the relatively humid San Diegan area to the restricted similar areas in the Cape district could take place at present, on account of the intervening deserts. It must therefore be supposed that a continuous, or nearly continuous, semi-humid belt connected the San Diegan and the Cape areas at an early date. It is not incompatible with this theory that, in the diverse habitat conditions of Lower California and its isolated position, a large number of species have developed "in place." This differentiation after migration accounts in part for the distinctive species of the various faunal districts.

#### ARTIFICIAL KEYS TO THE GENERA OF AMPHIBIANS AND REPTILES IN LOWER CALIFORNIA

The amphibians are scantily represented in Lower California by eleven species of seven genera, which may be recognized as follows:

1. Adult tailed.....2.  
Adult tailless.....4.
2. Toes four in front, five behind.....3.  
Toes four on each foot.....*Batrachoseps*.
3. Tail longer than head and body; size large, adult exceeding 10 inches.. *Plethodon*.  
Tail shorter than head and body; size smaller, adult rarely exceeding 6 inches.  
*Aneides*.
4. Digits dilated at the tip.....*Hyla*.  
Digits not dilated.....5.
5. Skin smooth.....*Rana*.  
Skin more or less warty.....6.
6. Two metatarsal tubercles, not black or horny.....*Bufo*.  
A single (inner) metatarsal tubercle with a black and horny edge.. *Scaphiopus*.

The two species of *Hyla* may be distinguished as follows:

Skin rough, with small warts; two phalanges of fourth toe free from web.

*H. arenicolor*

Skin smooth, three phalanges of fourth toe free from web.....*H. regilla*

The two species of *Bufo* do not occur in the same area; they are very different in form, the *Bufo boreas halophilus* in the northwestern part of the peninsula being a large species with a deep head, the *Bufo punctatus* from the cape region much smaller, with a flattened head.

The species of *Scaphiopus* in Lower California may be distinguished as follows:

- Snout sharply truncate in profile.....*S. hammondi*.  
 Snout rounded in profile.....*S. couchii*.

The reptiles of Lower California include lizards, snakes and a single species of non-marine turtle. The lizards represent nine families: Gekkonidæ, Eublepharidæ, Iguanidæ, Anguidæ, Anniellidæ, Xantusiidæ, Teiidæ, Scincidæ, and Amphisbænidæ. The snakes represent four families: Leptotyphlopidae, Boidæ, Colubridæ and Viperidæ. These families may be distinguished as follows:

1. Both pairs of limbs present.....2.  
    Only one pair of limbs, or none.....8.
2. Eyelids absent.....3.  
    Eyelids developed.....4.
3. Top of head covered with small granular scales; tips of digits dilated with a pair of plates beneath.....Gekkonidæ.  
    (a single genus in Lower California, *Phyllodactylus*).  
    Top of head with large plates; tips of digits not dilated.....Xantusiidæ.  
    (a single genus in Lower California, *Xantusia*).
4. Top of head covered with very small granular scales, skin free from skull, pupil vertical.....Eublepharidæ.  
    (a single genus in Lower California, *Coleonyx*)  
    Top of head covered with scales larger than those of the back, skin not free from skull.....5.
5. A series of femoral pores.....6.  
    No femoral pores.....7.
6. Ventral scales in regular transverse and longitudinal series.....Teiidæ.  
    (see key below).  
    Ventral scales not in regular series, more numerous.....Iguanidæ.  
    (see key below).
7. Dorsal scales smooth, laterals and ventrals not much different.....Scincidæ.  
    (a single genus in Lower California, *Plestiodon*).  
    Dorsal scales keeled, lateral scales smaller than dorsals or ventrals, a strong lateral fold.....Anguidæ.  
    (a single genus in Lower California, *Gerrhonotus*).
8. A pair of anterior limbs, no posterior pair.....Amphisbænidæ.  
    (a single genus in Lower California, *Bipes*, forming a distinct subfamily (Bipedinæ) of this otherwise limbless family).  
    No anterior or posterior limbs.....9.
9. Scales of the lower surface not enlarged.....10.  
    Ventral scales enlarged.....11.
10. Eyes present, external.....Anniellidæ.  
    (a single genus in Lower California, *Anniella*).  
    Eyes absent externally, visible as a black dot beneath the scales which cover them.....Leptotyphlopidae.  
    (a single genus in Lower California, *Siagonodon*).

11. A pair of spurs just in front of the anal cleft, (representing the vestigial hind limbs); scales of top of head small..... Boidæ.  
(a single genus in Lower California, *Lichanura*).
- \*No spurs in front of anal cleft..... 12.
12. A pair of large erectile fangs in the upper jaw..... Viperidæ.  
(a single genus in Lower California, *Crotalus*).
- No erectile fangs in the upper jaw..... Colubridæ.  
(see key below).

### Key to the Genera of Teiidae in Lower California

- Two frontoparietal plates..... *Cnemidophorus*.  
A single frontoparietal plate..... *Verticaria*.

### Key to the Genera of Iguanidae in Lower California

1. A dorsal crest..... 2.  
No dorsal crest..... 3.
2. Tail spinous at base..... *Ctenosaura*.  
Tail not spinous at base..... *Dipso-saurus*.
3. Head with strong spines or horns..... *Phrynosoma*.  
Head without horns..... 4.
4. Supraciliary scales juxtaposed; size large; form stout..... *Sauromalus*.  
Supraciliary scales strongly imbricate; form slender..... 5.
5. Upper labials oblique, imbricate..... 6.  
Upper labials not oblique or imbricate..... 7.
6. Back with an ocellated color pattern; two rows of subdigital scales; a series of very long lateral fringes on the digits..... *Uma*.  
Back without ocellation; a single row of subdigital scales; fringes present in one species..... *Callisaurus*.
7. Head covered with small irregular scales; no large occipital scale..... *Crotaphytus*.  
Head scales enlarged, a large occipital..... 8.
8. A well-defined collar, preceded by a transverse gular fold..... *Uta*.  
No collar..... 9.
9. A well-defined transverse gular fold; body compressed; tail very long..... *Sator*.  
No transverse gular fold; body usually depressed..... *Sceloporus*.

### Key to the Genera of Colubrine Snakes in Lower California

1. Scales keeled..... 2.  
Scales smooth..... 4.
2. The two prefrontal plates longitudinally divided, forming four prefrontals.  
Only two prefrontal plates..... *Pituophis*.  
3.
3. Anal plate simple..... *Thamnophis*.  
Anal plate divided..... *Natrix*.
4. Anal entire..... 5.  
Anal divided..... 8.
5. Loreal scales 2-4; rostral projecting..... *Phyllorhynchus*.  
One loreal; rostral not projecting..... 6.

6. Subcaudal scales usually undivided.....*Rhinocheilus*.  
Subcaudal scales in two rows.....7.
7. Dorsal scales 27-31.....*Arizona*.  
Dorsal scales less than 27.....*Lampropeltis*.9.
8. Loreal absent.....10.  
Loreal present.....10.
9. Nasal fused with the frontonasal plate.....*Chilomeniscus*.  
Nasal not fused with the frontonasal.....*Tantilla*.
10. Two loreals.....*Trimorphodon*.  
A single loreal.....11.
11. Rostral projecting, its lateral edges free; color pattern of longitudinal bands.  
*Salvadora*.  
Rostral not projecting; coloration various.....12.
12. Dorsal scales in 15 rows.....*Sonora*.  
Dorsal scales in more than 15 rows.....13.
13. Pupil vertical.....*Hypsiglena*.  
Pupil round.....14.
14. Dorsal scales in 17-19 rows.....*Coluber*.  
Dorsal scales in about 33 rows.....*Elaphe*.

DISTRIBUTIONAL LIST OF THE AMPHIBIANS AND LAND REPTILES OF  
LOWER CALIFORNIA AND THE NEIGHBORING ISLANDS, WITH  
NOTES ON THE SPECIES CONTAINED IN THE COLLECTION  
MADE BY THE 'ALBATROSS' IN 1911

**AMPHIBIA**

**Caudata**

***Batrachoseps attenuatus* (Eschscholtz)**

*Salamandrina attenuata* ESCHSCHOLTZ, 1833, p. 1, Pl. xxii, figs. 1-4.

*Batrachoseps attenuatus* STEJNEGER AND BARBOUR, 1917, p. 13.

RANGE.—S. W. Oregon, California, and Lower California.

LOWER CALIFORNIAN RECORDS.—La Paz, Lockington, 1880, p. 295; San Pedro Martir Mts., Van Denburgh, 1895a, p. 560.

***Batrachoseps leucopus* Dunn**

*Batrachoseps leucopus* DUNN, 1922, Copeia, No. 109, p. 60.

RANGE.—Coronados Islands, Lower California.

***Plethodon croceator* Cope**

*Plethodon croceator* COPE, 1867, p. 210; STEJNEGER AND BARBOUR, 1917, p. 14.

RANGE.—Lower California and California north to El Dorado County.

LOWER CALIFORNIAN RECORDS.—"75 miles S. E. of San Diego," Lockington, 1880, p. 295; Cape St. Lucas, Cope, 1889, p. 150. (Occurrence doubtful in the Cape district.)

**Aneides lugubris lugubris** (Hallowell)

*Salamandra lugubris* HALLOWELL, 1849, p. 126.

*Aneides lugubris* STEJNEGER AND BARBOUR, 1917, p. 21.

RANGE.—California; the Coronados Islands.

LOWER CALIFORNIAN RECORDS.—Coronados Islands, Van Denburgh and Slevin, 1914, p. 139.

**Salientia****Scaphiopus couchii** Baird

*Scaphiopus couchii* BAIRD, 1854, p. 62; STEJNEGER AND BARBOUR, 1917, p. 25.

RANGE.—Texas to Arizona, northern Mexico and Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1863a, p. 52; La Paz, Yarrow, 1882, p. 177; San José del Cabo, Miraflores, Van Denburgh, 1895a, p. 558; San Ignacio, Mulege, Mocquard, 1899, p. 342; between La Paz and San Pedro, Van Denburgh and Slevin, 1921a, p. 53.

**Scaphiopus hammondi** Baird

*Scaphiopus hammondi* BAIRD, 1859a, p. 12, Pl. XXVIII, fig. 2; STEJNEGER AND BARBOUR, 1917, p. 25.

RANGE.—Montana to Mexico, westward to the Pacific Coast and northern Lower California.

Two specimens in the collection of the Biological Survey add this form to the fauna of Lower California. U. S. N. M. No. 37710 is from Ensenada; 37709, without locality, is probably also from the north-western part of the peninsula.

**Bufo punctatus** Baird and Girard

*Bufo punctatus* BAIRD AND GIRARD, 1852, p. 173; STEJNEGER AND BARBOUR, 1917, p. 29.

RANGE.—Western Texas, Utah, southern California, and Lower California.

LOWER CALIFORNIAN RECORDS.—La Paz, Yarrow, 1875, p. 162; Cape St. Lucas, Cope, 1889, p. 262; Santa Anita, San Ignacio, Agua Caliente, San José del Cabo, Corral de Piedras (Sierra el Taste), Miraflores, Van Denburgh, 1895a, p. 559; Santa Rosalia, Mocquard, 1899, p. 334; San Antonio, San Pedro, foothills of Sierra Laguna, Van Denburgh and Slevin, 1921a, p. 53.

This species was secured by the Albatross Expedition at Miraflores, Lower California (A. M. N. H. Nos. 3163, 3165-67, U. S. N. M. No. 64454).

Specimens at hand from the Biological Survey collection come from Santa Anita (U. S. N. M. Nos. 37713-15); Santana (37716); San Ignacio (37717-18); and La Providencia Canyon, east base of San Pedro Martir Mountains (37719-20).

The last of these localities is the most northerly record for this species in Lower California.

**Bufo boreas halophilus** Baird and Girard

*Bufo halophila* BAIRD AND GIRARD, 1853a, p. 301.

*Bufo boreas halophilus* STEJNEGER AND BARBOUR, 1917, p. 27.

RANGE.—Western Nevada, California, and northern Lower California.

LOWER CALIFORNIAN RECORDS.—Ensenada, Van Denburgh and Slevin, 1921a, p. 53.

Two specimens in the collection of the Biological Survey come from La Grulla (U. S. N. M. Nos. 37711–37712).

**Hyla arenicolor** Cope

*Hyla arenicolor* COPE, 1866, p. 84; STEJNEGER AND BARBOUR, 1917, p. 32.

RANGE.—Utah to Texas and northern Lower California, south in Mexico to Guadalajara and Toluca.

LOWER CALIFORNIAN RECORDS.—Ensenada, Van Denburgh and Slevin, 1921a, p. 54.

**Hyla regilla** Baird and Girard

*Hyla regilla* BAIRD AND GIRARD, 1852a, p. 174; STEJNEGER AND BARBOUR, 1917, p. 33.

RANGE.—Vancouver Island and British Columbia to Lower California.

LOWER CALIFORNIAN RECORDS.—Cedros Island, Streets, 1877, p. 35; La Paz, Yarrow, 1882, p. 171; Cape St. Lucas, Cope, 1889, p. 360; Sierra Laguna, San Rafael Valley, San Pedro Martir Mt., San Ignacio, Comodu, Miraflores, San José del Cabo, Van Denburgh, 1895a, p. 556; Santa Rosalia, Mocquard, 1899, p. 339.

This species was collected on Cedros Island by the Albatross Expedition (A. M. N. H. No. 3161, U. S. N. M. No. 64453).

A specimen from La Grulla (U. S. N. M. No. 37708) was collected by the Biological Survey Expedition.

**Rana aurora draytonii** Baird and Girard

*Rana draytonii* BAIRD AND GIRARD, 1852a, p. 174; STEJNEGER AND BARBOUR, 1917, p. 37.

*Rana aurora draytonii* CAMP, 1917, p. 115.

RANGE.—Oregon, California and northern Lower California.

LOWER CALIFORNIAN RECORDS.—San Pedro Martir Mts., Van Denburgh, 1896, p. 1008.

Three specimens in the collection made by the Biological Survey are from San Tomas (U. S. N. M. No. 37699); La Grulla (37700); and Rancho San Antonio (37701).

**REPTILIA****LACERTILIA****Phyllodactylus tuberculosus** Wiegmann

*Phyllodactylus tuberculosus* WIEGMANN, 1835, p. 241, Pl. XVIII, figs. 2–2a; STEJNEGER AND BARBOUR, 1917, p. 42.



RANGE.—Western Mexico, Lower California and extreme southern California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1863, p. 102; La Paz, Yarrow, 1882, p. 73; Santa Rosalia, Mocquard, 1899, p. 300; San Xavier, Bartolo, Van Denburgh and Slevin, 1921a, p. 54.

The collection made by the Albatross Expedition contains a single adult specimen (U. S. N. M. No. 64455) from Miraflores.

### ***Phyllodactylus unctus* (Cope)**

*Diplodactylus unctus* COPE, 1863, p. 102.

*Phyllodactylus unctus* STEJNEGER AND BARBOUR, 1917, p. 42.

RANGE.—Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1863, p. 102; Triunfo, Streets, 1877, p. 35; La Paz, Yarrow, 1882, p. 73; San José del Cabo, Miraflores, Van Denburgh, 1895, p. 86; Agua Caliente, Van Denburgh and Slevin, 1921a, p. 55.

### Key to Distinguish the Species of *Phyllodactylus* in Lower California

Small dorsal granular scales interspersed with large tubercles. . . . . *P. tuberculosus*.  
Dorsal scaling uniform. . . . . *P. unctus*.

### ***Coleonyx variegatus* (Baird)**

*Stenodactylus variegatus* BAIRD, 1858, p. 254.

*Coleonyx variegatus* STEJNEGER AND BARBOUR, 1917, p. 43.

RANGE.—Texas to California and northern Lower California.

LOWER CALIFORNIAN RECORDS.—Santa Rosalia, Mulege, Mocquard, 1899, p. 300; San Felipe, Meek, 1905, p. 4.

### ***Ctenosaura hemilopha* Cope**

*Ctenosaura hemilopha* COPE, 1863, p. 105; STEJNEGER AND BARBOUR, 1917, p. 44.

*Ctenosaura conspicuosa* DICKERSON, 1919, p. 461.<sup>1</sup>

*Ctenosaura insulana* DICKERSON, 1919, p. 462.<sup>2</sup>

RANGE.—Lower California, north to San Esteban Island, in the Gulf of California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1863, p. 105; La Paz, Yarrow, 1882, p. 71; San José del Cabo, Miraflores, Agua Caliente, Pescadero, Sierra San Lazaro, Van Denburgh, 1895, p. 88; San Pedro, Triunfo, San Antonio, San Bartolo, Buena Vista, Santiago, Todos Santos, Van Denburgh and Slevin, 1921a, p. 55.

This species was collected by the Albatross Expedition at Miraflores on the peninsula (A. M. N. H. Nos. 5665–7, U. S. N. M. Nos. 64554–6), on Cerralvo Island (A. M. N. H. No. 5568, U. S. N. M. No.

<sup>1</sup>Type: U. S. N. M. No. 64439.

<sup>2</sup>Type: U. S. N. M. No. 64440.

64553) on San Esteban Island, near Tiburon Island (A. M. N. H. No. 2278, U. S. N. M. Nos. 64439, 64551-2), and Lower California (A. M. N. H. Nos. 5639-41, 5657-8, U. S. N. M. Nos. 64440, 64557-9).

Specimens in the National Museum, collected by the Biological Survey Expedition, are from Santa Anita (U. S. N. M. Nos. 37578-9), Cape San Lucas (37580-81), and San José del Cabo (37582).

Dickerson, 1919, *loc. cit.*, has named two insular species from San Esteban and Cerralvo Islands, on the basis of this material. Upon careful examination of the types and paratypes, I am unable to maintain their validity even as insular races. The difference in proportions between the two new forms (*loc. cit.*, p. 462) appears to be due to the fact that several of the San Esteban specimens are more or less shrunken from too strong alcohol, while the Cerralvo specimens are females, consequently with somewhat stockier bodies. Furthermore, the records now available do not indicate that all of these specimens are actually from the islands to which they are ascribed by Dickerson; the localities assigned above are from the department catalogue.

The tails of the older males are nearly always more or less injured. The regenerated portion is covered with sharply keeled scales, which are, however, scarcely spinose and not arranged in whorls.

The stomach of A. M. N. H. No. 5641 was entirely filled with the flowers of a leguminous plant.

### ***Dipso-saurus dorsalis lucasensis* Van Denburgh**

*Dipso-saurus dorsalis lucasensis* VAN DENBURGH, 1920b, p. 33.

RANGE.—Cape region of Lower California.

LOWER CALIFORNIAN RECORDS.—La Paz, Cape St. Lucas, Yarrow, 1882, p. 54; San Luis Gonzales Bay, Townsend, 1890, p. 144; San José del Cabo, Magdalena Island, Comondu to San Quentin, Miraflores, Van Denburgh, 1895, p. 92; San Ignacio Mocquard, 1899, p. 301; San Pedro, Triunfo, San Bartolo, Buena Vista, Santiago, Agua Caliente, Todos Santos, Van Denburgh and Slevin, 1921a, p. 56.

Like Van Denburgh, I am unable to find any difference between Cape specimens of this species and those from Arizona, except the difference in the scales between rostral and nasal in which the sixteen specimens collected by the Albatross Expedition agree excellently with those of the California Academy of Sciences. The localities represented in the collection of the Albatross Expedition are San José del Cabo (A. M. N. H. Nos. 5552-4, 5556-7, U. S. M. N. Nos. 64543, 64547-50), Miraflores (A. M. N. H. No. 5663, U. S. N. M. Nos. 64544-6), and Santa Catalina Island (A. M. N. H. No. 5548). The specimen from

Santa Catalina Island is a juvenile one, the smallest in the series, but apparently indistinguishable from the mainland specimens.

***Dipso-saurus dorsalis dorsalis* (Baird and Girard)**

*Crotaphytus dorsalis* BAIRD AND GIRARD, 1852a, p. 126.

*Dipso-saurus dorsalis* STEJNEGER AND BARBOUR, 1917, p. 44.

RANGE.—Colorado and Mohave Deserts, east to the Colorado River, northern Lower California.

LOWER CALIFORNIAN RECORDS.—San Felipe, Meek, 1905, p. 4; San Xavier, Van Denburgh and Slevin, 1921a, p. 56.

Specimens in the Biological Survey collection from northern Lower California come from Volcano Lake (U. S. N. M. No. 37631), and San Felipe Bay (37632). I have also referred Meek's specimen from San Felipe to the typical subspecies. The area of intergradation between the two forms remains to be determined.

***Crotaphytus collaris baileyi* Stejneger**

*Crotaphytus baileyi* STEJNEGER, 1890, p. 103, Pl. XII, fig. 1.

*Crotaphytus collaris baileyi* STEJNEGER AND BARBOUR, 1917, p. 45.

RANGE.—Northern Mexico, Arizona, the Great Basin; east in southern New Mexico to southwestern Texas; west to eastern California and Lower California.

LOWER CALIFORNIAN RECORDS.—San Felipe, San Salado, Meek, 1905, p. 8; (observed at Cañon Esperanza and Trinidad by Heller); Cerro de las Palmas, Mocquard, 1899, p. 303.

Specimens in the Biological Survey collection come from Volcano Lake (U. S. N. M. No. 37625) and San Pablo (37626). The juvenile specimen from San Pablo, in the same general area as the type locality of *Crotaphytus fasciatus* Mocquard (1899, p. 303, Pl. XIII, fig. 1), is of especial interest for comparison with this form. Mocquard's specimen measured 113 mm. in length, of which the body occupied 40 mm. They are consequently of approximately the same age. The coloration of the back, black with six transverse white lines, is almost exactly the same, Mocquard's specimen having an additional white line. This coloration corresponds with that described by Cope (1900, p. 249) as the juvenile coloration of *C. collaris*. Unfortunately I have no juvenile *collaris* of comparable age at hand, but I am convinced that *fasciatus* is merely a juvenile color phase. The characters other than coloration employed by Mocquard to distinguish *C. fasciatus* are either juvenile or inconstant.

***Crotaphytus dickersonæ*,<sup>1</sup> new species**

DIAGNOSTIC CHARACTERS.—Closely related to *Crotaphytus collaris baileyi* Stejneger, from which it is distinguished by having the hind leg considerably longer than the body, a longer, more distinctly compressed tail, and slightly enlarged scales on the mid-dorsal line of the tail.

RANGE.—Known only from the type locality, Tiburon Island.

TYPE.—U. S. N. M. No. 64451, ♀, Tiburon Island; April 12, 1911, C. H. Townsend, collector (Albatross Expedition).

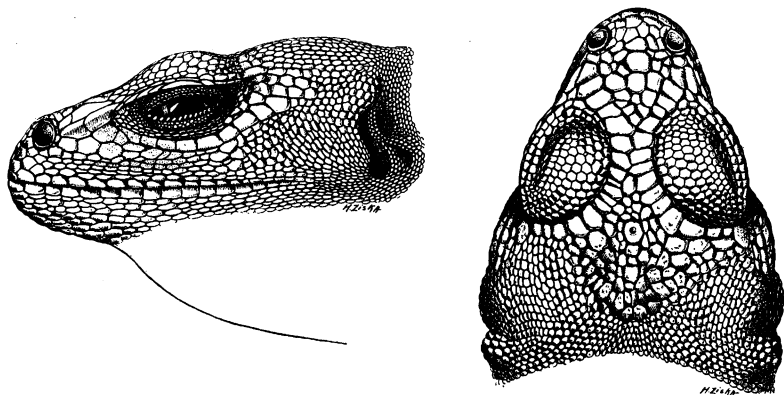


Fig. 2. Lateral and dorsal views of the head of the type of *Crotaphytus dickersonæ*, new species U. S. N. M. No. 64451, ♀.  $\times 1\frac{1}{2}$ .

**DESCRIPTION OF TYPE.**

Habitus of *Crotaphytus collaris*, but legs and tail markedly longer; hind leg reaching considerably beyond the snout when laid along the body; tail more than twice as long as the head and body. Scales of the supraorbital semicircles distinct, as in *C. collaris baileyi*; supraoculars small, occipital slightly enlarged, separated from the supraorbital semicircles by two rows of smaller scales. Auricular opening narrow, oblique, bordered in front by small tubercular scales directed away from the opening. Ventral scales very small, not one-half the size of the ventral caudals. Soles of the feet with a few keeled, tridentate, more or less mucronate scales. Tail compressed with one or two median dorsal scale rows slightly enlarged. Femoral pores 19.

Two black collars, separated by a white band, the posterior wide, complete dorsally, and ending at insertion of the arm, the anterior extending to unite on the mid-line ventrally. Dorsal surface bluish gray with broad reticulating bands of darker color. More or less regular transverse rows of small white spots. Tail with dark spots proximally. A gular patch and groin patches reddish brown.

Total length, 313 mm.; tail, 218 mm.; snout to posterior border of ear, 30 mm.; width of head, 22 mm.; hind leg, 99 mm.; tibia, 37 mm. The tail forms .70 of the total length.

<sup>1</sup>Named for Miss Mary C. Dickerson, former Curator of the Department of Herpetology of The American Museum of Natural History.

The single specimen in the collection is a gravid female, considerably injured in collecting. The stomach contents consist of a ground beetle, a large wasp, and the tail of a lizard.

I have compared the type with a series of nineteen *C. collaris baileyi* in The American Museum of Natural History. In these, the average proportion of hind leg to body length is .87, while in the present specimen it is 1.04. The tail length in the series of *C. c. baileyi* averages .66 of the total, .70 in the type of *C. dickersonæ*.

It is possible that this species will be found to extend on the Mexican mainland and that it will ultimately be referred to a subspecific rank under *C. collaris*, occupying the southern portion of the range of the species on the western coast of Mexico.

***Crotaphytus insularis* Van Denburgh and Slevin**

*Crotaphytus insularis* VAN DENBURGH AND SLEVIN, 1921b, p. 96.

RANGE.—Angel de la Guardia Island.

***Crotaphytus wislizenii* Baird and Girard**

*Crotaphytus wislizenii* BAIRD AND GIRARD, 1852b, p. 340, Pl. III; STEJNEGER AND BARBOUR, 1917, p. 46.

*Crotaphytus copeii* YARROW, 1882a, p. 441; STEJNEGER AND BARBOUR, 1917, p. 45.

RANGE.—Idaho, the Great Basin, southward into Mexico, southern California and Lower California.

LOWER CALIFORNIAN RECORDS.—La Paz, Yarrow, 1882a, p. 441; Magdalena Island, Van Denburgh, 1895, p. 93; San Tomas, 1896, p. 1004; San Quentin, Meek, 1905, p. 8; Cedros Island, Van Denburgh and Slevin, 1914, p. 144; Tiburon Island, Dickerson, 1917, p. 96.

Specimens in the Biological Survey collection come from Ensenada (U. S. N. M. No. 37629) and Yubay (37630). The record from Ensenada extends the range of this species northward on the Pacific coast of Lower California, the nearest previous record being Santo Tomas. The record from Yubay, in the central part of the peninsula, fills a gap in the known distribution, connecting the Cedros Island record with those to the north and south.

I have followed Van Denburgh (1905, p. 25) in regarding the Lower Californian *Crotaphytus* of this type as *C. wislizenii*. The specimens secured by the Albatross Expedition in 1911, one each on Cedros and Tiburon Islands, are certainly insufficient to establish the validity of *C. copeii*, much less of insular races, in view of the great variability of typical *wislizenii*. Larger series from the peninsula may reestablish *C. copeii*, and I append the measurements of the two insular specimens for reference.

Number	A. M. N. H. No. 5544	U. S. N. M. No. 64464
Locality	Cedros Island	Tiburón Island
Sex	♂	♂
Length	358 mm.	377 mm.
Tail	239 mm.	266 mm.
Length of Head	32 mm.	30 mm.
Breadth of Head	23 mm.	21 mm.
Hind Leg	88 mm.	93 mm.
Tibia	33 mm.	34 mm.

Key to Distinguish the Species of *Crotaphytus* in Lower California  
 Interorbital scales in two rows; a series of subequal suboculars. . *C. collaris baileyi*.  
 Interorbital scales in three or four series, a single much enlarged subocular.

*C. wislizenii*.

### **Sauromalus ater** Duméril

Plate L, Figure 3

*Sauromalus ater* DUMÉRIL, 1856, p. 536, Pl. XXIII, fig. 3.

*Sauromalus* sp. STEJNEGER, 1891b, p. 411.

*Sauromalus interbrachialis* DICKERSON, 1919, p. 463.<sup>1</sup>

RANGE.—Lower California, north to the island Espiritu Santo, off La Paz.

LOWER CALIFORNIAN RECORDS.—Island of Espiritu Santo, Stejneger, 1891, p. 411.

Two specimens of *Sauromalus* from La Paz are included in the collections of the Albatross Expedition. These are possibly from the island of Espiritu Santo, off La Paz, like the specimen recorded by Yarrow and Stejneger.

In defining *Sauromalus hispidus* in 1891, Stejneger remarked the discrepancy between the *Sauromalus ater* of California and Arizona and the single immature specimen from Lower California. With two additional specimens from the same locality, I believe the recognition of a distinct species is fully warranted. Mr. Charles L. Camp has pointed out to me the fact that it is highly improbable that the type of *S. ater* Duméril, collected by Lieut. Jaurès during the circumnavigating voyage of the frigate Danaide, and presented without locality to the Museum d'Histoire Naturelle in Paris, could have been collected in California or Arizona, since *Sauromalus* does not reach the coast of California. With this in mind, I applied to Professor Louis Roule, of the Museum d'Histoire Naturelle in Paris, for information regarding the type of *ater*, and he has very kindly supplied me with an excellent photograph of the ventral aspect of the type. The ventral scales from anus to gular fold number about 135, compared with a range of 160–182 in the California

<sup>1</sup>Type: U. S. N. M. No. 64443.

and Arizona specimens described by Stejneger. In the two specimens from La Paz in the Albatross collection (U. S. N. M. No. 64443, A. M. N. H. No. 6808), the ventral scales number 126 and 133, and in the specimen from Espiritu Santo already mentioned (U. S. N. M. No. 12633) they number 139.

In view of this agreement in the ventral scale character, I believe we are justified in assigning the name *ater* definitely to the species in southern Lower California.

	U. S. N. M.	A. M. N. H.	U. S. N. M.
Number	64443	6808	12633
Locality	La Paz	La Paz	Espiritu Santo Id.
Total Length	250 mm.	153 mm.	280 mm.
Tail Length	130 mm.	85 mm.	165 mm.
Femoral Pores	14-14	14-14	15-15
Dorsal Scales in Head Length	32	28	26
Ventral Scales from Gular Fold to Anus	133	126	139
Scales about Thickest Part of Tail	60	40	..

### ***Sauromalus obesus* (Baird)**

*Euphyne obesa* BAIRD, 1858, p. 253.

*Sauromalus ater* STEJNEGER AND BARBOUR, 1917, p. 46.

RANGE.—Southern Nevada, southwestern Utah, Arizona, southern California, and northern Lower California, south to Mulege on the Gulf side.

LOWER CALIFORNIAN RECORDS.—Santa Agueda, San Ignacio, Mulege, Mocquard, 1899, p. 302; "Northern Lower California," Meek, 1905, p. 9.

The application of the name *ater* to the Lower Californian species releases Baird's name *obesus*, type locality Fort Yuma, Arizona, for the form occurring in the United States. Dr. Roule has kindly included a photograph of the ventral surface of one of the specimens recorded by Mocquard from the middle of the gulf side of the peninsula of Lower California with the photograph of the type of *ater*. The ventral scale count, 160, agrees closely with that of the series described by Stejneger (*loc. cit.*).

### ***Sauromalus varius* Dickerson**

#### Plate XLIX

*Sauromalus varius* DICKERSON, 1919, p. 464.<sup>1</sup>

RANGE.—Known only from the type locality, San Esteban Island, to which it is doubtless confined.

<sup>1</sup>Type: U. S. N. M. No. 64441. Paratypes: U. S. N. M. Nos. 64560-71, A. M. N. H. Nos. 2701 5610-20, 5625-32, 5634-5, 5637-8.

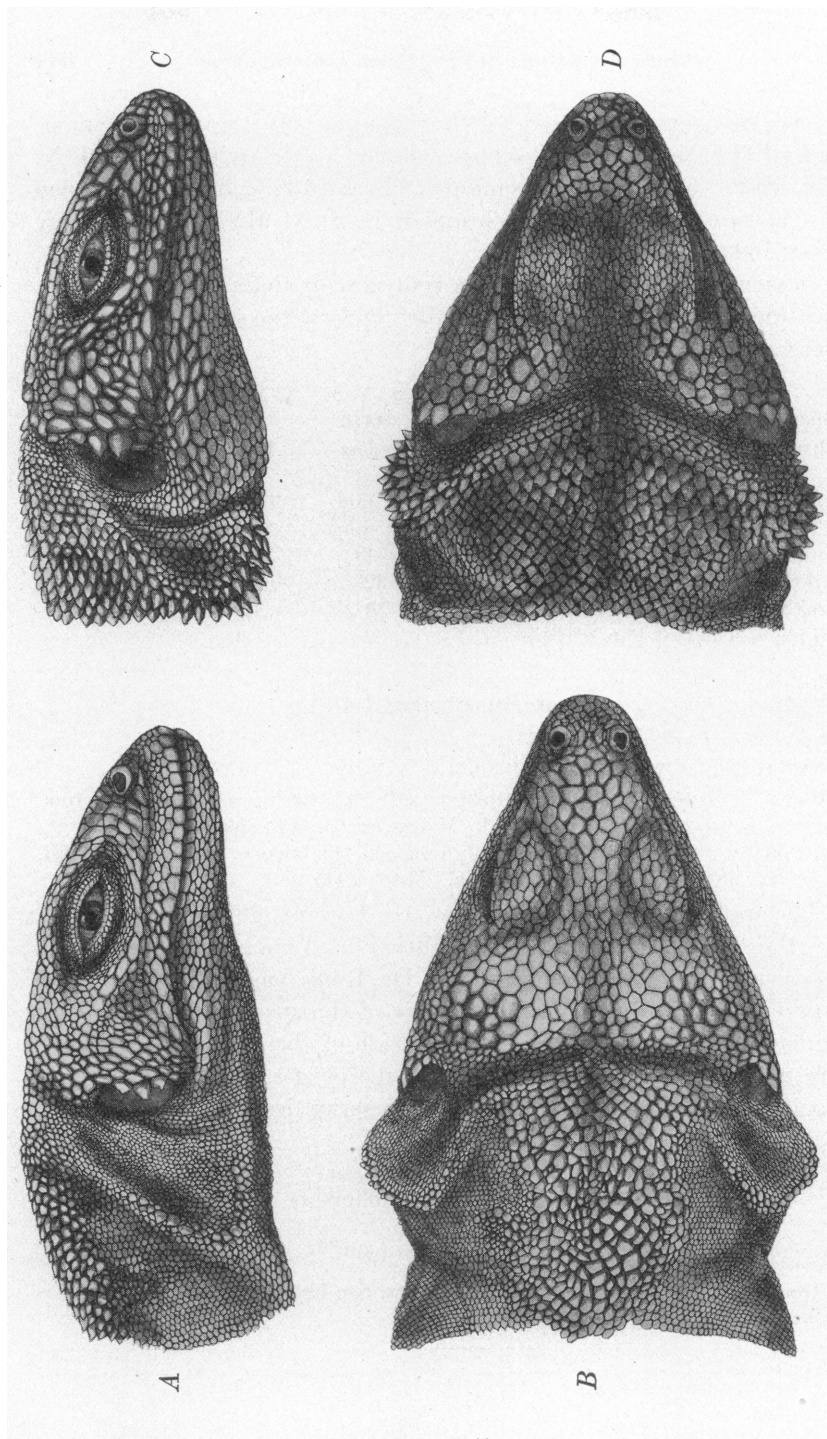


Fig. 3. A and B, lateral and dorsal views of the head and neck of *Sauromalus varius* Dickerson, A. M. N. H. No. 5630.  $\times 1\frac{1}{2}$ . C and D, lateral and dorsal views of the type of *Sauromalus townsendi* Dickerson, U. S. N. M. No. 64442.  $\times 1\frac{1}{2}$ .



The Albatross Expedition in 1911 secured forty-one specimens of this large lizard from San Esteban. Comparison with *S. hispidus* from Angel de la Guardia, *S. ater* from the peninsula, and *S. obesus* from California proves that it is quite as distinct a species as *S. hispidus*. From *S. obesus* it is distinguished by the distinctly smaller auricular spines and the smaller number of ventral scales, from *S. ater* by the large size and coloration, while from *S. townsendi* and *S. hispidus*, it is readily distinguished by the non-spinose nuchals.

In coloration the species is strikingly distinct from the much darker adults of *obesus* and *hispidus*. I have no large specimens of *S. ater* and *S. townsendi* but neither of these species shows any trace of the blotching of *S. varius*. The dorsal dark patches take on most irregular shapes and arrangements, never symmetrical, sometimes ill-defined, sometimes rather sharply set off from the ground color. Ventrally, the color is yellowish with a few small dark spots. Even on the tail the arrangement of the dark color is not symmetrical, as in juvenile *hispidus*.

The Albatross Expedition visited San Esteban Island on April 13, 1911. Large numbers of the big spotted lizards of this species, as well as of *Ctenosaura hemilopha*, were conspicuous, and were secured by pulling them out from under the rocks where they took refuge, or by turning over the rocks.

Dr. J. N. Rose, who was a member of the party, has kindly identified the stomach contents of three specimens. He writes: "The contents of two stomachs are entirely made up of the flowers of *Pachycereus pringlei* Britton and Rose. The third stomach is also largely filled with this cactus flower, but also contains numerous small leaflets of some leguminous plants, probably some *Cercidium*."

Measurements and scale characters of fifteen specimens of this species may be tabulated as follows.

	EXTREMES	AVERAGE
Total Length	465-615 mm.	513 mm.
Tail-Length	245-335 mm.	280 mm.
Tail-Length/Total Length	.53-.60	.55
Femoral Pores	15-19	
Dorsal Scales in Head Length	35-41	37
Ventral Scales from Gular Fold to Anus	136-151	142
Scales Around Thickest Part of Tail	69-76	72

#### ***Sauromalus townsendi* Dickerson**

*Sauromalus townsendi* DICKERSON, 1919, p. 464.<sup>1</sup>

RANGE.—Tiburon Island; coast of Sonora?

<sup>1</sup>Type: U. S. N. M. No. 64442.

This species is founded on a unique specimen collected by the Albatross Expedition on Tiburon Island, April 11-13, 1911. It is in several respects intermediate between *S. obesus* and *S. hispidus*, but fully distinct from both. The nuchals and scales of the gular pouches are much larger and more spinose than in *S. obesus* of the same size, but much less spinose than in *S. hispidus*, while the dorsal scales are not appreciably spinose. The number of ventral scales from gular fold to anus is 125, which allies it to *hispidus* and distinguishes it from *obesus*. The number of scales around the thickest part of the tail is 60, not 90 as in the original description. It is interesting that the species on Tiburon Island should be sharply distinguished from that on San Esteban, only a few miles away. Belding (1893, p. 97) records seeing *Sauromalus* at Guaymas, on the Mexican mainland, not far south of Tiburon and it is not unlikely that this will be found to be *Sauromalus townsendi*.

Dr. J. N. Rose has kindly identified the stomach contents of this specimen as made up chiefly of *Fouquieria splendens* Engelm and leaflets of the desert shrub *Olneya tesota* Gray.

***Sauromalus hispidus* Stejneger**

Plate L, Figures 1 and 2

*Sauromalus hispidus* STEJNEGER, 1891b, p. 409; STEJNEGER AND BARBOUR, 1917, p. 46.

RANGE.—Angel de la Guardia Island, Gulf of California.

Fourteen specimens of this species were secured by the Albatross Expedition (A. M. N. H. Nos. 2696-97, 5566-67, 5607-09, 5705, and U. S. N. M. Nos. 64572-77).

This species equals the San Esteban *Sauromalus varius* in size, the maximum in the series collected by the Albatross Expedition of 1911 being 608 mm., (615 in *S. varius*). The adults in alcohol are very dark in color, differing strikingly in this respect from the *S. varius*. It is difficult to see how even a large capacity for color change in life could lessen the distinction in this respect between the two species.

Juvenile specimens (150 mm.) are light gray in color, with four dark crossbands on the back and six on the tail, those on the tail being most sharply defined. In this coloration, the young *hispidus* agree with juvenile *S. obesus*.

Measurements and scale characters of specimens of *S. hispidus* in The American Museum of Natural History:

	NUMBER OF SPECIMENS	EXTREMES	AVERAGE
Total Length	9	435-608 mm.	526 mm.
Tail Length	9	230-318 mm.	280 mm.
Tail Length/Total Length	13	.50-.54	.52
Femoral Pores	13	12-16	
Dorsal Scales in Head Length	13	15-23	18
Ventral Scales from Gular Fold to Anus	13	113-122	117
Scales Around Thickest Part of Tail	12	39-50	45

### Key to the Species of the Genus *Sauromalus*

1. Nuchals distinctly spinose.....2.  
Nuchals not distinctly spinose.....3.
2. Largest nuchals about equal to auricular spines; dorsal scales in head length, 16.  
*S. hispidus*.  
Largest nuchals about one-half the length of auricular spines; dorsal scales in head length, 28.....*S. townsendi*.
3. Ventral scales from gular fold to anus more than 155.....*S. obesus*.  
Ventral scales from gular fold to anus less than 155.....4.
4. Dorsal scales in head length 26-32; adult size under 400 mm.....*S. ater*.  
Dorsal scales in head length 35-41; adult size over 500 mm.....*S. varius*.

### *Callisaurus crinitus* Cope

Plate LI, Figure 1; Plate LII, Figures 1 and 3

*Callisaurus crinitus* COPE, 1896a, p. 1049; STEJNEGER AND BARBOUR, 1917, p. 47.

RANGE.—Balenas Bay and San Bartolome Bay, Pacific Coast of Lower California, to the Magdalena Plain.

LOWER CALIFORNIAN RECORDS.—Balenas Bay, Cope, 1889, p. 147.

This exceptionally interesting species was taken by the Albatross Expedition at Abrejos Point (A. M. N. H. No. 5390), not far from the type locality, and at San Bartolome Bay, some distance to the north (A. M. N. H. Nos. 5369-71, 5501-2, 5504, U. S. N. M. No. 64530).

In the series at hand, one male (U. S. N. M. No. 64530) has three lateroventral bars on both sides, followed by a large and distinct spot on one side, which is less distinct on the other side; two males (A. M. N. H. Nos. 5371, 5502) have three bars on each side, the posterior ones being prolonged caudad from its ventral angles; in A. M. N. H. No. 5501, there are three bars followed by a spot on one side, while on the other side the middle bar forks slightly below the lateral fold, so that there appears to be four bars followed by a spot; in A. M. N. H. No. 5369, the middle bar forks in the other direction, i.e., it is single ventrally and divides on the side. The latter condition appears in A. M. N. H. Nos. 5502 and 5371, but the division is concealed by the lateral fold.

Two specimens, one of each sex, in the Biological Survey collection from Santo Domingo (U. S. N. M. Nos. 37644, 37646) greatly extend the range of this species which has hitherto been known only from the type locality, Ballenas Bay, and San Bartolome Bay (Albatross collection). The occurrence of a species characteristic of the Vizcaino Desert district on the Magdalena Plain adds to the evidence that the latter is faunally more closely allied to the Vizcaino area than to the Cape district proper, as I have elsewhere indicated.

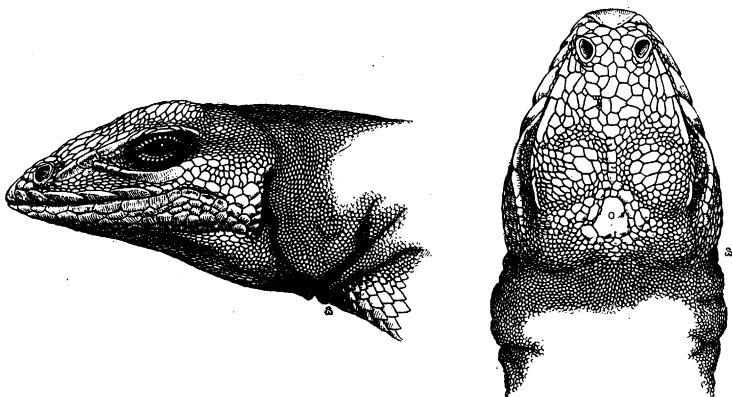


Fig. 4. Lateral and dorsal views of the head of *Callisaurus crinitus* Cope, U. S. N. M. No. 64530.  $\times 2$ .

In the male specimen from Santo Domingo the fringes of the toes appear to be less strongly developed than in specimens from San Bartolome Bay, but the specimen shows signs of having been subjected to friction, and the points of some of the fringe scales are broken off. There are four lateroventral bands on one side, three on the other. The female specimen has the fringe scales well developed.

### ***Callisaurus draconoides* Blainville**

Plate LI, Figures 1 to 3

*Callisaurus draconoides* BLAINVILLE, 1835, p. 286, Pl. XXIV, fig. 2; STEJNEGER AND BARBOUR, 1917, p. 47.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Baird, 1859*a*, p. 299; La Paz, Yarrow, 1882, p. 50; San José del Cabo, Sierra San Lazarro, Van Denburgh, 1895, p. 95; San Ignacio, Santa Rosalia, Mocquard, 1899, p. 305; Todos Santos, Miraflores, Agua Caliente, Buena Vista, San Bartolo, San Antonio, Triunfo, San Pedro, Van Denburgh and Slevin, 1921*a*, p. 57.

Thirteen specimens of this species were collected by the Albatross Expedition in 1911, from the following localities: Cape San Lucas (U. S. N. M. Nos. 64514-8); San José del Cabo (A. M. N. H. Nos. 5392-95); and Miraflores (A. M. N. H. Nos. 5391, 5659-60, U. S. N. M. No. 64519).

Specimens in the Biological Survey collection come from Cape San Lucas (U. S. N. M. No. 37637), Espiritu Santo Island (37638), and La Paz (37634).

The specimens from San Ignacio and Santa Rosalia recorded by Mocquard (*loc. cit.*) are north of the established range of this species, but the fact that he mentions three ventral spots makes it fairly certain that he had true *draconoides* before him.

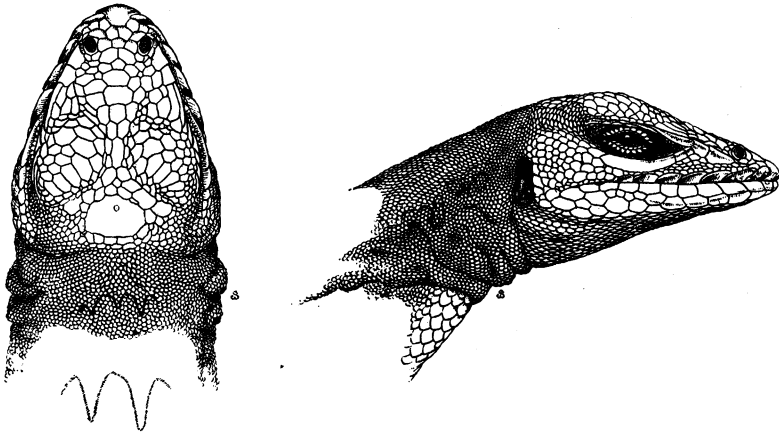


Fig. 5. Lateral and dorsal views of the head of *Callisaurus draconoides* Blainville, U. S. N. M. No. 64514.  $\times 2.4$ .

The presence of a black spot posterior to the two lateroventral black bars is a conspicuous difference between *C. draconoides* and the other species of the genus, and is invariable in the series before me; the dorsal bars are often confluent, forming continuous wavy transverse markings.

### ***Callisaurus splendidus* Dickerson**

Plate LI, Figure 1

*Callisaurus draconoides* (part) TOWNSEND, 1890, p. 144.

*Callisaurus splendidus* DICKERSON, 1919, p. 467.

RANGE.—Angel de la Guardia, Gulf of California.

The Albatross Expedition of 1911 collected eight specimens of a *Callisaurus* on Angel de la Guardia Island (A. M. N. H. Nos. 5338, 5342, 5373-75, 5396, 6807, U. S. N. M. No. 64254 (Type)).

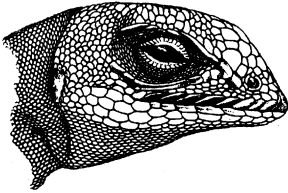


Fig. 6. Lateral view of the head of *Callisaurus splendidus* Dickerson, A. M. N. H. No. 5373.  $\times 2$ .

The distinctness of this species rests primarily on the convex frontal region of the head, which is accompanied by an enlargement of the scales in the same area, and the low number of femoral pores. The tail is rather short, ranging from .54 to .56 of the total, mean .55. The length of the hind leg is moderate, ranging from .86 to .98 of the length from snout to vent, mean .92. The occipital is in contact with the supraorbital semicircles in seven out of eight specimens.

***Callisaurus ventralis inusitatus* (Dickerson)**

Plate LI, Figure 1; Plate LII, Figure 2

*Callisaurus inusitatus* DICKERSON, 1919, p. 465.<sup>1</sup>

*Callisaurus ventralis ventralis* (part) STEJNEGER AND BARBCUR, 1917, p. 47.

RANGE.—Tiburon Island and adjacent part of Sonora, Mexico.

Twenty-nine specimens of a species of *Callisaurus* were collected on Tiburon Island by the Albatross Expedition.

In spite of the fact that I have no actual intergrades between this form and the Arizonan *C. ventralis*, the nature of the characters used to distinguish it from *ventralis ventralis* on one hand and *ventralis gabbii* on the other is such that I prefer to give it subspecific rank.

The series before me is rather strikingly different from *C. ventralis ventralis* in habitus, being much more slender bodied and longer limbed. This character does not appear in its real value in a tabulation of measurements, *C. ventralis ventralis* with the same length of body and tail being much heavier. The length of the hind leg is variable but averages much longer than in the Arizonan specimens, while the femoral pores, averaging 18, distinguish it from the form in southern California and Lower California (*C. ventralis gabbii*).

The character of the union of the black lateroventral bands inferiorly in the males is invariable in the present series.

***Callisaurus ventralis gabbii* Cope**

Plate LI, Figure 1

*Callisaurus ventralis gabbii* COPE, 1900, p. 272.

*Callisaurus plasticus* DICKERSON, 1919, p. 466.<sup>2</sup>

*Callisaurus carmenensis* DICKERSON, 1919, p. 465.<sup>3</sup>

<sup>1</sup>Type: U. S. N. M. No. 64256. Paratypes: U. S. N. M. Nos. 64520-29, A. M. N. H. Nos. 5317-19, 5322, 5325-37, 5346.

<sup>2</sup>Type: U. S. N. M. No. 64255. Paratypes: U. S. N. M. Nos. 64531-42; A. M. N. H. Nos. 5308-14, 5346-48, 5350-54, 5357-60, 5381-87.

<sup>3</sup>Type: U. S. N. M. No. 64253.

*Callisaurus ventralis ventralis* (part) STEJNEGER AND BARBOUR, 1917, p. 47.

RANGE.—Lower California from La Paz north to the deserts of southern California and adjacent areas in Arizona.

LOWER CALIFORNIAN RECORDS.—San Luis Gonzales Bay, Townsend, 1890, p. 144; El Llano de Santano, San Ignacio, Santa Margarita Island, Van Denburgh, 1895, p. 97; San Fernando, Seven Wells (Salton River), Gardner's Laguna (Colorado Desert), Cope, 1900, p. 273; Trinidad, San Matias, San Felipe, Cañon Esperanza, San Antonio, Matomi, and Aguas Escondita, Meek, 1905, p. 7; San José Island, Carmen Island, Agua Verde Bay, Conception Bay, Mulege, San Francisquito Bay, Dickerson, 1919, pp. 465–66; San Xavier, Van Denburgh and Slevin, 1921a, p. 57.

Specimens in the Biological Survey collection come from Alamo (U. S. N. M. No. 37642), Rancho San Antonio (37640–1), Volcano Lake (37647–9), Cocopah Mts., east base (37650–1), San Felipe Bay (37635–6), San Francisquito (37639), San Ignacio (37643), and Santo Domingo, Magdalena Plain (37645).

With the northern Lower Californian specimens collected by Heller and recorded by Meek (*loc. cit.*) before me in addition to those of the Biological Survey collection, I am unable to find any adequate character by which they could be distinguished from the peninsular specimens described by Dickerson as *C. plasticus*. An examination of the measurements of all the Lower Californian specimens at hand indicates that they are not distinguishable; the results of the tabulation may be condensed as follows.

Locality	No. of Spec.	Tail Total Length		Hind Leg Body		Femoral Pores	Occipital and Supraorbital Semicircles	
		Ex- tremes	Mean	Ex- tremes	Mean		In Con- tact	Sep- arate
Northern Lower California (Heller Coll.)	18	.56–.60	.58	.85–1.00	.94	15.1	1	17
Middle Lower California San Francisquito Bay to Conception Bay	25	.58–.63	.59	.85–.97	.92	14.8	9	16
Southern Lower California, Carmen Id. to San José Id.	23	.57–.65	.60	.86–1.01	.94	15.1	2	12

If the above conclusions are correct, i.e., that a single subspecies of *C. ventralis* extends from Yuma, Arizona, to La Paz, Lower California, it seems preferable to introduce the name *gabbii* in spite of the very inadequate description of Cope in 1900. Cope had specimens from northern Lower California (the type locality) before him, at least the National Museum specimens above mentioned and probably also the original specimens collected by Gabb on which his manuscript name in 1875 was based.

I do not find any characters in the type and paratype of *C. carmenensis* which warrant its distinction from *C. gabbii*.

In seventy-eight specimens from Tucson, I find a mean tail-length of .54 of the total, and the length of the hind leg .86 of that of the body, the average of femoral pores higher (17.4) and the proportion of specimens with the occipital separated from the supraorbital semicircles a minority, instead of a majority, as in the Lower Californian series.

Turning to the description of *C. ventralis myurus* (Richardson, 1915, p. 408), I find that he has compared the proportionate tail-length in *myurus* from Pyramid Lake, Nevada, with the tail-length of a series of *ventralis* from Yuma, Arizona, and San Diego County, California, with an average of .55 for the former and .58 for the latter. (I have transposed his figures for body/tail to tail/body and tail, for comparison with mine.) It will be seen that the Yuma specimens agree with the Lower Californian ones, while *myurus* has a tail of practically the same length as Tucson *ventralis*, from which it is distinguished, therefore, chiefly by the lower number of femoral pores. As the type locality of *ventralis* is "New Mexico west of the Rio Grande" (including Arizona in 1852), I believe I am justified in regarding the Tucson specimens as typical *ventralis*, distinct from the form at Yuma.

Additional evidence on this question is furnished by the character of the occipital, which may be more or less broadly in contact with the supraorbitals or separated from them by a row of scales. In our series of *C. v. gabbii* as above defined, twelve specimens have the supraorbitals in contact with the occipital and forty-three have an intercalated row of scales. In the seventy specimens examined from Tucson, the proportions are reversed, fifty-one specimens having the supraorbitals and occipital in contact, while nineteen have them separated. Dr. Stejneger has kindly examined a series of specimens in the National Museum from west of the mouth of the Colorado River in this respect, and states that out of fifty-seven specimens, seventeen have the supraorbitals and the occipital in contact, six have them in contact on one side, separated on the other,



and thirty-four have them separated by a row of scales. The general conclusion, therefore, is that the range of *C. v. gabbii* should include the desert areas of southern California and of Arizona west of Tucson.

In the larger series of specimens reported by Van Denburgh (1921, p. 33) the notable difference in tail-length between the series from Yuma and the other Arizonan specimens confirms this conclusion. In his table, however, the specimens from Cavecreek, Maricopa County, are indistinguishable from *myurus*. It is evident, therefore, that further study is required to establish the limits of *ventralis* and *myurus*. The range of variation in the characters above discussed is shown in the following tabulation for the several forms of *Callisaurus*.

	Tail			Hind Leg			Femoral		Occipital and	
	Total Length			Body Length			Pores		Supraorbital Semicircles	
	No. Spec.	Ex-tremes	Mean	No. Spec.	Ex-tremes	Mean	No. Spec.	Mean	In Contact	Separated
<i>Callisaurus</i>										
<i>ventralis gabbii</i>	116	.55-.65	.59	64	.85-1.01	.93	116	15.5	27	77
<i>ventralis ventralis</i>	70	.51-.56	.54	70	.78-.95	.86	78	17.4	51	19
<i>ventralis myurus</i>	53	.54-.58	.55				53	14.2		
<i>ventralis inusitatus</i>	15	.56-.59	.57	29	.88-1.04	.96	29	18.0	16	13
<i>splendidus</i>	8	.54-.56	.55	8	.86-.98	.92	8	12.2	7	1
<i>draconoides</i>	16	.49-.59	.54	16	.82-.97	.89	16	15.1	13	3
<i>crinitus</i>	9	.55-.58	.56	9	.83-.93	.86	9	19.0	2	4

### ***Uma notata* Baird**

#### Plate LIII

*Uma notata* BAIRD, 1858, p. 253.

*Callisaurus notatus* STEJNEGER AND BARBOUR, 1917, p. 47.

RANGE.—Deserts of southern California and northeastern Lower California.

LOWER CALIFORNIAN RECORDS.—Gardner's Laguna, Cope, 1900, p. 281; Laguna Salada, 80 mi. south of Mexicali, Van Denburgh and Slevin, 1921a, p. 56.

While *Uma* (of which I recognize only a single species) is unquestionably more closely allied to *Callisaurus* than to any other iguanid genus, I do not believe that it is directly allied to *Callisaurus crinitus*, nor that the occurrence of digital fringes in *crinitus* necessitates the reference of *Uma notata* to *Callisaurus*.

*Uma* is distinguished from all of the species of *Callisaurus* by its unique dorsal color pattern and structurally by the presence of an inter-

calated row of small subdigital scales between the fringe and the subdigital lamellæ proper. The accompanying figures illustrate these characters of the digits in *Uma notata*, *Callisaurus crinitus* and *Callisaurus ventralis*. It seems evident that *crinitus* is much more closely allied to *ventralis* than to *Uma notata*, and that the development of the fringe has been independent in the two forms.

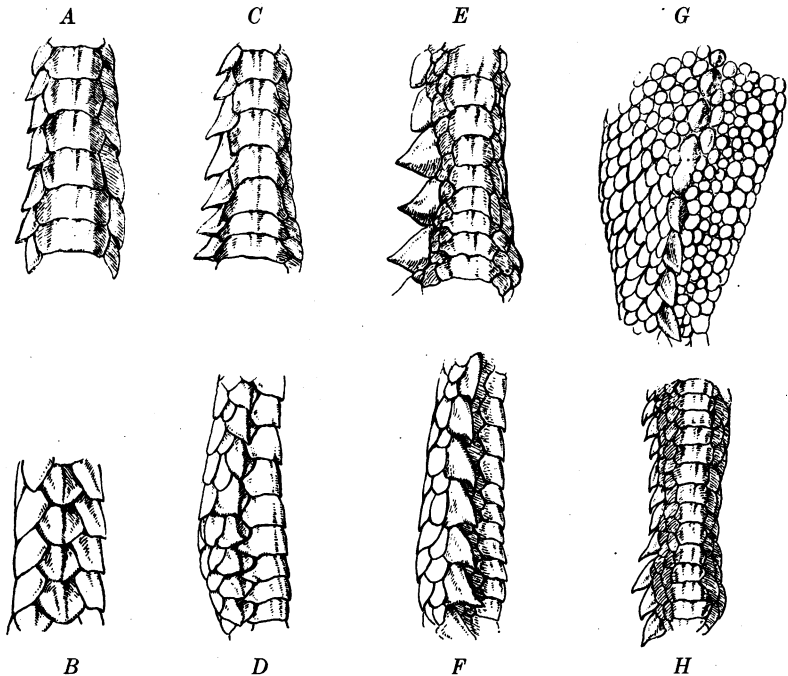


Fig. 7. A and B, ventral and posterior lateral views of the base of the fourth toe of *Callisaurus ventralis ventralis* (A. M. N. H. No. 2454). C and D, same of *Callisaurus crinitus* (U. S. N. M. No. 64530). E and F, same of *Uma notata*, Field Mus. No. 1203. G, posterior lateral surface of foot between base of fourth and fifth toes, showing extension of the fringe scales and transition to smooth scales of same specimen. H, distal joint of third toe, showing narrowness of the ventral lamellæ and insertion of a double row of small scales between them and the fringe scales, same specimen. All  $\times 6.6$ .

### Key to the Species of *Callisaurus* and *Uma*

1. Digits with or without a lateral fringe; subdigital scales broad, in a single row; coloration not ocellated. . . . . *Callisaurus*.—2.
- Digits with a long lateral fringe; subdigital scales in more than one row; dorsal coloration ocellated. (A single species, *Uma notata*; deserts of southern California and adjacent parts of Arizona.) . . . . . *Uma*.

2. Digits with a lateral fringe of long spinose scales. (Pacific Coast of Lower California.).....*C. crinitus*.  
Digits not fringed.....3.
3. Lateroventral black spots, 3; dorsal spots more or less united into a scalloped crossband. (Confined to Cape District of Lower California.) *C. draconoides*.  
Lateroventral spots, 2; dorsal spots more widely separated.....4.
4. Frontal region of head strongly convex; femoral pores usually 12. (Angel de la Guardia Island, Gulf of California.).....*C. splendidus*.  
Frontal region of head plane or nearly so; femoral pores more than 12 (average).  
*C. ventralis*.—5.
5. Lateroventral black spots confluent at their lower extremities; body very slender; femoral pores (average) 18; hind leg averaging .96 of body length; tail .57 of total. (Tiburon Island and Sonora, Mexico.)  
*C. ventralis inusitatus*.  
Lateroventral bars always distinct.....6.
6. Femoral pores (average) 14; tail length (average) .55. (Pyramid Lake, Nevada).....*C. ventralis myurus*.  
Femoral pores (average) more than 14.....7.
7. Femoral pores (average) 17 or more; tail length averages .54; hind leg averages .86. (Central Arizona; border of the Plateau.).....*C. ventralis ventralis*.  
Femoral pores average less than 17; tail length averages .58 or more; hind leg averages .92 or more. (Lower California from La Paz north; the Colorado Desert.).....*C. ventralis gabbii*.

### ***Uta thalassina* Cope**

*Uta thalassina* COPE, 1863, p. 104; STEJNEGER AND BARBOUR, 1917, p. 52.

*Uta repens* VAN DENBURGH, 1895, p. 102; Pl. VII-VIII, figs. a-e.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1863, p. 104; La Paz, Yarrow, 1882, p. 54; Playitas, San Lazaro, Belding, 1887, p. 96; San José del Cabo, San Bartolome, Corral de Piedras (Sierra El Taste), Miraflores, Sierra San Lazaro, Comondu, Van Denburgh, 1895, p. 99; Mulege, Mocquard, 1899, p. 311. San Xavier, Triunfo, San Bartolo, Agua Caliente, Sierra Laguna, Van Denburgh and Slevin, 1921a, p. 57.

The Albatross Expedition collected six specimens of this species at San Bernardo Mountain, Lower California (A. M. N. H. Nos. 5547, 5650-51, 5653-54, U. S. N. M. No. 64485).

*Uta repens* Van Denburgh was based on a single specimen, distinguished from *Uta thalassina* by (1) shorter hind leg, (2) shorter head, and (3) four dorsal black bars instead of three, followed by three dusky bars. In the typical coloration of *Uta thalassina*, there are three distinct anterior black bars on the back, followed by two dusky ones. The anterior bars are outlined with very light greenish gray, leaving a darker interspace between the true bars, which may approach them in depth of pigmentation; the two posterior bars are less distinctly outlined, but in

one specimen I am able to trace the pattern of five primary crossbars (three black and two dusky), with four secondary bars on the interspaces. In other specimens, only the anterior secondary bars are evident, making seven crossbands, as in the type of *U. repens*. The length of the hind leg, when compared with that of the body from snout to anus, varies from .58 to .73 (ten specimens). In the type of *repens*, the ratio is .60, and in one of the specimens of *thalassina*, whose measurements are given by Van Denburgh, it is likewise .60. The length of the head in *repens* is .31 of that of the body, .23-.27 in the available *thalassin*as. In view of these facts, I do not think that *U. repens* can be maintained.

### ***Uta mearnsi* Stejneger**

*Uta mearnsi* STEJNEGER, 1894a, p. 589; STEJNEGER AND BARBOUR, 1917, p. 50.

RANGE.—Boundary region of Lower California and California.

LOWER CALIFORNIAN RECORDS.—“Seventy-five miles south-east of San Diego,” Lockington, 1880, p. 295 (=Ensenada, Todos Santos Bay, *vide* Stejneger, 1894a, p. 591); Santa Rosalia, Mocquard, 1899, p. 308; San Salado, San Matias, Cañon Esperanza, Parral, Matomi, Meek 1905, p. 9.

Specimens in the Biological Survey collection come from La Provi-dencia Cañon, east base of San Pedro Martir Mts., (U. S. N. M. Nos. 37627-8).

The specimen (Acad. Nat. Sci. Phila., No. 12644, Cope collection) recorded by Lockington as *U. thalassina* is a typical *Uta mearnsi*. It is interesting that a specimen of so distinct a species should have passed through Cope's hands and remained undescribed.

In two specimens of this species with a reproduced tail (in the collection of the Field Museum) the tail is as long as, or slightly longer than, the normal tail.

### ***Uta stansburiana stejnegeri* Schmidt**

*Uta stansburiana elegans* (part) STEJNEGER AND BARBOUR, 1917, p. 52.

*Uta stansburiana stejnegeri* SCHMIDT, 1921, p. 1.

RANGE.—Western Texas and northern Mexico through New Mexico and Arizona to the coast range in California; northeastern Lower California; Angel de la Guardia Island, Gulf of California.

LOWER CALIFORNIAN RECORDS.—San Matias, Cañon Esperanza, Agua de las Fresas, San Felipe, Parral, and Matomi, Meek, 1905, p. 10.

A specimen in the National Museum (U. S. N. M. No. 37689), from Volcano Lake, northeastern Lower California, is a typical *stejnegeri*. A single immature specimen in the Albatross collection (U. S. N. M. No. 64487), from Angel de la Guardia Island, where a distinct form might be expected, resembles *stejnegeri* in scales and leg length. It is probable

that some of the specimens recorded by Meek, and here assigned to this species on geographical grounds, may be intergrades between *stejnegeri* and *hesperis*. Two specimens in the Academy of Natural Sciences of Philadelphia, collected by S. N. Rhoads in the Cocopah Mountains, northeastern Lower California, represent this form (A. N. S. P. Nos. 16102, 16106).

***Uta stansburiana hesperis* Richardson**

*Uta stansburiana hesperis* RICHARDSON, 1915, p. 415. STEJNEGER AND BARBOUR, 1917, p. 52.

*Uta parva* DICKERSON, 1919, p. 471.<sup>1</sup>

RANGE.—Coastal region of southern California and Lower California, south to San Bartolome Bay.

LOWER CALIFORNIAN RECORDS.—San Bartolome Bay, Townsend, 1890, p. 144; Todos Santos Bay, Lockington, 1880, p. 295; Guadalupe to Colnett, San Tomas to Guadalupe, Van Denburgh, 1895, p. 105; San Rafael, San Telmo, foothills of San Martir Mt., Van Denburgh, 1896, p. 1004; El Alamo, Hanson's Lagoon, San Salado Cañon, Trinidad, San Antonio, Santa Rosa, and San Quentin, Meek, 1905, p. 10; Ensenada, Van Denburgh and Slevin, 1921a, p. 59.

The Albatross collection contains six specimens from San Bartolome Bay on which *Uta parva* is based. I am unable to find any characters sufficient to distinguish this series from *hesperis*. The length of hind leg, given in the original description as 42 mm. (for the type), is in error for 32. A. M. N. H. No. 5431 measures 48 mm. from snout to anus, which is not appreciably different from the average size of *hesperis*. The keeling of the posterior femorals distinguishes it slightly from *concinna*.

***Uta martinensis* Van Denburgh**

*Uta martinensis* VAN DENBURGH, 1905, p. 18, Pl. VI; STEJNEGER AND BARBOUR, 1917, p. 50.

RANGE.—San Martin Island, off the Pacific coast of Lower California.

The only characters which distinguish this species from *Uta stansburiana hesperis* are the considerably larger size and the slightly larger scales. The type of *martinensis* measured 62 mm. from snout to anus, while the maximum body length recorded for *hesperis* by Richardson is 53 mm.

***Uta concinna* Dickerson**

*Uta concinna* DICKERSON, 1919, p. 470.<sup>2</sup>

RANGE.—Cedros Island and Natividad Island, off Pacific coast of Lower California.

<sup>1</sup>Type: U. S. N. M. No. 64258.

<sup>2</sup>Type: U. S. N. M. No. 64257. Paratypes: U. S. N. M. Nos. 64489-93; A. M. N. H. Nos. 5399-407, 5410

*Uta concinna* was based on sixteen specimens collected on Cedros Island by the Albatross Expedition. Three specimens from Natividad Island, between Cedros and the mainland, in the U. S. National Museum, have also been examined.

The dorsal scales from a point opposite the posterior surface of the thigh to the occipital average 92 in eight male specimens, ranging from 85 to 97. The difference from *Uta stansburiana hesperis* is slight, though the dorsal scales are slightly larger and slightly smoother and the posterior femorals are more weakly keeled in *concinna*. The two latter characters distinguish it also from *stejnegeri*.

***Uta palmeri* Stejneger**

*Uta palmeri* STEJNEGER, 1890, p. 106; STEJNEGER AND BARBOUR, 1917, p. 51.

RANGE.—San Pedro Martir Island, Gulf of California.

***Uta stellata* Van Denburgh**

*Uta stellata* VAN DENBURGH, 1905, p. 21, Pl. VIII; STEJNEGER AND BARBOUR, 1917, p. 52.

RANGE.—San Benito Islands, off the Pacific coast of Lower California.

The Albatross Expedition collected seven specimens (A. M. N. H. Nos. 5414–5418, 5420, U. S. N. M. No. 64486) on East and West San Benito. These agree excellently with the original description of Van Denburgh. The dorsal scales from the occipital to rump number from 110 to 125 in the specimens examined. The femoral pores in the large series recorded by Van Denburgh and Slevin (*loc. cit.*) average 15.

***Uta squamata* Dickerson**

*Uta squamata* DICKERSON, 1919, p. 471.<sup>1</sup>

RANGE.—Santa Catalina Island, Gulf of California.

The series of six specimens collected by the Albatross Expedition, on which this species is based, is excellently preserved. The species is a very distinct one, though directly allied to *Uta elegans* of the peninsula. The dorsal scales from the occipital to the base of the tail range from 70 to 78. The length of the hind leg divided by that of the body averages .79, in which respect *squamata* is the only species of the *stansburiana* group approaching *elegans*.

***Uta elegans* Yarrow**

*Uta elegans* YARROW, 1882a, p. 442.

*Uta stansburiana elegans* (part) STEJNEGER AND BARBOUR, 1917, p. 52.

*Uta mannophorus* DICKERSON, 1919, p. 470.<sup>2</sup>

<sup>1</sup>Type: U. S. N. M. No. 64259.

<sup>2</sup>Type: U. S. N. M. No. 64260.

RANGE.—Southern Lower California, north at least to Francisquito Bay.

LOWER CALIFORNIAN RECORDS.—La Paz, Yarrow, 1882*a*, p. 442; Cape St. Lucas, Yarrow, 1882, p. 57; Carmen Island, Townsend, 1890, p. 144; San José del Cabo, Espiritu Santo Island, Van Denburgh, 1895, p. 105. Santa Rosalia and San Ignacio, Mocquard, 1899, p. 306; Buena Vista, Todos Santos, Van Denburgh and Slevin, 1921*a*, p. 59.

The Albatross collections contain a sufficient series of specimens to establish the validity of this species definitely. The localities represented are: Magdalena (U. S. N. M. No. 64511); Cape San Lucas (U. S. N. M. Nos. 64512–13); San José del Cabo (U. S. N. M. No. 64505); Pichilínque Bay (A. M. N. H. Nos. 5459, 5461, U. S. N. M. Nos. 64506–10); San José Island (5439); Agua Verde Bay (5449); Carmen Island (5440–46, 5448, U. S. N. M. No. 64260); and Francisquito Bay (5452–53). In addition a fine series from Espiritu Santo Island, opposite La Paz, has been kindly loaned for study by the U. S. National Museum.

The number of dorsal scales from rump to occipital ranges from 82 to 106, the average of twenty specimens being 91. The femoral pores average 14.5 (twenty-one specimens). The most satisfactory character distinguishing the series at hand from Arizonan and New Mexican specimens is the notably greater length of the hind leg. In eighteen male specimens, this ranges from .74 to .85 of the body length, while in the northern series, the range is .65 to .79, average .71, in twenty-four male specimens examined. The average given by Richardson, who includes four specimens from southern Lower California, is .74 for twenty-three specimens.

*Uta mannophorus* Dickerson agrees with *elegans* in scale counts and length of hind leg; the color characters on which it is based are so closely approached in specimens of *U. elegans* and so ill defined in some paratypes of *mannophorus* that I do not think it can be maintained even as an insular race.

Van Denburgh and Slevin (1921*a*, p. 59) note the difference in habitat between *Uta elegans* in Lower California and the subspecies of *U. stansburiana* to the north. *Uta elegans* frequents the coast and was not found inland.

#### ***Uta nolascentis* Van Denburgh and Slevin**

*Uta nolascentis* VAN DENBURGH AND SLEVIN, 1921*c*, p. 395.

RANGE.—San Pedro Nolasco Island, Gulf of California.

#### ***Uta microscutata* Van Denburgh**

*Uta microscutata* VAN DENBURGH, 1894, p. 298; STEJNEGER AND BARBOUR, 1917, p. 50.

*Uta stansburiana* MOCQUARD, 1899, p. 306.

RANGE.—Lower California south to San José, Gulf of California.

LOWER CALIFORNIAN RECORDS.—San Pedro Martir Mts., northern Lower California, Van Denburgh, 1894, p. 298; San José Island, Gulf of California, Van Denburgh, 1895, p. 106; Santa Rosalia, San Ignacio, and Mulege, Mocquard, 1899, p. 306; San Salado Cañon, San Matias, Cañon Esperanza, Parral, San Quentin, and Rosarito, Meek, 1905, p. 10; San Xavier, Van Denburgh and Slevin, 1921*a*, p. 59.

The Albatross collection contains two specimens, one of each sex, (A. M. N. H. No. 5451, U. S. N. M. No. 64488), from Castro Rancho, Pt. Conception. The male specimen has the frontal more elongate and transversely divided, but is in every other character identical with the female, which has the normal single frontal of the species. It is evident that the specimens referred to *Uta stansburiana* by Mocquard belong to this species, since they are said to have very small dorsal scales and the frontal entire.

#### ***Uta nigricauda* Cope**

*Uta nigricauda* COPE, 1864, p. 176; STEJNEGER AND BARBOUR, 1917, p. 51.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1864, p. 176; La Paz, Yarrow, 1882, pp. 55, 56; Magdalena Island, San José del Cabo, Miraflores, and Sierra San Lazaro, Van Denburgh, 1895, p. 108; Todos Santos, Agua Caliente, Santiago, San Antonio, Triunfo, San Pedro, foothills of the Sierra Laguna, Van Denburgh and Slevin, 1921*a*, p. 58.

The Albatross collection contains thirty-five specimens of this species representing the following localities: Cape San Lucas (A. M. N. H. No. 5438); San Bernardo Mts. (A. M. N. H. Nos. 5471–72; U. S. N. M. No. 64494); Miraflores (A. M. N. H. Nos. 5466, 5563, 5676–91, U. S. N. M. Nos. 64495–504); Pichilique Bay (A. M. N. H. No. 5454); and the island of Espiritu Santo, opposite La Paz, (A. M. N. H. Nos. 5463–64).

Four specimens have a divided frontal. The dorsal scaling is highly variable, on one hand approaching *Uta microscutata*, while in the other direction the enlarged dorsals are as distinct as in *Uta ornata* or *graciosa*. Thus, in A. M. N. H. No. 5690, there are only four rows of prominently enlarged dorsals; normally, there are six to eight enlarged rows; and exceptionally, the dorsals are little enlarged and pass more gradually into the smaller laterals.

#### ***Uta ornata symmetrica* Baird**

*Uta symmetrica* BAIRD, 1858, p. 253.

*Uta symmetrica* (part) STEJNEGER AND BARBOUR, 1917, p. 52.

*Uta ornata symmetrica* SCHMIDT, 1921*a*, p. 6.

RANGE.—Valley of the Colorado River and adjacent areas of the Colorado Desert.



This form is represented in the collections of the Academy of Natural Sciences of Philadelphia by two specimens (A. N. S. P. Nos. 16103-4), collected in the Cocopah Mountains of northeastern Lower California by S. N. Rhoads.

***Uta auriculata* Cope**

*Uta auriculata* COPE, 1871, p. 303; STEJNEGER AND BARBOUR, 1917, p. 49.

RANGE.—Socorro Island, Revilla Gigedo Islands, to which it is confined.

***Uta clarionensis* Townsend**

*Uta clarionensis* TOWNSEND, 1890, p. 143; STEJNEGER AND BARBOUR, 1917, p. 50.

RANGE.—Clarion Island, Revilla Gigedo Islands, to which it is confined.

***Uta graciosa* (Hallowell)**

*Uro-saurus graciosus* HALLOWELL, 1854, p. 92.

*Uta graciosa* STEJNEGER AND BARBOUR, 1917, p. 50.

RANGE.—Southern Nevada, southeastern California, southwestern Arizona, and northeastern Lower California.

LOWER CALIFORNIAN RECORDS.—Santa Rosalia, Mocquard, 1899, p. 307; San Felipe, Meek, 1905, p. 10; Laguna Salada, 80 mi. south of Mexicali, Van Denburgh and Slevin, 1921a, p. 58.

Mocquard's identifications are not wholly reliable (see above under *Uta microscutata*) but, on analogy with *Sauromalus obesus* and *Callisaurus ventralis gabbii*, *Uta graciosa* might be expected as far south as Santa Rosalia.

**Key to the Species of *Uta* in Lower California and Adjacent Islands**

1. Dorsal granules very small, perfectly smooth; enlarged supraoculars in more than one row.....2.
- Dorsal granules less than 40 in the length of the head, at least faintly keeled posteriorly; enlarged supraoculars in one row.....3.
2. Caudal scales small, smooth. (Southern Lower California.).....*thalassina*.
- Caudal scales large, keeled, spinose. (Northern Lower California.).....*earnsi*.
3. Dorsal scales nearly uniform, graduated into the smaller laterals.....4.
- Dorsal scales with a few median rows abruptly enlarged.....13.
4. Frontal entire.....5.
- Frontal transversely divided.....6.
5. Dorsal scales very small, about 35 in head length. (Northern Lower California.).....*microscutata*.
- Dorsal scales larger, a broad band of enlarged scales down the back. (Southern Lower California.).....*nigricauda*.
6. Gular scales about 40; femoral pores 17. (San Pedro Martir Island, Gulf of California.).....*palmeri*.
- Gular scales less than 35; femoral pores less than 17.....7

7. Hind leg short, .71 to .72 of the body length; dorsal scales very weakly keeled, very small (average 115 from rump to occipitals). (San Benito Islands, off Pacific Coast of Lower California.) . . . . . *stellata*.  
Hind leg more than .72 of the body length; dorsal scales sharply keeled, larger. . . . . 8.
8. Dorsal scales largest in the group, 70-78 from occiput to rump; hind leg .79 of the body length; femoral pores average 15. (Santa Catalina Island, Gulf of California.) . . . . . *squamata*.  
Dorsal scales average more than 80. . . . . 9.
9. Hind leg averages .80 of the body length. (Southern Lower California.) . *elegans*.  
Hind leg averages .74 to .75 of the body length. . . . . 10.
10. Dorsal scales average about 86. (Southeastern California to western Texas and adjacent areas in Mexico; Angel de la Guardia Island.) . . . . .  
*stansburiana stejnegeri*.  
Dorsal scales average more than 90. . . . . 11.
11. Size large, snout to anus 62 mm. (San Martin Island, off Pacific Coast of Lower California.) . . . . . *martinensis*.  
Smaller, rarely exceeding 50 mm. in body length. . . . . 12.
12. Dorsal scales strongly keeled, average about 100; posterior femorals strongly keeled. (Southwestern California, San Joaquin Valley, and northwestern Lower California.) . . . . . *stansburiana hesperis*.  
Dorsal scales weakly keeled, average about 92; posterior femorals weakly keeled. (Cedros and Natividad Islands, off Pacific Coast of Lower California.) . . . . . *concinna*.
13. Frontal transversely divided. . . . . 14.  
Frontal entire. (Southern Lower California.) . . . . . *nigricauda*.
14. Enlarged dorsal scales nearly uniform, with no series of small scales on vertebral line; tail long, about two-thirds of total. (Southern Nevada, southeastern California, and southwestern Arizona.) . . . . . *graciosa*.  
One or more vertebral series of small scales. . . . . 15.
15. No tubercular scales forming a well defined dorsolateral line; enlarged dorsals nearly smooth; upper posterior scales on thigh smooth. (Socorro Island, Revilla Gigedo Islands.) . . . . . *auriculata*.  
A well-defined dorsolateral row of tubercles. . . . . 16.
16. Enlarged dorsals beginning on the nape; dorsolateral tubercles very large, close set. (Clarion Island, Revilla Gigedo Islands.) . . . . . *clarionensis*.  
Enlarged dorsals beginning on the shoulders, dorsolateral tubercles smaller and more widely spaced. (The Colorado Desert.) . . . . . *ornata symmetrica*.

*Uta nolascentis* is not entered in the above key, information on its "key characters" being insufficient. It should apparently be placed next to *Uta stansburiana stejnegeri*.

### **Sceloporus occidentalis bi-seriatus** Hallowell

*Sceloporus bi-seriatus* HALLOWELL, 1854, p. 93.

*Sceloporus occidentalis bi-seriatus* STEJNEGER AND BARBOUR, 1917, p. 55.

RANGE.—The Great Basin, south to Texas and California.

LOWER CALIFORNIAN RECORDS.—San Pedro Martir Mt., and Valladares, Van Denburgh, 1895, p. 114; between Ensenada and San Rafael Valley, and San Telmo, Van Denburgh, 1896, p. 1005; Santo Tomas and Los Encinos, Meek, 1905, p. 11 (Heller's notes); Ensenada, Van Denburgh and Slevin, 1921a, p. 59.

Specimens in the Biological Survey collection come from Hanson Laguna (U. S. N. M. No. 37674) and Ojos Negros (37677-8).

**Sceloporus graciosus vandenburgianus** Cope

*Sceloporus vandenburgianus* COPE, 1896, p. 834.

*Sceloporus graciosus vandenburgianus* STEJNEGER AND BARBOUR, 1917, p. 54.

RANGE.—Mountain ranges south of Ventura County, California, into northern Lower California.

LOWER CALIFORNIAN RECORDS.—San Pedro Martir Mt., Van Denburgh, 1895, p. 114; Agua de las Fresas, Vallecitos, and La Grulla, Meek, 1905, p. 11.

A specimen in the Biological Survey collection comes from La Grulla (U. S. N. M. No. 37673).

**Sceloporus magister** Hallowell

*Sceloporus magister* HALLOWELL, 1854, p. 93; STEJNEGER AND BARBOUR, 1917, p. 55.

RANGE.—Southern Nevada, southwestern Utah, southeastern California, southwestern Arizona, northwestern Lower California.

LOWER CALIFORNIAN RECORDS.—Gardner's Laguna, Salton River, Cope, 1900, p. 361.

Specimens in the Biological Survey collection come from Volcano Lake (U. S. N. M. Nos. 37659-60), Cocopah Mts., east base (37663), and San Felipe Bay (37664).

**Sceloporus rufidorsum** Yarrow

*Sceloporus rufidorsum* YARROW, 1882a, p. 442; VAN DENBURGH AND SLEVIN, 1921a, p. 60.

RANGE.—Northwestern Lower California to Cedros Island.

LOWER CALIFORNIAN RECORDS.—75 miles S. E. of San Diego, Lockington, 1880, p. 295; San Quentin Bay and Cedros Island, Yarrow, 1882a, p. 442; San José, Matomi, Rosarito, and San Quentin, Meek, 1905, p. 11; Ensenada, Van Denburgh and Slevin, 1921a, p. 60.

Specimens in the Biological Survey collection come from Ensenada (U. S. N. M. Nos. 37661-2).

Three specimens of this species from Cedros Island (A. M. N. H. Nos. 5474, 5476, U. S. N. M. No. 64473) bear out the remarks of Van Denburgh (*loc. cit.*) in distinguishing *rufidorsum* from *zosteromus*, especially in the presence of a broad mid-dorsal rufous band and similar indistinct dorsolateral lines, and in the larger size as compared with *zosteromus* from the Cape Region.

**Sceloporus zosteromus** Cope

*Sceloporus zosteromus* COPE, 1863, p. 105; STEJNEGER AND BARBOUR, 1917, p. 57.

RANGE.—Southern and central Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1863, p. 105; La Paz, Yarrow, 1882a, p. 442; San Pablo, Magdalena Island, Santa Margarita Island,

San José Island, Miraflores and San José del Cabo, Van Denburgh, 1895, p. 110; Mulege and San Ignacio, Mocquard, 1899, p. 313; Todos Santos, Agua Caliente, Buena Vista, San Antonio and San Pedro, Van Denburgh and Slevin, 1921a, p. 60.

Specimens in the Biological Survey collection come from San Ignacio (U. S. N. M. Nos. 37666-9), Santa Anita (37671), and Cape San Lucas (37672).

Twelve specimens of this species were secured in the Cape Region of Lower California by the Albatross Expedition. The localities represented are: Cape San Lucas (A. M. N. H. Nos. 5437, 5473); San José del Cabo (U. S. N. M. Nos. 64468-71); Miraflores (5484, 5489, U. S. N. M. Nos. 64466-7); Espiritu Santo Island (5486).

#### ***Sceloporus lineatulus* Dickerson**

*Sceloporus lineatulus* DICKERSON, 1919, p. 467.<sup>1</sup>

RANGE.—Santa Catalina Island, Gulf of California.

Two specimens collected by the Albatross Expedition on Santa Catalina Island were distinguished from *S. zosteromus* by Dickerson on the basis chiefly of the strongly lineate lateral scales. In this character, the single paratype (A. M. N. H. No. 5477) agrees excellently with the type, each scale bearing two sharply defined brown lines, which combine to form very irregular, curved lines extending from the black throat patch nearly as far back as the groin. This specimen measures 96 mm. from snout to vent, thus considerably exceeding the average for the peninsular *zosteromus*. The ventral color in both specimens is dark blue without the broad light mid-ventral band common in *S. zosteromus*. I do not find any distinctive characters in addition to size and coloration, and Van Denburgh and Slevin (1921, p. 60) refer to lineate lateral scales as a character of adult male *zosteromus*. I prefer, however, to maintain *lineatulus* as distinct until further evidence bearing on the question is available.

#### ***Sceloporus monserratensis* Van Denburgh and Slevin**

*Sceloporus monserratensis* VAN DENBURGH AND SLEVIN, 1921c, p. 396.

RANGE.—Monserrate Island, Gulf of California.

#### ***Sceloporus orcutti* Stejneger**

*Sceloporus orcutti* STEJNEGER, 1893, p. 181, Pl. I, fig. 4; STEJNEGER AND BARBOUR, 1917, p. 56.

RANGE.—Northern Lower California and southern California.

LOWER CALIFORNIAN RECORDS.—San Rafael Valley, Wasson's Ranch (in San Rafael Valley), between Ensenada and Rafael Valley, and in the foothills of the San Pedro Martir Mts., Van Denburgh, 1896, p. 1005; Nochogüero Valley near U. S.

<sup>1</sup>Type: U. S. N. M. No. 64263.

boundary, Cope, 1900, p. 356; San Salado Cañon, Trinidad, San Matias, Agua de la Fresas, Cañon Esperanza, Parral, Matomi, Rosarito, San Antonio, and Los Encinos, Meek, 1905, p. 11; San Xavier, Van Denburgh and Slevin, 1921a, p. 61.

Specimens in the Biological Survey collection come from Ojos Negros (U. S. N. M. Nos. 37675-6) and Rancho San Antonio (37665).

### ***Sceloporus licki* Van Denburgh**

*Sceloporus licki* VAN DENBURGH, 1895, p. 110, Pl. x;

STEJNEGER AND BARBOUR, 1917, p. 54.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—San José del Cabo, Corral de Piedras (Sierra El Taste), Miraflores, and Sierra San Lazaro, Van Denburgh, 1895, p. 114; San Antonio, Todos Santos, Guamuchil Ranch, Cape San Lucas, Agua Caliente, San Bartolo, Triunfo, and La Paz, Van Denburgh and Slevin, 1921a, p. 61.

The Albatross Expedition contains six specimens referable to this species; the localities represented are Miraflores, (A. M. N. H. Nos. 5564, 5669, 5702, U. S. N. M. No. 64472); San Bernardo Mts., (5487); and Espiritu Santo Island, (5485).

A specimen in the Biological Survey collection comes from Espiritu Santo Island (U. S. N. M. No. 37670).

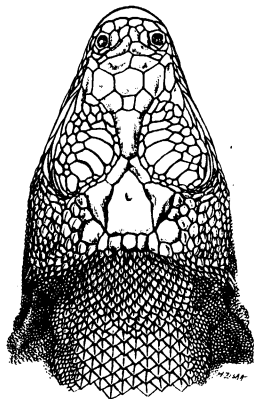


Fig. 8. Dorsal view of the head of the type of *Sator grandævus* Dickerson, U. S. N. M. No. 64261.

### Key to the Species of *Sceloporus* in Lower California

1. Enlarged supraoculars separated from the parietal and frontoparietal scales by a semicircle of small scales. . . . . 2.
- Enlarged supraoculars in contact with the parietals and frontoparietals. . . . . 3.
2. Dorsal scales small, 45-66 on middle of back from occipital to base of tail; scales on back of thigh smooth. . . . . *S. graciosus vandenburgianus*.
- Dorsal scales larger, 35-46, scales on back of thigh keeled; males with a blue patch on center of throat. . . . . *S. occidentalis biseriatus*.
3. Dorsal scales shortly mucronate, the central point scarcely extending beyond the lateral; no black patch in front of shoulder. . . . . *S. orcutti*.
- Dorsal scales sharply mucronate; a black patch in front of shoulder. . . . . 4.
4. Femoral pores usually less than 14, average 12 on each side. . . . . *S. magister*.
- Femoral pores usually more than 14, average 16 or more. . . . . 5.
5. Dorsal scales from occipital to base of tail more than 30 (32-38). . . . . *S. licki*.
- Dorsal scales 30 or less (28-30). . . . . 6.
6. Femoral pores fewer, average 16.6; back with mid-dorsal and dorsolateral light bands. . . . . *S. rufidorsum*.
- Femoral pores more numerous, average 18.5; dorsolateral and mid-dorsal bands not evident. . . . . *S. zosteromus*.

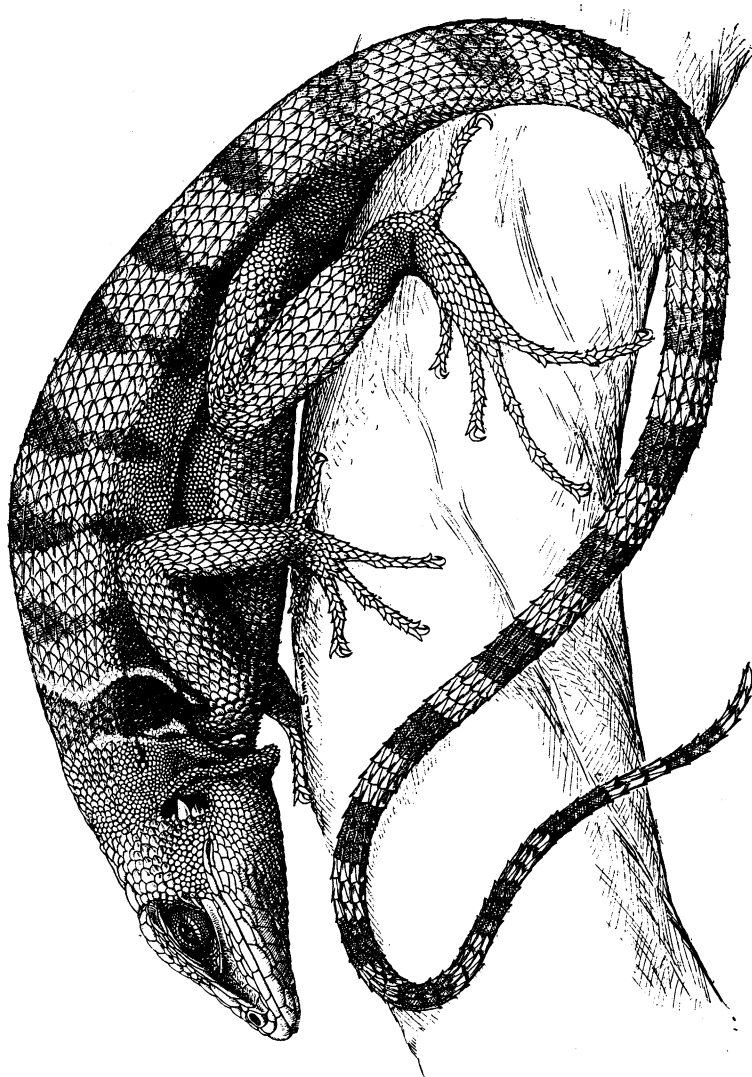


Fig. 9. *Sator grandaeus* Dickerson, A. M. N. H. No. 5492.

***Sator grandævus* Dickerson**

*Sator grandævus* DICKERSON, 1919, p. 469.<sup>1</sup>

RANGE.—Cerralvo Island, Gulf of California.

This species and the following are certainly closely related to *Sceloporus* through *S. utiformis* of the Coliman region in Mexico and are much more closely allied to *Sceloporus* than to *Uta*. The development of the gular fold and the rudiment of a collar illustrate excellently an intermediate stage between *Sceloporus* with differentiated dorsal and lateral scales and a *Uta* of the *Uta nigricauda* type; but it is not at all necessary to assume that *Sator* is the direct representative of the ancestral *Utas*, which I believe to have been very different from *Sceloporus*. The gular fold being more strongly developed than in *Uta*, and the collar less developed, it may well be that both are parallel structures and that the species of *Sator* have arisen independently from a *Sceloporus* stock related to *S. utiformis*. The three genera *Sceloporus*, *Sator*, and *Uta* form a group of North American iguanid genera much like that formed by *Callisaurus*, *Uma* and *Holbrookia*.

The distribution of the two insular species of *Sator*, on widely separated islands off the Gulf coast of the peninsula, suggests that the genus must formerly have inhabited the mainland of the peninsula, where it is now almost certainly extinct.

***Sator angustus* Dickerson**

*Sator angustus* DICKERSON, 1919, p. 469.<sup>2</sup>

RANGE.—Santa Cruz Island, Gulf of California.

The measurements of the type of this species are, unfortunately, placed after those of *Sator grandævus* in the original description. The anterior gular folds in this species is much more definitely marked by differentiation of the scales than it is in *grandævus*. In the latter, the fold is marked by an abrupt transition in size of the gular scales, which are about twice as wide behind the fold as the scales in the series anterior to it. In *angustus*, a double row of granular scales, much smaller than those on the fold, crosses the throat immediately behind the fold, which thus becomes very similar to the collar of other genera, but is not a homologous structure. In *Sator grandævus*, there is a distinct lateral invasion of granules in the position of the posterior gular fold, i.e., an incipient collar homologous with the collar of *Uta*. In *angustus*, there

<sup>1</sup>Type: U. S. N. M. No. 64261.

<sup>2</sup>Type: U. S. N. M. No. 64262. Paratypes: U. S. N. M. Nos. 64474-78; A. M. N. H. Nos. 5713-16, 5719, 5722.

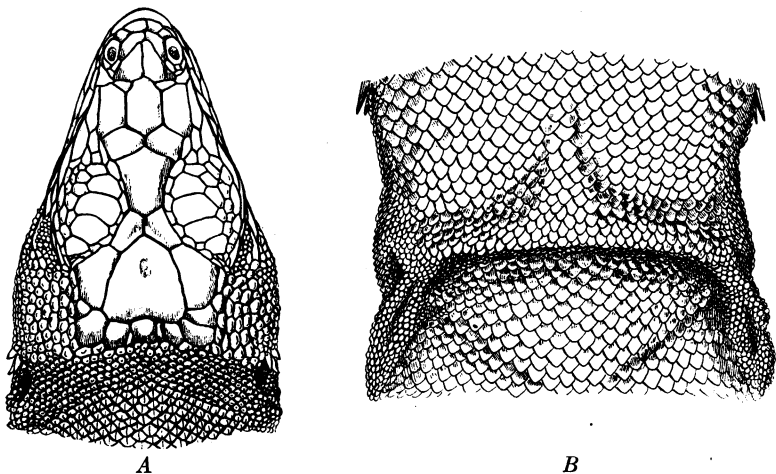


Fig. 10. A, Dorsal view of head of *Sator angustus* Dickerson, A. M. N. H. No. 5716.  $\times 2.5$   
 B, Throat of type of *Sator angustus*, to show differentiation of scales at the gular fold. U. S. N. M. No. 64262.  $\times 3$ .

is no trace of the posterior fold or incipient collar, and the better development of the anterior fold may be correlated with this fact.

### ***Phrynosoma blainvillii blainvillii* Gray**

Plate LIV, Figure 2

*Phrynosoma blainvillii* GRAY, 1839, p. 96, Pl. XXIX, fig. 1; STEJNEGER AND BARBOUR, 1917, p. 57.

*Phrynosoma blainvillii blainvillii* GRINNELL AND CAMP, 1917, p. 164.

RANGE.—Southwestern California and northwestern Lower California.

LOWER CALIFORNIAN RECORDS.—Valladares, Van Denburgh, 1895, p. 118; Ensenada, San Telmo, Wasson's Ranch in San Rafael Valley, Van Denburgh, 1896, p. 1005; Nochogüero Valley, United States boundary, Cope, 1900, p. 427; San Salado and Trinidad, Meek, 1905, p. 12; Ensenada, Van Denburgh and Slevin, 1921a, p. 62.

A specimen in the Biological Survey collection comes from Ojos Negros (U. S. N. M. No. 37583).

### ***Phrynosoma nelsoni*,<sup>1</sup> new species**

Plate LIV, Figure 3

*Phrynosoma coronatum* (non Blainville) MEEK, 1905, p. 12.

DIAGNOSTIC CHARACTERS.—Two lateral fringes of elongate scales; enlarged gulars present; nostrils on the canthus rostralis; ventral scales smooth; temporal and occipital horns well developed; a large subtrical spine, followed by a postrical; tympanum nearly concealed by folds of the neck; closely allied to *P. blainvillii blainvillii*, from which it is distinguished by the smaller and rugose scales of the top of the head, the fewer enlarged dorsal scales, and the larger and more strongly keeled scales of the vertebral line.

<sup>1</sup>Named for Dr. Edward W. Nelson, Chief, Bureau of Biological Survey, United States Department of Agriculture, whose explorations in Lower California make this name especially appropriate.



RANGE.—Known only from the type locality.

TYPE.—U. S. N. M. No. 37585; ♀; San Quintin, Lower California; E. W. Nelson and A. E. Goldman; August 15, 1905. (Biological Survey Collection.)

DESCRIPTION OF TYPE.—Habitus stout, apparently wider in proportion to length than *P. blainvillii*; tail round; tympanum nearly concealed by the folds of the neck; nostril just below the canthus rostralis; superciliary region expanded; a series of four temporal spines, the last largest and nearly equalling the occipital; two strong occipital spines with a smaller median spine nearly in line with them; all somewhat grooved basally; scales of front very rugose, much smaller than in *b. blainvillii*, larger than those of *b. frontale*; no connecting ridge between the superciliary angles; a transverse series of four conical spines in front of the occipitals; six infralabials, the fifth largest, the last (very small) beneath the anterior side of the subtrical; a strong subtrical above the line of the infralabial spines, followed by a smaller, pointed spine (the postrical) in the line of the infralabials; two lateral groups of spines on the neck; three rows of enlarged gulars on each side; eight or ten irregular rows of large keeled scales on the back, continuing as a lateral and a dorsolateral series on the tail; vertebral line covered with enlarged, flat, keeled scales; strong spinose scales on the thighs, two well-marked series of elongate lateral scales forming a double marginal fringe; ventral scales flat, smooth; femoral pores 15–16.

Grayish above, with four pairs of obscure transverse brown blotches on the back, corresponding in position to the larger of the enlarged dorsal scales; two brown crossbands on base of tail; venter grayish, spotted with brown posteriorly.

MEASUREMENTS OF TYPE.—Total length, 127 mm.; body, 87 mm.; tail, 40 mm.; foreleg, 38 mm.; hind leg, 51 mm.; snout to tip of temporal horn, 29 mm.; greatest width of head (between tips of third temporal horns), 31 mm.

NOTES ON PARATYPES.—The smaller male paratype, U. S. N. M. No. 37584, from the same locality, has a narrower body, and only five infralabials, but agrees in essential characters with the type. A third specimen in the series before me, Field Museum No. 1127, a female, recorded by Meek as *P. coronatum* (*loc. cit.*), thus recognizing its distinctness from *P. blainvillii*, has the tympanum completely concealed by the neck folds. The measurements of the two paratypes are as follows:

Number	U. S. N. M. No. 37584	F. M. No. 1127
Total Length	110 mm.	122 mm.
Length of Body	73 "	88 "
Length of Tail	37 "	34 "
Length of Foreleg	34 "	38 "
Length of Hind Leg	43 "	51 "
Greatest Width of Head	27 "	31 "

I have no doubt that this species is fully distinct from *P. blainvillii*, which is unquestionably the most closely allied species. Its relationship with *P. blainvillii frontale*, shown in the rugosity of the frontal scales, appears to be closer than with the typical subspecies, although the range of the latter is inserted between that of *nelsoni* and *frontale*. From *frontale* it is distinguished by the larger frontal scales and the keeled scales of the vertebral line. *Phrynosoma coronatum* has much

larger scales on the frontal region of the head, a more fully exposed tympanum, stronger and much more divergent occipital spines, and is immediately distinguishable from *nelsoni* by the absence of a postrictal spine.

***Phrynosoma schmidti* Barbour**

*Phrynosoma schmidti* BARBOUR, 1921, Proc. New England Zool. Club, VII, p. 113.

RANGE.—Confined to Cedros Island.

***Phrynosoma jamesi*,<sup>1</sup> new species**

Plates LV and LVI

DIAGNOSTIC CHARACTERS.—Closely allied to *Phrynosoma cerroense* Stejneger, from which it is distinguished chiefly by the presence of a ventral lateral fringe; enlarged gulars present; nostrils very large, just below the canthus rostralis; ventrals smooth; temporal and occipital horns well developed; a large substrictal nearly in line with the labial spines, followed by a slender postrictal spine; tympanum not concealed.

RANGE.—Known only from the type locality.

TYPE.—U. S. N. M. No. 64450; ♀; San Bartolome Bay, Lower California; H. Townsend; 1911.

DESCRIPTION OF TYPE.—Habitus rather narrow, probably similar to that of *P. cerroense*; head small, snout very obtuse, truncate in profile; tail round; nostril very large, just below the line of the canthus rostralis; ear opening not closed; superciliary angle not produced; temporal region little expanded, with four spines, of which the two middle ones are in contact; the last temporal spine about half the length of the occipital; two occipitals, straight, somewhat grooved at the base; a low tubercular spine between the occipitals; scales of front smaller than in *helleri* or *coronatum*, rugose; no connecting ridge between the superciliary angles; a transverse series of four low conical scales in front of the occipital spines; five infralabials, the last largest, followed after an interspace by the somewhat larger substrictal, which is very nearly in line with the labials; a small, slender postrictal spine; two lateral groups of tubercular scales on the neck, but no spines; three or four rows of enlarged gulars on each side; irregular rows of widely separated, flat, keeled scales on the back; vertebral line covered with smaller, flat, keeled scales; tail with two dorsal rows of spines and a lateral row on each side; two lateral fringes of spinose scales, the lower one much smaller than the upper; ventral scales flat, smooth; femoral pores 17–17.

Grayish above, with two obscure nuchal marks; venter with a few scattered brown spots.

MEASUREMENTS OF TYPE.—Total length, 120 mm.; body, 86 mm.; tail, 34 mm.; foreleg, 34 mm.; hind leg, 46 mm.; snout to tip of occipital horn, 24 mm.; greatest breadth of head, 24 mm.

NOTES ON PARATYPES.—The single paratype, A. M. N. H. No. 5497, agrees excellently with the type; the last temporal spines are somewhat longer, and are curved upward. The back is marked with large brown spots, two elongate nuchal spots, a transverse series of four spots behind these, with two pairs of more obscure spots between these and the base of the tail.

<sup>1</sup>Named for Mr. Arthur Curtiss James, Trustee of The American Museum of Natural History.

The close relation of this species to *P. cerroense*, its nearest neighbor geographically, is especially evident in the arrangement of the spines of the head; from the figure of the type of *cerroense* it appears that *jamesi* has a much more truncate muzzle. The two are readily distinguishable by the absence of the ventral lateral fringe in *cerroense*.

As *cerroense* was considered intermediate between *blainvillii* and *coronatum* by Stejneger (1893, p. 187) and Cope (1900, p. 430), it is evident that the present form, with its two lateral fringes, is much more nearly intermediate between them and that *cerroense* is to be regarded as divergent from a stock similar to *jamesi*. Our knowledge of the distribution of the four Lower Californian species, *blainvillii*, *nelsoni*, *jamesi*, and *coronatum* is very inadequate. It is not at all unlikely that *nelsoni* may prove to be a third subspecies of *blainvillii*. *P. jamesi* and *coronatum*, however, appear to be sufficiently distinct to preclude any possibility of their intergradation. It would be highly interesting to know if the species of *Phrynosoma* in Lower California really have a restricted distribution, with wide areas where they are absent, as might be inferred from the present information regarding them.

#### ***Phrynosoma cerroense* Stejneger**

*Phrynosoma cerroense* STEJNEGER, 1893, p. 187; STEJNEGER AND BARBOUR, 1917, p. 58.

RANGE.—Confined to Cedros Island, off the Pacific coast of Lower California.

#### ***Phrynosoma coronatum* (Blainville)**

Plate LIV, Figure 1

*Agama* (*Phrynosoma*) *coronatum* BLAINVILLE, 1835, p. 284, Pl. xxv, fig. 1.

*Phrynosoma coronatum* STEJNEGER AND BARBOUR, 1917, p. 58.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1866a, p. 312; La Paz, Yarrow, 1882, pp. 67–68; Comondu to San Quentin, Poso Grande, San José del Cabo, San Francisquito (Sierra Laguna), and Miraflores, Van Denburgh, 1895, p. 115; Santa Anita, McLain, 1899, p. 2; Santa Rosalia, San Ignacio, and Mulege, Mocquard, 1899, p. 314; Todos Santos, Pescadero, Agua Caliente, Triunfo, and San Pedro, Van Denburgh and Slevin, 1921a, p. 62.

Three specimens of *P. coronatum* were secured by the Albatross Expedition, from Miraflores (A. M. N. H. Nos. 5499, 5701) and San José del Cabo (U. S. N. M. No. 64465). A fourth is contained in a small collection with the general locality "La Paz" received from the Museo Nacional de Mexico.

Five specimens in the Biological Survey collection come from Matancita (U. S. N. M. Nos. 37586–90).

**Phrynosoma platyrhinos** Girard

*Phrynosoma platyrhinos* GIRARD, 1852, pp. 361, 363, Pl. VII, figs. 1-5; STEJNEGER AND BARBOUR, 1917, p. 60.

RANGE.—Washington and Idaho, south through Utah and Nevada to southeastern California, northeastern Lower California and southwestern Arizona.

LOWER CALIFORNIAN RECORDS.—San Felipe, Meek, 1905, p. 12.

A specimen in the Biological Survey collection comes from Pozo San Augustin (U. S. N. M. No. 35791). This locality extends the range of this form considerably to the south, the only previous record from Lower California being that of Meek from San Felipe Bay.

**Phrynosoma solare** Gray

*Phrynosoma solaris* GRAY, 1845, p. 229.

*Phrynosoma solare* STEJNEGER AND BARBOUR, 1917, p. 60.

RANGE.—Northeastern Lower California, southwestern Arizona and Sonora.

LOWER CALIFORNIAN RECORDS.—Las Animas Bay, Van Denburgh, 1894b, p. 456.

The distribution of *P. solare* is remarkable for the wide gap between the Lower Californian record (opposite Angel de la Guardia Island) and the area of relative abundance of this species at the border of the Mexican Plateau in Arizona. It appears to be absent from the Colorado Desert, and thus forms one of the best examples of what I have called attention to (above) as peripheral distribution, bordering the Colorado Desert.

Key to the Species of *Phrynosoma* in Lower California

1. A single marginal (lateral) fringe of elongate scales.....2.  
Two or three complete marginal fringes.....3.
2. Nostrils within the lines of the canthi rostrales.....*P. platyrhinos*.  
Nostrils on the lines of the canthi rostrales.....*P. cerroense*.
3. Three closely set lateral fringes; tail flattened. (Not recorded from Lower California, but probably entering the northeastern area.).....*P. m'callii*.  
Two lateral fringes; tail round distally.....4.
4. Four large subequal occipital spines in line with the temporals.....*P. solare*.  
Occipital spines unequal, not in line with the temporals.....5.
5. Subrietal spine broadly expanded at base, its anterior border overlapping the last spine of the sublabial series.....6.  
Subrietal not overlapping the last of the sublabials, nearly in line with them...7.
6. Scales of mid-dorsal line keeled, pointed and strongly imbricate; scales of front rugose.....*P. nelsoni*.  
Scales of vertebral line smaller, rounded and less imbricate; scales of front convex and smooth.....*P. blainvillii blainvillii*.
7. No slender elongate postrictal spine.....*P. coronatum*.  
A slender elongate postrictal spine, about as long as the subrietal.....8.
8. Lower of the two lateral fringes weak; occipital spines slender.....*P. jamesi*.  
Lower lateral fringe strongly developed; occipital spines short and stout.  
*P. schmidtii*.

***Gerrhonotus scincicauda webbiai* Baird**

*Gerrhonotus webbiai* BAIRD, 1858, p. 255.

*Gerrhonotus scincicauda webbiai*, GRINNELL AND CAMP, 1917, p. 168.

RANGE.—Southwestern California, chiefly west of the desert divides, north to Mariposa County, south into northwestern Lower California.

LOWER CALIFORNIAN RECORDS.—Coronados Islands, Belding, 1887, p. 97; Valladares and San Pedro Martir Mt., Van Denburgh, 1895, p. 121; San Antonio, Meek, 1905, p. 12; San Martin Island, Van Denburgh, 1905, p. 19.

Specimens in the Biological Survey collection come from Rancho San Antonio (U. S. N. M. No. 37681) and Hanson Laguna (37682).

***Gerrhonotus multi-carinatus* (Blainville)**

*Cordylus* (*Gerrhonotus*) *multi-carinatus* BLAINVILLE, 1835, p. 289, Pl. XXV, fig. 2.

*Gerrhonotus multi-carinatus* STEJNEGER AND BARBOUR, 1917, p. 61.

RANGE.—Lower California and Mexico.

LOWER CALIFORNIAN RECORDS.—La Paz, Yarrow, 1882, p. 47; San José del Cabo, Corral de Piedras (Sierra El Taste), Sierra San Lazaro, Miraflores, and Sierra Laguna, Van Denburgh, 1895, p. 120.

Three specimens in the Biological Survey collection come from Santa Anita (U. S. N. M. Nos. 37683–5). This species has been excellently characterized by Van Denburgh (1898, p. 65). In addition to the characters employed by him, it may be noted that the limbs are much weaker and the body and tail more elongate than in *G. scincicauda webbiai*. The proportions of arm and leg to body length in two specimens of each species are as follows:

	<i>G. multi-carinatus</i>	<i>G. s. webbiai</i>
Arm/Body Length	.19, .23	.25, .27
Leg/Body Length	.27, .29	.35, .36

**Key to Distinguish the Species of *Gerrhonotus* in Lower California<sup>1</sup>**

Dorsal scales usually in 16 rows, weakly keeled.....*G. multi-carinatus*.

Dorsal scales usually in 14 rows, strongly keeled.....*G. scincicauda webbiai*.

***Anniella pulchra* Gray**

*Anniella pulchra* GRAY, 1852, p. 440; STEJNEGER AND BARBOUR, 1917, p. 63.

RANGE.—Coastal Region of southern California and northern Lower California.

LOWER CALIFORNIAN RECORDS.—San Salado Cañon, San José, Meek, 1905, p. 13; Coronados Islands, San Geronimo Island, Van Denburgh and Stewin, 1914, pp. 140, 142.

***Xantusia vigilis* Baird**

*Xantusia vigilis* BAIRD, 1858, p. 255; STEJNEGER AND BARBOUR, 1917, p. 64.

RANGE.—Southeastern California, southern Nevada, and northeastern Lower California.

LOWER CALIFORNIAN RECORDS.—San Matias Pass, Heller, in Meek, 1905, p. 13.

<sup>1</sup>After Van Denburgh, 1898, p. 64.

A specimen in the Biological Survey collection comes from San Felipe Bay (U. S. N. M. No. 37679).

***Xantusia gilberti* Van Denburgh**

*Xantusia gilberti* VAN DENBURGH, 1895, p. 121, Pl. XI; STEJNEGER AND BARBOUR, 1917, p. 64.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—San Francisquito, Sierra Laguna, Van Denburgh, 1895, p. 121.

A specimen in the Biological Survey collection comes from Laguna, Sierra Laguna (U. S. N. M. No. 37680). This specimen is of great interest, proving that *X. gilberti* is very closely related to *vigilis* and that some of the distinctive characters of the type were abnormal. In the type, the frontal is divided, and in contact with the interfronto-nasal. In the present specimen, the head shields are disposed exactly as in *vigilis*, the prefrontals meeting in the mid-line in front of the single frontal. The head shields differ from those of *vigilis*, however, in being flatter and smoother. The head is smaller, the nose more pointed, and the eye smaller. In addition to the smallness of the eye, this specimen agrees with *X. gilberti* in the disposition of the postmentals, the second pair being separated by a narrow scale, as figured by Van Denburgh (1895, Pl. XI, fig. D). In *vigilis*, this median scale is much broader. There is no question, therefore, of the validity of *gilberti*, though its diagnosis must be changed.

In two specimens of *vigilis* from Lane's Mill, California, collected by Heller in 1903 and preserved in the Field Museum of Natural History, the frontal is completely divided, as in the type of *gilberti*. In another specimen in the same series the frontal is in contact with the interparietal.

The back of the present specimen of *gilberti* is nearly uniform brown, with scarcely any of the darker brown maculation of *vigilis*.

**Key to Distinguish the Species of *Xantusia* in Lower California**

- |  |                      |
|--|----------------------|
| Second pair of postmentals widely separated; eye larger; back maculate or lineolate with dark brown spots..... | <i>X. vigilis</i> .  |
| Second pair of postmentals narrowly separated; eye smaller; back nearly uniform in color.....                  | <i>X. gilberti</i> . |

***Cnemidophorus tessellatus tessellatus* (Say)**

*Ameiva tessellata* SAY, 1823, p. 50.

*Cnemidophorus tessellatus tessellatus* STEJNEGER AND BARBOUR, 1917, p. 67.

RANGE.—Texas to California, the Great Basin; entering northeastern Lower California.

--- LOWER CALIFORNIAN RECORDS.—San Felipe, Meek, 1905, p. 14.

Van Denburgh lists this species as probably entering northeastern Lower California but not yet definitely recorded from the peninsula. It seems highly probable that the specimen recorded by Meek as *C. stejnegeri* from San Felipe, on the Gulf side of the peninsula, should be placed here.

I have referred specimens in the Biological Survey collection from Cocopah Mts., east base (U. S. N. M. Nos. 37693-4), San Felipe Bay (37690), and Poso Altamirano (37696) to this subspecies. The specimen from Poso Altamirano, near the center of the peninsula, differs slightly in coloration and in having smaller antebrachials from the typical *tessellatus*. It seems best, however, to place it with this species, pending the accumulation of further data.

***Cnemidophorus tessellatus stejnegeri* Van Denburgh**

*Cnemidophorus stejnegeri* VAN DENBURGH, 1894, p. 300.

*Cnemidophorus tessellatus stejnegeri* STEJNEGER AND BARBOUR, 1917, p. 68.

RANGE.—Coastal district of southern California and northern Lower California.

LOWER CALIFORNIAN RECORDS.—Near Ensenada, San Telmo, foothills of San Pedro Martir Mts., Van Denburgh, 1894, p. 300; "Comondu to San Quentin," Van Denburgh, 1895, p. 126; San Fernando, Cope, 1900, p. 599; Trinidad, San Matias, Cañon Esperanza, San Antonio, Parral, Matomi, Rosarito, Aguas Escondito, Meek, 1905, p. 14.

A specimen in the Biological Survey collection comes from Ojos Negros (U. S. N. M. No. 37689).

***Cnemidophorus bartolomas* Dickerson**

*Cnemidophorus bartolomas* DICKERSON, 1919, p. 476.

RANGE.—San Bartolome Bay, Lower California.

LOWER CALIFORNIAN RECORDS.—San Bartolome Bay, Abreojos Point, Dickerson, 1919, p. 476.<sup>1</sup>

The four specimens of this form brought back by the Albatross Expedition are of considerable interest for the variations they exhibit. In two specimens, the nasal is in contact with the second labial on one side, separated from it on the other; in one case, just touching; in the other, more broadly in contact. In two specimens, there are only two complete rows of enlarged antebrachials; in the others, there are three complete rows. In coloration, one specimen, No. 5522, from the more southern locality, Abreojos Point, approaches *C. rubidus* in the distinctness and wide separation of the black spots. The remaining three are fully adult specimens, the spots somewhat smaller and less sharply defined.

<sup>1</sup>Type: U. S. N. M. No. 64448.

In the variation of the antibrachials and of the second labial, these specimens show an approach to *C. labialis* Stejneger, which is amply distinguished, however, by other characters (single posterior anal plate, low number of femoral pores and coloration). I believe that *C. bartolomas* is directly related to *C. tessellatus stejnegeri*, and that it is derived from that form. It seems amply distinct in the character of the throat scales described in the key. *C. multiscutatus* is somewhat less distinct from *C. tessellatus stejnegeri* in coloration and in other characters than *C. bartolomas*. It is evident that for an adequate revision of the Lower Californian *Cnemidophorus* much additional material is needed.

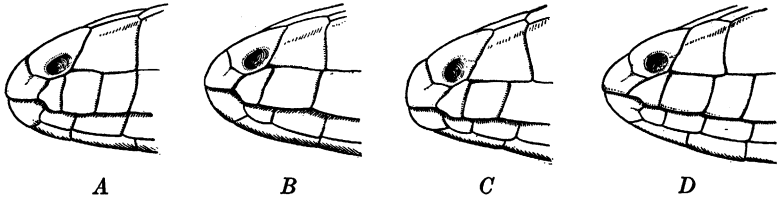


Fig. 11. Variation in the labials of *Cnemidophorus bartolomas* Dickerson. A, Type, U. S. N. M. No. 64448, left side, nasal in contact with second labial; B, same specimen, right side (reversed in figure) nasal not in contact with second labial; C, A. M. N. H. No. 5507, and D, A. M. N. H. No. 5522, showing different degrees of separation of nasal and second labial.

#### ***Cnemidophorus multiscutatus* Cope**

*Cnemidophorus tessellatus multiscutatus* COPE, 1892a, p. 38.

*Cnemidophorus multiscutatus* STEJNEGER AND BARBOUR, 1917, p. 66.

RANGE.—Cedros Island, off the Pacific Coast of Lower California.

Three specimens (A. M. N. H. Nos. 5505–6, U. S. N. M. No. 64462) were collected on Cedros Island by the Albatross Expedition. They do not differ in any important respect from the description of Cope (1900, p. 586).

#### ***Cnemidophorus rubidus* Cope**

*Cnemidophorus tessellatus rubidus* COPE, 1892a, p. 36, Pl. XII, fig. f.

*Cnemidophorus rubidus* STEJNEGER AND BARBOUR, 1917, p. 67.

RANGE.—Santa Margarita and Magdalena Islands, Pacific coast of Lower California.

LOWER CALIFORNIAN RECORDS.—Santa Margarita Island, Cope, 1892a, p. 36; Magdalena Island, Comodu, Van Denburgh, 1895, p. 126.

A single specimen of this species was collected by the Albatross Expedition on Santa Margarita Island (U. S. N. M. No. 64463).

#### ***Cnemidophorus labialis* Stejneger**

*Cnemidophorus labialis* STEJNEGER 1890, p. 643; STEJNEGER AND BARBOUR, 1917, p. 66.

RANGE.—Confined to Cedros Island.



***Cnemidophorus vandenburghi* Dickerson**

*Cnemidophorus vandenburghi* DICKERSON, 1919, p. 477.<sup>1</sup>

RANGE.—Carmen Island, Gulf of California.

The single specimen (U. S. N. M. No. 64449), collected by the Albatross Expedition, on which this species is based appears to be sufficiently distinct from any peninsular *Cnemidophorus* or from *C. celeripes* on San José Island. Although much smaller in size than the specimens of *celeripes*, the color pattern represents the end stage of the usual *tessellatus* development, being distinguished further by an unusually fine division of the residual black spotting.

***Cnemidophorus celeripes* Dickerson**

Plate LVII

*Cnemidophorus celeripes* DICKERSON, 1919, p. 472.<sup>2</sup>

RANGE.—San José Island, Gulf of California.

Two specimens of a *Cnemidophorus* were collected on San José Island by the Albatross Expedition. Aside from the species related to *C. martyris* Stejneger, they certainly represent the most distinct of the insular species of this genus in the Gulf of California, being readily distinguishable from the remaining Lower Californian species of the *tessellatus* group by their retention of sharply defined black lines in the adult phase of coloration.

Dickerson (*loc. cit.*) has tentatively referred the *Cnemidophorus grahami* recorded from Santa Rosalia and Mulege by Mocquard (1899, p. 315) to this form. In the examination of the Gulf insular faunas which I have been able to make, it appears that the San José species are in general more distinct from the peninsular forms than are those on Carmen Island, the latter being frequently identical with those on the mainland. It is, therefore, more probable that Mocquard's *C. grahami*, and probably his *C. sexlineatus* from Santa Rosalia as well, are *C. vandenburghi*. This question must await the evidence of further collections, which are urgently needed from the whole of the Gulf side of the peninsula north of La Paz. It is not improbable that *C. maximus* will be discovered in this area when it is more fully explored.

***Cnemidophorus estebanensis* Dickerson**

*Cnemidophorus estebanensis* DICKERSON, 1919, p. 474.<sup>3</sup>

RANGE.—Confined to San Esteban Island, Gulf of California.

The single *Cnemidophorus* collected by the Albatross Expedition on San Esteban Island is the type of this species. It is certainly well dis-

<sup>1</sup>Type: U. S. N. M. No. 64449.

<sup>2</sup>Type: U. S. N. M. No. 64444.

<sup>3</sup>Type: U. S. N. M. No. 64446.

tinguished from *C. punctilinealis* Dickerson from Tiburon Island by the much longer head and neck, and the smaller size. The scales of the under surface of the forearm are not notably different from those of *punctilinealis*. The femoral pores number 22–23.

The differences cited in the original description to distinguish *estebanensis* from *melanostethus* are inadequate, and I am unable to find other characters of greater weight. The coloration appears to be practically identical. I have, nevertheless, retained *C. estebanensis* in the present list, as it is not improbable that the examination of series of specimens will justify its retention as an insular race. On the other hand, the examination of adequate material of this form and its near relatives on the neighboring islands may quite as probably disprove their supposed distinctness.

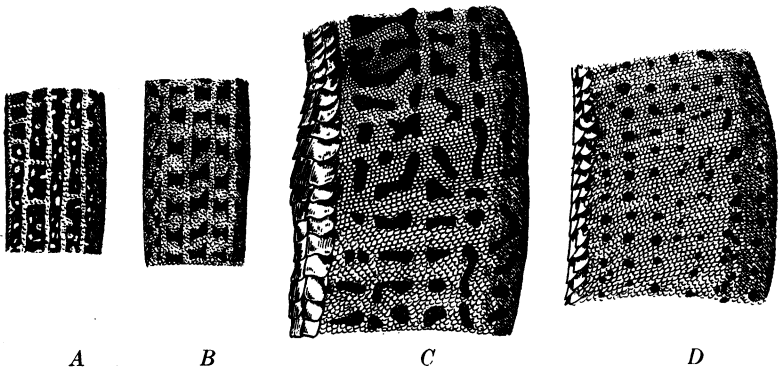


Fig. 12. Stages in the development of the color pattern of *Cnemidophorus punctilinealis* Dickerson. A, U. S. N. M. No. 64460; B, A. M. N. H. No. 5539; C, A. M. N. H. No. 5533; D, (type), U. S. N. M. No. 64447. A and B, dorsal views; C and D, lateral views.

### *Cnemidophorus punctilinealis* Dickerson

*Cnemidophorus punctilinealis* DICKERSON, 1919, p. 475.<sup>1</sup>

RANGE.—Tiburon Island, Gulf of California; coastal strip of Sonora (?).

The specimens described under this name by Dickerson apparently represent a fairly distinct race of *C. melanostethus*, the dorsal coloration being more nearly that of *C. tessellatus tessellatus*, the ventral of *C. melanostethus*. This is exactly the coloration described by Van Denburgh and Slevin in specimens from Isla Partida, near Angel de la Guardia Island, as *C. dickersonæ*; a paratype of this species, in the collection of The American Museum of Natural History, is more nearly allied in color pattern to adult *C. disparilis*.

<sup>1</sup>Type: U. S. N. M. No. 64447. Paratypes: U. S. N. M. Nos. 64456–60, A. M. N. H. Nos. 5533–39.

**Cnemidophorus maximus** Cope

*Cnemidophorus maximus* COPE, 1863, p. 104; STEJNEGER AND BARBOUR, 1917, p. 66.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1863, p. 104; La Paz, Yarrow, 1882, p. 42; San José del Cabo, Miraflores, Sierra San Lazaro, Van Denburgh, 1895, p. 122; Espiritu Santo Island, Cope, 1900, p. 570; San Pedro, Triunfo, San Antonio, San Bartolo, Buena Vista, Agua Caliente, Todos Santos, Guamuchil Rancho (about 25 miles north of Cape St. Lucas), Van Denburgh and Slevin, 1921a, p. 62.

Six specimens of *Cnemidophorus maximus* were collected by the Albatross Expedition, two at Miraflores (A. M. N. H. Nos. 5542, 5570), and four in the San Bernardo Mts. (5549, 5551, 5656, U. S. N. M. No. 64461).

Two specimens in the Biological Survey collection come from Cape San Lucas (U. S. N. M. No. 37688) and Espiritu Santo Island (37691).

It is possible that the *C. grahami* and *C. sexlineatus* recorded by Mocquard (1899, p. 315) from Santa Rosalia and Mulege belong here.

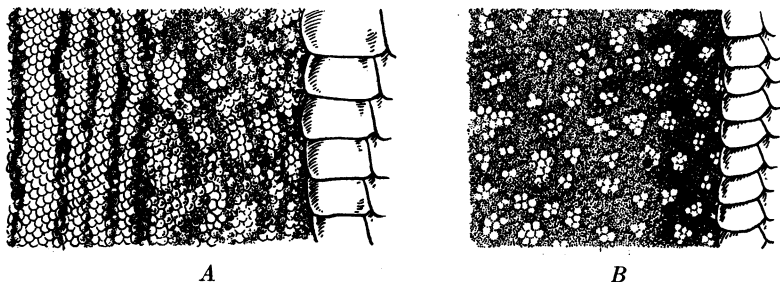


Fig. 13. A, Dorsal color pattern of type of *Cnemidophorus disparilis*, U. S. N. M. No. 64445, from the mid-dorsal line to the ventral plates. B, Similar view of dorsal pattern of *Cnemidophorus catalinensis*, A. M. N. H. No. 6885.

**Cnemidophorus disparilis** Dickerson

*Cnemidophorus disparilis* DICKERSON, 1919, p. 473.<sup>1</sup>

RANGE.—Tiburon Island, Gulf of California.

This species was based on three specimens in the Albatross collection, one (the type) from Tiburon Island, and two juvenile specimens with no further data than "Lower California." The association of these two specimens with the type appears to be unjustifiable, as comparison of one of them with the types of *C. catalinensis* Van Denburgh and Slevin proves them to be indistinguishable (Van Denburgh, in correspondence).

<sup>1</sup>Type: U. S. N. M. No. 64445.

Conclusions on the development of the peculiar coloration of *disparilis* from the still more distinctive pattern of *C. martyris* and *C. catalinensis* are therefore baseless. An adequate understanding of the relations of the fifteen species of *Cnemidophorus* in the present list can only be reached by the comprehensive study of large series of each species, which are not at present available.

***Cnemidophorus martyris* Stejneger**

*Cnemidophorus martyris* STEJNEGER, 1891, p. 407; STEJNEGER AND BARBOUR, 1917, p. 66.

RANGE.—San Pedro Martir Island, Gulf of California.

***Cnemidophorus catalinensis* Van Denburgh and Slevin**

*Cnemidophorus catalinensis* VAN DENBURGH AND SLEVIN, 1921c, p. 396.

RANGE.—Santa Catalina Island, Gulf of California.

Two specimens (A. M. N. H. Nos. 6884–85), without other locality than "Lower California," referred to *C. disparilis* by Dickerson, almost certainly belong to this species, as has been noted above.

***Cnemidophorus dickersonæ* Van Denburgh and Slevin**

*Cnemidophorus dickersonæ* VAN DENBURGH AND SLEVIN, 1921b, p. 97.

RANGE.—Confined to Isla Partida, near Angel de la Guardia Island, Gulf of California.

***Cnemidophorus canus* Van Denburgh and Slevin**

*Cnemidophorus canus* VAN DENBURGH AND SLEVIN, 1921b, p. 97.

RANGE.—Sal Si Puedes Island, Gulf of California.

***Cnemidophorus bacatus* Van Denburgh and Slevin**

*Cnemidophorus bacatus* VAN DENBURGH AND SLEVIN, 1921b, p. 97.

RANGE.—San Pedro Nolasco Island, Gulf of California.

**Key to the Species of *Cnemidophorus* in Lower California**

**(Exclusive of Insular Forms)**

1. Postmental little if at all longer than the mental; parietals subequal in length to the fronto-parietals; size very large.....*C. maximus*.  
Postmental longer than mental; parietals decidedly longer than the fronto-parietals; size moderate.....2.
2. Tail red distally; dorsal pattern of sharply defined black spots, in regular longitudinal and transverse rows.....*C. rubidus*.  
Tail not red at end; dorsal pattern of longitudinal lines or rows of spots, not in regular transverse rows.....3.
3. Granular scales between collar and enlarged central gulars very small, abruptly differentiated from the latter.....*C. bartolomas*.

- Granular scales between collar and central gulars larger, passing more gradually into the latter.....4.
4. Central gulars strongly enlarged; throat heavily spotted with black, often united into transverse bands or reticulation.....*C. tessellatus stejnegeri*.  
Central gulars little enlarged; throat often unspotted.....*C. t. tessellatus*.

***Verticaria ceralbensis* Van Denburgh and Slevin**

*Verticaria ceralbensis* VAN DENBURGH AND SLEVIN, 1921c, p. 396.

RANGE.—Ceralvo Island, Gulf of California.

***Verticaria hyperythra hyperythra* (Cope)**

*Cnemidophorus hyperythrus* COPE, 1863, p. 103.

*Verticaria hyperythra hyperythra* STEJNEGER AND BARBOUR, 1917, p. 65.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1863, p. 103; La Paz, Yarrow, 1882, p. 45; San José del Cabo, Miraflores, Van Denburgh, 1895, p. 128; Todos Santos, Agua Caliente, Buena Vista, San Bartolo, San Antonio, Triunfo, San Pedro, Guamuchil Ranch, and foothills of Sierra Laguna opposite Todos Santos, Van Denburgh and Slevin, 1921a, p. 63.

This species was collected by the Albatross Expedition at Cape San Lucas (U. S. N. M. No. 64483), Miraflores (A. M. N. H. Nos. 5565, 5670, 5672-75, U. S. N. M. No. 64481-2), and Pichlinque Bay (U. S. N. M. No. 64484). It agrees excellently with the definition of Van Denburgh (1895, p. 128) in the character of the supraoculars employed by him to distinguish it from *beldingi*. Eight specimens have the third supraocular only partly separated from the central head shields, two have it completely separated.

A specimen in the Biological Survey collection comes from Santa Anita (U. S. N. M. No. 37698).

***Verticaria hyperythra beldingi* Stejneger**

*Verticaria beldingi* STEJNEGER, 1894, p. 17.

*Verticaria hyperythra beldingi* STEJNEGER AND BARBOUR, 1917, p. 65.

RANGE.—Southwestern California, northeastern Lower California at least as far as Ensenada, Cedros Island, and Santa Margarita Island and Magdalena Islands.

LOWER CALIFORNIAN RECORDS.—Cedros Island, Stejneger, 1894, p. 17; Magdalena Island, Van Denburgh, 1895, p. 131; San Telmo, Ensenada, and between Salado and San Vicente, Van Denburgh, 1896, p. 1005.

The only *Verticaria* collected by the Albatross Expedition which I refer to this subspecies is a specimen from Santa Margarita Island (U. S. N. M. No. 64479). For a discussion of the relations of this form and *V. h. schmidtii*, to which I refer the *Verticarias* of the remaining part of the peninsula north of the Cape area, see below.

***Verticaria hyperythra schmidtii* Van Denburgh and Slevin**

*Verticaria sericea* MEEK, 1905, p. 14.

*Verticaria hyperythra schmidtii* VAN DENBURGH AND SLEVIN, 1921c, p. 397.

RANGE.—San Antonio (in northern Lower California) to Conception Bay and San Marcos Island.

LOWER CALIFORNIAN RECORDS.—Aguas Escondito, San Antonio, San Salado Cañon, and Rosarito, Meek, 1905, p. 14; San Marcos Island, Van Denburgh and Slevin, 1921c, p. 397.

Two specimens of *Verticaria* in the Albatross collection, from Castro Rancho, Concepcion Bay (U. S. N. M. No. 64252, and A. M. N. H. No. 5524) have a mid-dorsal light line, forked anteriorly, and four supra-oculars, and are accordingly identified with the form found on the island of San Marcos, to which my name is attached through the courtesy of Dr. Van Denburgh. A third specimen, from Mulege (A. M. N. H. No. 5523), has the typical coloration of *V. h. beldingi*, but I have included it with the present form on geographical grounds and on the evidence of specimens from northern Lower California.

Examination of the specimens from northern Lower California recorded by Meek as *V. sericea* shows that his reason for so recording them was their possession of the *sericea* color pattern; seven out of eleven specimens have a sharply defined median dorsal white line, dividing at the shoulders or a little farther back and sending the two branches to the parietals. Six of these specimens are from San Antonio, one from Aguas Escondito. The remaining four specimens from San Salado Cañon, Rosarito, Aguas Escondito and San Antonio exhibit various stages in the fusion of the two dorsal lines. In one, they are juxtaposed, but not actually united, on the posterior half of the body; in one, they are plainly fused on the posterior third of the back; in two, they unite at mid-body, but separate again for a short distance, reuniting at the base of the tail; three of these specimens show traces anteriorly of the fainter median dorsal line which is present in the normal pattern of both *hyperythra* and *beldingi*. Nine out of twelve specimens examined by me have the *sericea* type of color pattern. Van Denburgh's series of thirty-eight specimens of *V. h. beldingi* (1895, p. 131) did not exhibit this variation, and Van Denburgh and Slevin (1920, p. 64) in their recent paper, with twenty-four fresh specimens at hand from Ensenada, make no mention of it.

As far as I can discover, the specimens before me with the *sericea* color pattern or with a pattern intermediate between that of *sericea* and *hyperythra* are not structurally distinguishable from *V. h. beldingi*; and the color pattern itself is not firmly fixed, although it appears in the majority of the specimens before me. The specimens from Santa Rosalia

and San Ignacio recorded by Mocquard may be placed with this form on geographical grounds. His description indicates that they do not have the *sericea* pattern, and are therefore like our specimen from Mulege. My conception of *V. h. schmidtii* therefore allows for the appearance of a minority of specimens colored like the form from which I believe it to be directly derived or in process of derivation.

Two localities represented by specimens in the Biological Survey collection from San Esteban (U. S. N. M. No. 37695) and San Francisco (37697) are very satisfactory links between the records from the northern part of the peninsula and those from Mulege and San Marcos Island. In these two specimens the mid-dorsal pair of light lines is juxtaposed but not entirely confluent on the posterior two-thirds of the back.

***Verticaria espiritensis* Van Denburgh and Slevin**

*Verticaria espiritensis* VAN DENBURGH AND SLEVIN, 1921c, p. 397.

RANGE.—Espíritu Santo Island, Gulf of California.

***Verticaria franciscensis* Van Denburgh and Slevin**

*Verticaria franciscensis* VAN DENBURGH AND SLEVIN, 1921c, p. 397.

RANGE.—San Francisco Island, Gulf of California.

***Verticaria sericea* Van Denburgh**

*Verticaria sericea* VAN DENBURGH, 1895, p. 132, Pl. XII ; STEJNEGER AND BARBOUR, 1917, p. 65.

RANGE.—Confined to San José Island, Gulf of California.

A single specimen of this handsome and distinct species was taken by the Albatross Expedition on San José Island (U. S. N. M. No. 64480). It agrees excellently with the description of the type, the small scales of the border of the collar being quite unlike those of any form of *V. hyperythra*.

***Verticaria cærulea* Dickerson**

*Verticaria cærulea* DICKERSON, 1919, p. 472.<sup>1</sup>

RANGE.—Confined to Carmen Island, Gulf of California.

Five specimens forming the typical series of this species were collected by the Albatross Expedition on Carmen Island. They are directly related to *V. sericea* Van Denburgh from which they are slightly distinguishable in measurements. In the specimen of *V. sericea* at hand, the length of the hind leg forms .75 of the body length (.81 in the type). In the five *cæruleas*, the proportion ranges from .64 to .73, average .70.

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<sup>1</sup>Type: U. S. N. M. No. 64251.

In addition to the generally light coloration mentioned in the original description, the absence of the two white lines on the posterior and superior aspect of the hind leg, which are very distinct in *sericea*, appears to be the most important distinctive character.

***Verticaria picta* Van Denburgh and Slevin**

*Verticaria picta* VAN DENBURGH AND SLEVIN, 1921b, p. 98.

RANGE.—Confined to Monserrate Island, Gulf of California.

The relations of this newly discovered form with those of the Lower Californian peninsula are unknown, the preliminary diagnosis only being at present available.

**Key to the Peninsular Species of *Verticaria***

1. A single mid-dorsal line, forked anteriorly . . . . . *V. hyperythra schmidtii*.  
A pair of sharply defined dorsal lines, sometimes with a faint line between them. 2.
2. Second supraocular usually in contact with the frontal . . . *V. h. hyperythra*.  
Second supraocular usually separated from the frontal by a row of granules.  
*V. h. beldingi*.

***Plestiodon skiltonianus* Baird and Girard**

*Plestiodon skiltonianus* BAIRD AND GIRARD, 1852b, p. 349, Pl. IV, figs. 4-6.

*Plestiodon skiltonianus* STEJNEGER AND BARBOUR, 1917, p. 71.

RANGE.—British Columbia to Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Yarrow, 1882, p. 41; San Francisquito, Sierra Laguna, Van Denburgh, 1895, p. 134; Los Coronados Islands, Van Denburgh, 1905, p. 18.

A specimen in the Biological Survey collection comes from Todos Santos Island, opposite Ensenada, (U. S. N. M. No. 37686).

The *P. lagunensis* described by Van Denburgh from the Sierra Laguna (*loc. cit.*) is not recognized by Stejneger and Barbour. It does not appear to me to warrant specific separation. Mr. Charles L. Camp informs me that the salmon-colored tail, one of the characters on which *lagunensis* was based, is common in *skiltonianus* in California.

***Bipes biporus* (Cope)**

*Euchirotes biporus* COPE, 1894a, p. 436, figs. 5a-e.

*Bipes biporus* STEJNEGER AND BARBOUR, 1917, p. 72.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—La Paz, Streets, 1877, p. 37.

**SERPENTES**

***Siagonodon humilis* (Baird and Girard)**

*Rena humilis* BAIRD AND GIRARD, 1853, p. 143.

*Siagonodon humilis* STEJNEGER AND BARBOUR, 1917, p. 73.



RANGE.—Southeastern California, southwestern Arizona, northwestern Mexico, and Lower California; southwestern Texas.<sup>1</sup>

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1861, p. 305; La Paz, Yarrow, 1882, p. 142; San Francisquito, Sierra Laguna, Van Denburgh, 1895, p. 136; San José del Cabo, Boulenger, 1896, p. 591; San Ignacio, Mocquard, 1899, p. 315; Cedros Island, Van Denburgh and Slevin, 1914, p. 145.

Two specimens of this species were secured at Cape San Lucas by the Albatross Expedition (A. M. N. H. No. 5576, U. S. N. M. No. 64580) Comparison with specimens from Tucson, Arizona, and Fort Clark, Texas, does not show any important differential character.

#### ***Lichanura roseofusca* Cope**

*Lichanura roseofusca* COPE, 1868, p. 2; STEJNEGER AND BARBOUR, 1917, p. 73.

RANGE.—Southern California and Arizona, northern Lower California.

LOWER CALIFORNIAN RECORDS.—Ensenada, Van Denburgh, 1896, p. 1005.

#### ***Lichanura trivirgata* Cope**

*Lichanura trivirgata* COPE, 1861, p. 304; STEJNEGER AND BARBOUR, 1917, p. 73.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, La Paz, Yarrow, 1882, p. 142.

U. S. N. M. No. 37525, ♂, Biological Survey collection, is from Santa Anita.

The scale counts of this specimen are as follows: Dorsals, 31–37–25; ventrals, 229; subcaudals, 47; scales about eye, 9; upper labials, 12; lower labials, 13; loreals, 3+4. The total length is 610 mm., the tail-length, 96 mm. The upper row of loreals contains two scales on one side, three on the other. The lower row has only one on each side.

#### **Key to the Species of *Lichanura* in Lower California**

Three dark longitudinal bands in strong contrast with the ground color; ventral plates 215–229.....*L. trivirgata*.  
Bands, if present, not strongly contrasted with the ground color; ventral plates 224–241.....*L. roseofusca*.

#### ***Coluber flagellum piceus* (Cope)**

*Bascanium piceum* COPE, 1892, p. 625.

*Coluber flagellum piceus* STEJNEGER AND BARBOUR, 1917, p. 79.

RANGE.—Southwestern Arizona and Lower California.

LOWER CALIFORNIAN RECORDS.—La Paz, Yarrow, 1882, p. 112; Santa Margarita Id., Cope, 1895, p. 679; San José del Cabo, Miraflores, Van Denburgh, 1895, p. 148; Santa Rosalia, San Ignacio, Mocquard, 1899, p. 323; Joruncho Ranch, San Quentin, Rosarito, Parral, Meek, 1905, p. 15; San Pedro, Triunfo, San Bartolo, Agua Caliente, Todos Santos, Van Denburgh and Slevin, 1921a, p. 64.

<sup>1</sup>A specimen in The American Museum of Natural History (No. 8596) from Fort Clark, Kinney County, Texas, collected May 29, 1915, by Mr. Chapman Grant, U. S. Army, greatly extends the known range of this species.

The Albatross collection contains thirteen specimens of this form, the following localities being represented: Cape San Lucas (A. M. N. H. Nos. 5584, 6890); Miraflores (A. M. N. H. Nos. 5585, 5600-6503, U. S. N. M. Nos. 64591-5); and San Bartolome Bay (U. S. N. M. No. 64590).

The specimens range in size from 887 mm. to 1780 mm. The dorsal scale formula is regularly 19-17-13, but may be 19-17-12 by the loss of the median scale row posteriorly (U. S. N. M. Nos. 64590-91). There does not appear to be any sex difference in the number of ventral plates or subcaudals, nor in the proportionate length of the tail. In scale characters, this series does not change the range of variation shown in the tabulation of Van Denburgh (1921a, *loc. cit.*).

Specimens in the Biological Survey collection come from San Felipe Bay (U. S. N. M. No. 37549), Trinidad Valley (37551), Ojos Negros (37559), and San Ignacio (37552-3). Two of these (37559 and 37552) are of the dark color phase originally described as *piceus*. They correspond so closely in coloration to the specimen in the Albatross collection from San Bartolome Bay, and this in turn with Cope's description of *C. lateralis fuliginosus* from Santa Margarita Island, that I am convinced of their identity.

Two specimens, U. S. N. M. Nos. 37549 and 37559, show very distinct light lateral lines on the anterior third of the body, indicating, I believe, the relation of this form with *C. tæniatus*.

#### ***Coluber lateralis* (Hallowell)**

*Leptophis lateralis* HALLOWELL, 1853, p. 237.

*Coluber lateralis* STEJNEGER AND BARBOUR, 1917, p. 80.

RANGE.—Southern and Lower California, absent from the Cape area.

LOWER CALIFORNIAN RECORDS.—Santa Rosalia, Mulege, San Ignacio, Mocquard, 1899, p. 324.

I refer Mocquard's records of *C. tæniatus* to this species, although it is entirely possible that they may prove to represent a distinct peninsular form or that they may be more nearly related to *C. barbouri* from Espiritu Santo Island.

#### ***Coluber aurigulus* (Cope)**

*Drymobius aurigulus* COPE, 1861, p. 301.

*Coluber aurigulus* STEJNEGER AND BARBOUR, 1917, p. 78.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1861, p. 301; San José del Cabo, Van Denburgh, 1895, p. 149.

***Coluber anthonyi* (Stejneger)***Bascanion anthonyi* STEJNEGER, 1901, p. 715.*Coluber anthonyi* STEJNEGER AND BARBOUR, 1917, p. 78.

RANGE.—Clarion Island, Revilla Gigedo Islands.

***Coluber barbouri* Van Denburgh and Slevin***Coluber barbouri* VAN DENBURGH AND SLEVIN, 1921*b*, p. 98.

RANGE.—Confined (as far as known) to Espiritu Santo Island, Gulf of California.

**Key to the Species of *Coluber* in Lower California (Exclusive of Insular Forms)**

1. No longitudinal light lines. Light brown above, with black nuchal bars (a melanistic phase occurs which is black or dark).....*C. flagellum piceus*.  
Longitudinal light lines on the sides.....2.
2. Lateral stripe continuous and uniform to base of tail.....*C. lateralis*  
Lateral stripe interrupted anteriorly, faint posteriorly.....*C. aurigulus*.

***Salvadora hexalepis* (Cope)***Phymothyrha hexalepis* COPE, 1866*a*, p. 304.*Salvadora hexalepis* STEJNEGER AND BARBOUR, 1917, p. 81.

RANGE.—Arizona, southern California and Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, La Paz, Yarrow, 1882, p. 98; Comondú, Agua Caliente, San José del Cabo, Sierra San Lazaro, Van Denburgh, 1895, p. 147; San Pedro Martir Mt., Van Denburgh, 1896, p. 1005; Santa Anita, McLain, 1899, p. 3; Santa Rosalia, San Ignacio, Mocquard, 1899, p. 325; San Matias, Meek, 1905, p. 15; San Pedro, Buena Vista, Santiago, Miraflores, Todos Santos, Van Denburgh and Slevin, 1921*a*, p. 65.

A single specimen of this species (U. S. N. M. No. 64581, ♀), was collected by the Albatross Expedition at Miraflores. The total length is 678 mm.; tail, 162 mm.; ventral plates, 198; subcaudals, 89; dorsal scales, 19–17–13; a small inferior loreal on each side below the true loreal.

Two specimens in the Biological Survey collection are from 20 miles west of Santa Rosalia (U. S. N. M. No. 37517) and Todos Santos (37518).

***Phyllorhynchus decurtatus* (Cope)***Phimothyrha decurtata* COPE, 1868*a*, p. 310.*Phyllorhynchus decurtatus* STEJNEGER AND BARBOUR, 1917, p. 81.

RANGE.—Lower California, north to Riverside County, California and Yuma, Arizona.

LOWER CALIFORNIAN RECORDS.—Northern Lower California, Cope, 1868*a*, p. 310; La Paz, Stejneger, 1890, p. 155.

A study of the published records of the scale characters of this species reduces the distinctive characters of *P. browni* Stejneger, from Tucson,

to the keeling of the scales on the posterior part of the body in the latter species. Stejneger, in the original description (*loc. cit.*, p. 153) distinguished *P. browni* by the following characters:

	<i>P. decurtatus</i>	<i>P. browni</i>
Posterior Dorsal Scales	Smooth	Keeled
Ventral Plates	172-177	159
Subcaudals	26-27	31
Tail-Length	.08-.09	.13
Lateral Spots	Present	Absent
Dorsal Spots	29-32	15

The specimen recorded from La Paz by Van Denburgh and Slevin (1921a, p. 66) has 161 ventrals and 35 subcaudals, thus agreeing with the scale counts of *P. browni*. Mr. Tracy I. Storer of the Museum of Vertebrate Zoölogy of the University of California has kindly examined the specimen recorded from Palm Springs, Riverside Co., California, by Atsatt (1921, p. 38) and informs me that it has 187 ventral plates and 32 subcaudals.

A specimen (A. M. N. H. No. 20590) collected by Dr. F. E. Lutz and J. A. G. Rehn near Tucson agrees with *browni* in every scale character, but has the dorsal coloration of *decurtatus* while a second specimen from the same locality is a typical *browni*. This extraordinary dimorphism in coloration can only be explained by further studies, depending on the discovery of additional specimens. My suspicion that the differences in scale counts alluded to is a sex character is apparently groundless, as Dr. Stejneger reports U. S. N. M. No. 62561, a *browni*, as a female, and the specimen from Palm Springs is reported to be a male by Mr. Storer. I append a tabulation of the characters of the extant specimens of these two species so far as I can determine them.

#### ***Elaphe rosalis* (Mocquard)**

*Coluber rosalis* MOCQUARD, 1899, p. 321, Pl. XII, fig. 1.

*Elaphe rosalis* STEJNEGER AND BARBOUR, 1917, p. 84.

RANGE.—Central and southern Lower California.

LOWER CALIFORNIAN RECORDS.—Santa Rosalia, Mocquard, 1899, p. 321; San Bartolo, Van Denburgh and Slevin, 1921a, p. 66.

#### ***Arizona elegans* Kennicott**

*Arizona elegans* KENNICOTT, 1859, p. 18, Pl. XIII; STEJNEGER AND BARBOUR, 1917, p. 85.

RANGE.—Southwestern United States, northern Mexico, northern Lower California.

LOWER CALIFORNIAN RECORDS.—Ensenada, Van Denburgh and Slevin, 1921a, p. 67.

	Mus. No.	SEX	LOCALITY	V. P.	SUBC.	TAIL TOTAL LENGTH	No. OF DORSAL SPOTS
<i>Phyllorhynchus browni</i> — Dorsal Scales Keeled	U. S. N. M. 15719 Type	?	Tucson	159	31	.13	15
	19258	♂	Tucson	156	30		
	62561	♀	Sabino Canyon, Arizona	158	32		
	A. M. N. H. 20590	♂	Tucson	159	33	.14	46
	A. N. S. P.	♂	Tucson	160	33	.14	13
<i>Phyllorhynchus decurtatus</i> — Smooth	A. N. S. P. — Type		N. Lower Calif. Yuma, Arizona	177	26	.08	32
	—			183	30	.10	47
	U. S. N. M. 12639	♀	La Paz	172	27	.09	29
	Cal. Acad. Sci. 45983		La Paz	161	35		
	Mus. V. Zool. Cal.	♂	Palm Springs, Calif.	187	32	.09	46

Two specimens in the Biological Survey collection come from San Tomas (U. S. N. M. No. 37519) and San Quintin (37529).

This species, while unquestionably present in the Colorado Desert area (Van Denburgh and Slevin, 1913, p. 417), appears to be more abundant in the San Diegan fauna, and also, perhaps locally, to the east of the desert.

***Pituophis catenifer annectens* Baird and Girard**

*Pituophis annectens* BAIRD AND GIRARD, 1853, p. 72.

*Pituophis catenifer annectens* VAN DENBURGH, 1920, p. 17.

RANGE.—Coast region of southern California and northern Lower California.

LOWER CALIFORNIAN RECORDS.—San Martin Island, Streets, 1877, p. 40; South Coronado Island, Van Denburgh and Slevin, 1914, p. 141; Ensenada, Van Denburgh, 1920, p. 17.

***Pituophis catenifer rutilus* Van Denburgh**

*Pituophis catenifer rutilus* VAN DENBURGH, 1920, p. 24.

RANGE.—Southwestern Arizona, ranging into northern Lower California.

LOWER CALIFORNIAN RECORDS.—(?) Gardner's Laguna (Salton River), Cope, 1900, p. 879; (?) Trinidad, Meek, 1905, p. 15.

A single specimen (U. S. N. M. No. 37536) of *Pituophis* in the collection of the Biological Survey from Alamo appears to be referable to this form. The dorsal scale count is 29–31–23; the ventral plates number 239; the subcaudals, 50; the preoculars are two on each side; the dorsal dark spots are 32, the caudal, 8.

Van Denburgh (*loc. cit.*) has recorded this form from Yuma, and it is therefore not improbable from a geographic standpoint that it should occur in northern Lower California. Its presence on the Pacific slope in the San Diegan fauna, however, is an anomaly. It can only be explained by the assumption that it has entered Lower California via the deserts and spread northward from the southern end of the San Pedro Martir Mountains, (or via the San Felipe valley) very much as I suppose *Crotaphytus wislizenii* to have done.

There does not seem to be any possibility of regarding the present specimen as an aberrant *annectens*, as both scale and color characters separate it sharply from Van Denburgh's diagnosis of that form. Whether or not *P. c. deserticola* may occur in Lower California is uncertain, but I believe that the present form will be found to inhabit the northeastern part of the peninsula rather than *deserticola*, and I have therefore tentatively referred the records of Cope and Meek to *rutilus*.

***Pituophis vertebralis* (Blainville)**

*Coluber vertebralis* BLAINVILLE, 1835, p. 293, Pl. XXVII, figs. 2-2B.

*Pituophis vertebralis* STEJNEGER AND BARBOUR, 1917, p. 86.

RANGE.—Southern and central Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1860a, p. 342; La Paz, Yarrow, 1882, p. 107; San José del Cabo, Miraflores, Van Denburgh, 1895, p. 150; San Ignacio, Arroyo de Santa Agueda, Mocquard, 1899, p. 320; Ballenas Bay, Cope, 1900, p. 879; San Pedro, San Antonio, San Bartolo, Agua Caliente, Van Denburgh and Slevin, 1921a, p. 67.

Four specimens (A. M. N. H. Nos. 5588-90, U. S. N. M. No. 64583) collected at Miraflores are in the Albatross collection. The lengths range from 965 to 1665 mm.; the tail-length from 118 mm. to 220 mm. The tail-length/total length ranges from .13 to .15 in the three male specimens, .12 in the single female. In scale characters, these specimens fall within the range of variation of the four specimens recorded by Van Denburgh and Slevin (*loc. cit.*).

Specimens in the Biological Survey collection come from Santa Margarita Island (U. S. N. M. No. 37537), Cape San Lucas (37538), San José del Cabo (37539), and Santa Anita (37540).

**Key to the Species of *Pituophis* in Lower California<sup>1</sup>**

1. Coloration on anterior half of body largely red; upper labials usually 9 or 10; scales usually in 33 or 35 rows.....*P. vertebralis*.  
Coloration anteriorly not reddish; upper labials usually 8; scale rows usually less than 35.....2.
2. Dorsal blotches numerous, 54 to 89 on body, 14-29 on tail.  
*P. catenifer annectens*.  
Dorsal blotches fewer, 32-55 on body, 8-14 on tail.....*P. c. rutilus*.

***Diadophis amabilis* Baird and Girard**

*Diadophis amabilis* BAIRD AND GIRARD, 1853, p. 113; STEJNEGER AND BARBOUR, 1917, p. 75.

RANGE.—Oregon to Lower California, west of the desert divides in California.

The specimen in the Biological Survey collection, U. S. N. M. No. 37526, from San Matias Pass, in the San Pedro Martir Mountains, established this species in the fauna of Lower California.

The specimen measures 503 mm., tail-length, 86 mm. The dorsal scales are 15-15-14; the ventral plates, 203; the subcaudals, 60; preoculars, 2-2; postoculars, 2-2; temporals, 1-1, 1-1; upper labials, 7-8; lower labials, 8-8.

The ventral color includes the first lateral scale row; the small dark ventral spots are irregularly disposed, but are on the posterior margins of the ventral plates.

<sup>1</sup>After Van Denburgh, 1920, p. 12.

**Lampropeltis getulus boylii** (Baird and Girard)

*Ophibolus boylii* BAIRD AND GIRARD, 1853, p. 82.

*Lampropeltis getulus boylii* BLANCHARD, 1920, p. 3.

RANGE.—Southwestern Utah to southern California and northern Lower California.

LOWER CALIFORNIAN RECORDS.—San Pedro Martir Mt., Van Denburgh, 1896, p. 1006; Beveridge Cañon, San Salado Cañon, San Quentin, Meek, 1905, p. 15; Ensenada, Blanchard, 1921, p. 87.

**Lampropeltis getulus conjuncta** Cope

*Lampropeltis boylii* var. *conjuncta* COPE, 1861, p. 301.

*Lampropeltis getulus conjuncta* BLANCHARD, 1920, p. 4.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1860, p. 255; La Paz, Yarrow, 1882, p. 92; San José del Cabo, Van Denburgh, 1895, p. 142; Santa Anita, Blanchard, 1921, p. 93.

Two specimens of this form were collected by the Albatross Expedition at Miraflores (A. M. N. H. No. 5649, U. S. N. M. No. 64584). The dorsal scales are 23–23–19 in one, 23–23–20 in the other; ventral plates 227 and 236; subcaudals 50 in both; specimens poorly preserved, measurements consequently not given. The coloration and head shields present no anomalies.

**Lampropeltis getulus yumensis** Blanchard

*Lampropeltis getulus yumensis* BLANCHARD, 1919, p. 6, Pl. I, fig. 2; 1921, p. 66, fig. 28.

RANGE.—Southwestern Arizona, southeastern California, and adjacent areas in Lower California and Sonora.

LOWER CALIFORNIAN RECORDS.—Volcano Lake, Blanchard, 1919, p. 10 (list).

**Lampropeltis californiæ californiæ** (Blainville)

*Coluber (Ophis) californiæ* BLAINVILLE, 1835, p. 292, Pl. xxvii, figs. 1–1B.

*Lampropeltis californiæ californiæ* BLANCHARD, 1920, p. 3.

RANGE.—Fresno County, California, to northern Lower California.

LOWER CALIFORNIAN RECORDS.—San Ysidra Ranch, Cope, 1900, p. 922.

**Lampropeltis californiæ nitida** Van Denburgh

*Lampropeltis nitida* VAN DENBURGH, 1895, p. 143, Pl. xiv.

*Lampropeltis californiæ nitida* BLANCHARD, 1920, p. 3.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—San José del Cabo, Van Denburgh, 1895, p. 143.

I have referred a single specimen, taken at Miraflores, May 6, 1911 (U. S. N. M. No. 64585), to this species. The dorsal scales are 25–25–19; ventral plates, 226; subcaudals, 46; total length, 865 mm., tail, 106 mm.



In coloration, this specimen is even more closely allied to *L. californiæ californiæ* than the juvenile specimen described by Van Denburgh (*loc. cit.*, p. 144), thus fully justifying Blanchard's reference of *nitida* to subspecific rank.

The superior head shields are entirely dark; a yellow spot extends on the nasals, loreal and preocular; the fourth and fifth upper labials, and the temporals are spotted with yellow; a small spot just behind the parietals; an oblique band crosses the neck, from the fifth ventral to the tenth, about two scales wide dorsally, expanding to include five ventrals below, and extending at each end, about to the mid-ventral line; a half collar anterior to this band; two similar oblique bands follow these, beginning on the fifteenth and twenty-fifth ventrals respectively; behind this, there are no complete dorsal crossbands on the body, but there are six on the tail; twenty-two large yellow blotches on each side, beginning on the ends of the ventrals, one or two of which, however, may be entirely yellow, and extending dorsally to the fourth scale row; above these blotches is an obscure, much interrupted, yellow dorsolateral line on each side, on the seventh and eighth scale rows; the lateral blotches are connected by a lateral line at the edge of ventrals and on the first scale row on the posterior half of the body; an irregular, frequently indistinct vertebral line begins at a point opposite the thirty-fourth ventral, and continues with eight interruptions to the base of the tail; part of this line is straight, part wavy, and at several of the interruptions, the expanded end descends laterally and nearly joins a lateral blotch, indicating its derivation from a fundamentally ringed pattern.

The chief, if not the only, difference between this coloration and that of typical *californiæ* is the predominance of the dark color on the venter. On this ground, and for geographical reasons, the specimen is referred to *nitida*. It is not unlikely that larger collections will ultimately prove that *nitida* is a variety of the species *californiæ* rather than a vicarious geographical race.

#### ***Lampropeltis catalinensis* Van Denburgh and Slevin**

*Lampropeltis catalinensis* VAN DENBURGH AND SLEVIN, 1921c, p. 397-398.

RANGE.—Santa Catalina Island, Gulf of California.

#### **Key to the Species of *Lampropeltis* in Peninsular Lower California<sup>1</sup>**

1. Dorsal longitudinal stripe, complete or interrupted.....2.  
Pattern of rings.....3.
2. Dorsal stripe white or yellow, sharply defined on a dark ground color.

*L. californiæ californiæ*.

<sup>1</sup>After Blanchard, 1920, pp. 1-7.

- Dorsal stripe less strongly contrasted with the ground color; belly uniform brown or with a few yellow blotches.....*L. californiæ nitida*.
3. White scales white to their bases, forming rings of uniform white; white bars on prefrontals broad, convex behind; lower labials usually 9...*L. getulus boylii*.  
White scales mostly brown at their bases; white bars on prefrontals broad or narrow; lower labials 9 or 10.....4.
4. White bars on prefrontals occupying less than half the area of these scutes; frontal plate uniform black, or with the white restricted to a narrow transverse bar at its anterior end; no white on parietals; lower labials usually 9.  
*L. getulus yumensis*.
- White bars on prefrontals occupying more than half the area of these plates; frontal plate with prominent white markings; each parietal with one or more white spots; lower labials usually 10.....*L. getulus conjuncta*.

### ***Rhinocheilus lecontei* Baird and Girard**

*Rhinocheilus lecontei* BAIRD AND GIRARD, 1853, p. 120; STEJNEGER AND BARBOUR, 1917, p. 91.

RANGE.—Idaho to Lower California, east to Texas.

LOWER CALIFORNIAN RECORDS.—“At or to the south of Magdalena Bay,” Lockington, 1880, p. 295.

A specimen in the Biological Survey collection, U. S. N. M. No. 37516, is from Ensenada.

The scale characters of this specimen, a male, are as follows: Dorsal scales, 23–23–19; ventral plates, 208; subcaudals, 49; preoculars, 1–1; postoculars, 2–2; temporals, 2–4, 2–3, upper labials, 7–8; lower labials, 9–9. The total length is 625 mm., the tail-length, 83 mm.

### ***Hypsiglena ochrorhynchus ochrorhynchus* Cope**

*Hypsiglena ochrorhynchus* COPE, 1860, p. 246.

*Hypsiglena ochrorhynchus ochrorhynchus* STEJNEGER AND BARBOUR, 1917, p. 93.

RANGE.—Lower California, southern California, and adjacent parts of Arizona and Sonora.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1860, p. 246; Magdalena Bay (or south), Lockington, 1880, p. 295; San José del Cabo, Sierra San Lazaro, San Francisquito (Sierra Laguna), Van Denburgh, 1895, p. 144; Mulege, Mocquard, 1899, p. 325; Los Coronados Islands, Van Denburgh and Slevin, 1914, p. 141; Sierra Laguna, Van Denburgh and Slevin, 1921a, p. 68.

Two specimens in the Biological Survey collection come from Cape San Lucas (U. S. N. M. No. 37528) and Santa Anita (37527).

The scale characters and measurements of these specimens are as follows:

Number	37527, ♂	37528, ♂
Dorsal Scales	21–21–15	21–21–17
Ventral Plates	172	168
Subcaudals	51	(tail broken)
Total Length	347 mm.	
Tail-length	63 mm.	

They agree with the specimen described by Van Denburgh and Slevin (1921a, p. 68) in the disposition of the head shields, with the exception that there are two preoculars, a small inferior and a large superior, in each.

***Natrix valida* (Kennicott)**

*Regina valida* KENNICOTT, 1860, p. 334.

*Natrix valida* STEJNEGER AND BARBOUR, 1917, p. 97.

RANGE.—Western Mexico, Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1860a, p. 341; La Paz, Yarrow, 1882, p. 132; San José del Cabo, Miraflores, Van Denburgh, 1895, p. 154; Mount San Rafael (near Agua Caliente), Santiago, Van Denburgh and Slevin, 1921a, p. 68.

The six specimens in the Albatross collection from San José del Cabo (A. M. N. H. Nos. 5573, 5581, 5583, U. S. N. M. No. 64582) and Miraflores (A. M. N. H. Nos. 5604–5) present no variation not already known in this species.

One specimen in the Biological Survey collection comes from San José del Cabo (U. S. N. M. No. 37545).

***Thamnophis ordinoides vagrans* (Baird and Girard)**

*Eutænia vagrans* BAIRD AND GIRARD, 1853, p. 35.

*Thamnophis ordinoides vagrans* VAN DENBURGH AND SLEVIN, 1918, p. 240.

RANGE.—Eastern Washington and Oregon, Idaho, south to northern Arizona and eastern California, reappearing in the San Pedro Martir Mountains, Lower California.

LOWER CALIFORNIAN RECORDS.—San Pedro Martir Mountain, Van Denburgh, 1896, p. 1007.

***Thamnophis ordinoides hammondii* (Kennicott)**

*Eutænia hammondii* KENNICOTT, 1860, p. 322.

*Thamnophis ordinoides hammondii* VAN DENBURGH AND SLEVIN, 1918, p. 256.

RANGE.—Southwestern Lower California and northwestern Lower California.

LOWER CALIFORNIAN RECORDS.—Comondu, Van Denburgh, 1896, p. 1008; Mulege, San Ignacio, Mocquard, 1899, p. 327; San Antonio, La Grulla, Ruthven, 1908, p. 133.

Four specimens in the Biological Survey collection come from Hanson Laguna (U. S. N. M. Nos. 37542–4) and Ensenada (37541).

***Thamnophis megalops* (Kennicott)**

*Eutænia megalops* KENNICOTT, 1860, p. 33.

*Thamnophis megalops* STEJNEGER AND BARBOUR, 1917, p. 101.

RANGE.—The Mexican Plateau region, north to southern Arizona and New Mexico, west to Yuma, Arizona, and the Cocopah Mountains, Lower California.

A specimen in the Biological Survey collection, U. S. N. M. No. 37514, from the Cocopah Mountains, east base, is the first record of this form from Lower California.

The lateral light line is plainly on the third and fourth scale rows anteriorly. The dorsal scale formula is 23-21-19-17; ventral plates, 152; subcaudals, 41 +; preoculars, 1-1; upper labials, 8-8; lower labials, 10-10.

The occurrence of this form in northern Lower California is not surprising in view of its occurrence at Yuma.

#### Key to the Species of *Thamnophis* in Lower California

1. Dorsal light line present.....2.  
No dorsal light line.....*T. ordinoides hammondi*.
2. Lateral light line anteriorly on the third and fourth scale rows...*T. megalops*.  
Lateral light line anteriorly on the second and third scale rows.  
*T. ordinoides vagrans*.

#### *Sonora episcopa* (Kennicott)

*Lamprosoma episcopum* KENNICOTT, 1859, p. 22, Pl. VIII, fig. 2.

*Sonora episcopa* STEJNEGER AND BARBOUR, 1917, p. 92.

RANGE.—Texas to southeastern California, south into Mexico.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Baird, 1859, p. 299; Santa Rosalia, Mocquard, 1899, p. 319.

#### *Chilomeniscus stramineus* Cope

*Chilomeniscus stramineus* COPE, 1860a, p. 339; STEJNEGER AND BARBOUR, 1917, p. 94.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1860a, p. 339; La Paz, Yarrow, 1882, p. 86; San José del Cabo, Miraflores, Van Denburgh, 1895, p. 138; San Marthe, Cope, 1900, p. 950.

Four specimens in the present collection, one from Cape San Lucas (A. M. N. H. No. 5578), three from Miraflores (A. M. N. H. Nos. 5574-5, U. S. N. M. No. 64579).

These specimens show very little variation; the dorsal scales are uniformly in thirteen rows; ventral plates (in the order named) 109, 117, 113, 121; subcaudals 24, 25, 28, 25; rostral in every case separated from the prefrontals and the nasals from the preoculars. The largest specimen (5578) measures 230 mm., tail, 32 mm.

#### *Chilomeniscus ephippicus* Cope

*Chilomeniscus ephippicus* COPE, 1867a, p. 85; STEJNEGER AND BARBOUR, 1917, p. 93.

RANGE.—Southern Lower California to the Colorado Desert, reaching Tucson, Arizona, to the east.

LOWER CALIFORNIAN RECORDS.—La Paz, Yarrow, 1882, p. 86; Santa Rosalia and Mulege, Mocquard, 1899, p. 317; San Fernando, Cope, 1900, p. 951; Todos Santos, Van Denburgh and Slevin, 1921a, p. 70.

The record of Van Denburgh and Slevin (*loc. cit.*) is only tentatively referred to this form, as they do not describe its coloration.

***Chilomeniscus punctatissimus* Van Denburgh and Slevin**

*Chilomeniscus punctatissimus* VAN DENBURGH AND SLEVIN, 1921b, p. 98.

RANGE.—Espiritu Santo Island, Gulf of California, and Magdalena Island.

A specimen in the Biological Survey collection, U. S. N. M. No. 37521, from Magdalena Island, appears to be very closely allied to this newly described form from the opposite side of the peninsula. It differs from the type in having the scales of the light bands immaculate, instead of spotted. The large number of crossbands, which is the same in both specimens, seems to me a more important character than the spotting.

The specimen from Magdalena Island has the rostral broad and in contact with the prefrontals posteriorly; nasals expanded on the upper side of the snout, probably by fusion with the frontonasals; prefrontals reaching the labials on each side; frontal broad, six-sided; supraoculars small; a minute preocular on each side; two postoculars; temporals, 1-1 on each side; upper labials, 7, third and fourth entering the eye; lower labials, 9, the first five in contact with the anterior chin shields; dorsal scales, 15-13-13; ventral plates, 127; subcaudals, 25.

Top of the head very dark brown, lighter on the snout, the lower border of the labials light; back crossed by 32 bands of dark brown about equal to the light interspaces and reaching the first row of scales on each side; 7 bands on the tail.

The total length is 98 mm.; tail, 11 mm.

***Chilomeniscus cinctus* Cope**

*Chilomeniscus cinctus* COPE, 1861, p. 303.

RANGE.—The Colorado Desert, to middle Lower California on the west and Sonora on the east.

LOWER CALIFORNIAN RECORDS.—Ballenas Bay, Cope, 1900, p. 952.

A specimen in the Biological Survey collection, U. S. N. M. No. 37520, from San Quintin, is characterized by a pattern of dark rings, completely encircling the body.

Dorsal scale rows, 15-13-13, ventral plates, 120; subcaudals, 25; the prefrontals meet the labials laterally; upper labials, 7-7; lower labials, 9-9; preoculars, 1-1; postoculars, 2-2; rostral broadly in contact with the prefrontals.

There are twenty-two dark brown rings encircling the body, with four more on the tail and a nuchal bar which does not reach the ventrals. The dark rings are wider than the interspaces dorsally, narrower ventrally, where they occupy quite regularly two ventral plates.

The forms of the genus *Chilomeniscus* are in considerable confusion and by no means well understood. Without sufficient material at hand to clear up the points in question, I prefer to lean to the side of the excessive analysis rather than synthesis. Van Denburgh and Slevin (1913, p. 410) reduce the genus to two species, *stramineus* from the Cape area of Lower California, and *cinctus* ranging from southern Lower California, southeastern California, western Arizona, and Sonora. This view is maintained by them in their recent list of Lower Californian forms (1921a, p. 52), with the subsequent addition of a new form, *C. punctatissimus* from Espiritu Santo Island.

Cope's analysis of the genus (1900, p. 948), unfortunately somewhat confused in compilation, recognizes, in addition to the well-defined *stramineus*, three crossbanded forms, *C. ephippicus*, *C. fasciatus*, and *C. cinctus*. Of these *ephippicus* and *fasciatus* have the venter immaculate, with crossbands confined to the back, while *cinctus* is sharply set off by having the body completely encircled by black bands. This may well prove to be a variable character, not of specific value, but I know of no evidence at present of intergradation or variation in this character. The scale character employed by Cope to separate *fasciatus* and *ephippicus*, however, has been shown by Van Denburgh and Slevin (1913, *loc. cit.*) to be invalid, and I follow them in uniting these two forms, but not in uniting *ephippicus* with *cinctus*. Van Denburgh and Slevin make no mention of the coloration. The evidence presented by Mocquard for the union of *fasciatus* and *cinctus* (1899, p. 318) does not seem to be sufficient for a final decision on this point.

Reference to the following key will make clear the characters which distinguish the forms recognized in the present analysis. It is notable that *C. cinctus* and *C. ephippicus* have broadly overlapping ranges, *C. ephippicus* occurring alone in southern Lower California, *C. cinctus* alone in Sonora, while northern Lower California and the Colorado Desert area have both forms.

#### Key to the Species of *Chilomeniscus*

1. Rostral not in contact with the prefrontals; no dark crossbands, each scale with a dark spot.....*C. stramineus*.  
Rostral in contact with the prefrontals; dark crossbands or rings on the body. 2.
2. Body completely encircled by dark rings.....*C. cinctus*.  
Dark crossbands on the back, venter immaculate.....3.
3. Crossbands about 25.....*C. ephippicus*.  
Crossbands about 39, with or without dark spots on the scales of the light rings.  
*C. punctatissimus*.

***Tantilla planiceps* (Blainville)**

*Coluber planiceps* BLAINVILLE, 1835, p. 294, Pl. xxvii, figs. 3-3B.

*Tantilla planiceps* STEJNEGER AND BARBOUR, 1917, p. 105.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—San José del Cabo, Sierra Laguna, Van Denburgh, 1895, p. 140; Santa Rosalia, San Ignacio, Mocquard, 1899, p. 316.

***Trimorphodon lyrophanes* (Cope)**

*Lycodon lyrophanes* COPE, 1860a, p. 343.

*Trimorphodon lyrophanes* STEJNEGER AND BARBOUR, 1917, p. 104.

RANGE.—Southern Arizona and Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1860a, p. 343; La Paz, Yarrow, 1882, p. 98; San José del Cabo, Sierra San Lazaro, Van Denburgh, 1895, p. 155; Santa Rosalia, Mocquard, 1899, p. 330.

A single specimen, (U. S. N. M. No. 64578), from Miraflores, is in the Albatross collection. Its stomach contains a juvenile specimen of *Ctenosaura hemilopha*.

The dorsal scales are 25-21-15; ventral plates, 241; subcaudals, 58+. The total length is somewhat more than 800 mm. (tail slightly mutilated). The loreal is double on one side, single on the other.

There are three specimens in the collection made by the Biological Survey, one from La Paz (U. S. N. M. No. 37522), and two from Santa Anita (37523-4).

***Micrurus euryxanthus* (Kennicott)**

*Elaps euryxanthus* KENNICOTT, 1860, p. 337.

*Micrurus euryxanthus* STEJNEGER AND BARBOUR, 1917, p. 106.

RANGE.—Southern New Mexico and Arizona, northern Mexico.

Recorded from Tiburon Island by Streets, 1877, p. 40.

***Crotalus molossus* Baird and Girard**

*Crotalus molossus* BAIRD AND GIRARD, 1853, p. 10; STEJNEGER AND BARBOUR, 1917, p. 110.

RANGE.—Southern Texas to Arizona and northern Mexico; San Esteban Island.

This species does not enter peninsular Lower California. A specimen secured on San Esteban Island in the Gulf of California by the Albatross Expedition (U. S. N. M. No. 64586) is referable to this species in all scale characters, but is exceptionally pale in color, neither the outlines of the rhombs nor the two spots normally enclosed in the rhombs being distinctly marked. This is due chiefly to the paleness of the general coloration.

The ventral plates number 189, the subcaudals 26, and the dorsal scale formula is 31-27-21. The total length is 476 mm., the tail (exclusive of a single rattle) 36 mm.

The presence of this species on San Esteban is further indication of the Sonoran, not Lower Californian, character of its fauna; and this conclusion is quite independent of the possibility that further adult specimens from San Esteban might justify the description of an insular race.

***Crotalus tortugensis* Van Denburgh and Slevin**

*Crotalus tortugensis* VAN DENBURGH AND SLEVIN, 1921c, p. 398

RANGE.—Tortuga Island, Gulf of California.

***Crotalus oreganus* Holbrook**

*Crotalus oreganus* HOLBROOK, 1840, p. 115, Pl. xxix.

*Crotalus oregonus* STEJNEGER AND BARBOUR, 1917, p. 110.

RANGE.—British Columbia to northwestern Lower California.

LOWER CALIFORNIAN RECORDS.—Los Coronados Islands, Streets, 1877, p. 40; "75 miles S. E. of San Diego," Lockington, 1880, p. 295; San Pedro Martir Mt., Van Denburgh, 1896, p. 1007; San José, Meek, 1905, p. 17.

A specimen in the Biological Survey collection, U. S. N. M. No. 37575, is from La Grulla.

***Crotalus atrox atrox* Baird and Girard**

*Crotalus atrox* BAIRD AND GIRARD, 1853, p. 5; STEJNEGER AND BARBOUR, 1917, p. 108.

RANGE.—Texas and northern Mexico to southeastern California, entering north-eastern Lower California.

LOWER CALIFORNIAN RECORDS.—East side of Cocopah Mountains, Murphy, 1917, p. 57.

I have no hesitation in recording this species from Lower California on the basis of the verbal record above quoted, as there is no snake in this area with which *Crotalus atrox* could readily be confused.

***Crotalus atrox lucasensis* Van Denburgh**

*Crotalus lucasensis* VAN DENBURGH, 1920a, p. 29, Pl. III.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1861, p. 292; La Paz, Yarrow, 1882, p. 75. San José del Cabo, Sierra El Taste, Van Denburgh, 1895, p. 156; Santa Rosalia, San Ignacio, Mulege, Mocquard, 1899, p. 332.

Six specimens of this species were collected by the Albatross Expedition at Miraflores (A. M. N. H. Nos. 5596–97, 5644–45, U. S. N. M. No. 64589) and head of Concepcion Bay (A. M. N. H. No. 6883). They agree with Van Denburgh's description in having the dorsal rhombs distinctly outlined laterally.

The dorsal scales range from 35–27–23 to 31–25–21. The ventrals range from 182 to 188 in four males, 189 and 195 in the two females; subcaudals 25 to 29 in males, 21 in both females. There are three black



caudal rings in the females, five to seven in the males. The tail is relatively much shorter in the female specimens, .05 of the total length, .07 to .08 in the males. The largest specimen (A. M. N. H. No. 5645, ♂) measures 1015 mm., tail 88 mm.

As *Crotalus atrox* certainly enters the peninsula of Lower California at the north, and as the differences on which *lucasensis* is based are slight, the use of a trinomial seems warranted.

Three specimens in the Biological Survey collection from Cape San Lucas (U. S. N. M. No. 37567), La Laguna (37568), and Santa Anita (37569).

### ***Crotalus atrox elegans*, new subspecies**

DIAGNOSTIC CHARACTERS.—Characters of *Crotalus atrox*, from which it is distinguished by the higher number of ventral plates and the reddish brown color; distinguished from *C. atrox lucasensis* by the incompleteness laterally of the light outlines of the dorsal rhombs, and by the higher number of ventral plates.

RANGE.—Angel de la Guardia Island, Gulf of California.

TYPE.—U. S. N. M. No. 64452; ♂; Angel de la Guardia Island, Gulf of California; April 10, 1911; Albatross Expedition.

DESCRIPTION OF TYPE.—Head subtriangular, covered with numerous small scales; ten scales in a line, between the large supraoculars; rostral higher than wide; two large preoculars on each side, of which the lower enters the loreal pit; two superior loreals on each side; four or five scales from the eye to the upper labials; upper labials 16–17, lower labials 18, of which only three on each side are in contact with the chin shields; dorsal scales, 35–27–21; ventrals, 197; subcaudals, 26; total length, 920 mm.; tail, 60 mm.

General color light reddish brown, marked dorsally with a series of slightly darker rhombs, which are bordered by narrow light lines; rhombs lighter at the center; these rhombic markings become difficult to distinguish on the anterior fourth of the body, but the light scales of their borders can be distinguished on the vertebral line; on the posterior fourth of the body, the light lines become entirely faded, the slightly darker markings forming broad transverse bands. Tail yellow, with five black rings, incomplete ventrally; venter uniform pale yellow; an indistinct light line from the preoculars to the middle of the labial border, and a very faint line from the posterior corner of the eye to the sixteenth upper labial.

NOTES ON PARATYPES.—The two female specimens from Angel de la Guardia (A. M. N. H. Nos. 5231 and 5586) have respectively 200 and 199 ventrals, and 21 and 20 subcaudals. The dorsal scale count is 31–27–21. The ground color is more grayish but shows a trace of the reddish tinge which is better marked in the type. The dorsal light lines enclosing the rhombs are incomplete at the sides.

I have described this form as a subspecies of *C. atrox* in order to indicate its obvious relations. The higher ventral scale count is nearly reached in a specimen of *C. atrox lucasensis* which has 195 ventrals; the average for the two forms is evidently quite different, but the extremes probably overlap. Additional material is required to determine whether it is to be considered an off-shoot of *lucasensis* or of *atrox atrox*.

**Crotalus exsul** Garman

*Crotalus exsul* GARMAN, 1883, p. 114; STEJNEGER AND BARBOUR, 1917, p. 109.

RANGE.—Southwestern California and northeastern Lower California to Cedros Island.

LOWER CALIFORNIAN RECORDS.—Cedros Island, Garman, 1883, p. 114; Ensenada, Van Denburgh, 1896, p. 1007; San Salado Cañon, San Matias, Santa Catalina, Agua Escondito, Matcni, San Quentin, Meek, 1905, p. 17; "Turtle Bay," Van Denburgh and Slevin, 1921a, p. 71.

The Albatross collection contains a single very large specimen (U. S. N. M. No. 64588) of this species, without definite locality, but almost certainly from Cedros Island.

Three specimens in the collection of the Biological Survey are from San Quintin (U. S. N. M. Nos. 37571-2) and San Tomas (37574).

The characters employed by Cope in his key to the species of *Crotalus* (1900, p. 1152) to distinguish *Crotalus ruber* (= *exsul*) are somewhat misleading, especially as he separates *ruber* widely from *atrox* which I believe to be its nearest relative. There is a tendency to widening of the rostral, and to obscurity of the canthus rostralis in *exsul*, but neither character is constant, and the reddish coloration must be relied on in most cases as a key character.

**Crotalus enyo** (Cope)

*Caudisona enyo* COPE, 1861, p. 293.

*Crotalus enyo* STEJNEGER AND BARBOUR, 1917, p. 109.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, La Paz, Yarrow, 1882, p. 74; San José del Cabo, Van Denburgh, 1895, p. 157; Mulege, Mocquard, 1899, p. 333; Miraflores, San Antonio, Todos Santos, San Bartolo, San Pedro, Sierra Laguna, Van Denburgh and Slevin, 1921a, p. 71.

A specimen collected by the Biological Survey, U. S. N. M. No. 37570, is from Santa Anita.

**Crotalus cerastes** Hallowell

*Crotalus cerastes* HALLOWELL, 1854, p. 95; STEJNEGER AND BARBOUR, 1917, p. 108.

RANGE.—Southwestern Utah to southeastern California and northeastern Lower California.

LOWER CALIFORNIAN RECORDS.—San Felipe, Meek, 1905, p. 18.

Four specimens in the collection of the Biological Survey are from San Felipe Bay (U. S. N. M. Nos. 37562-3), Cocopah Mountains, east base (37564), and San Francisquito (37565).

**Crotalus mitchellii** (Cope)

*Caudisona mitchellii* COPE, 1861, p. 293.

*Crotalus mitchellii* STEJNEGER AND BARBOUR, 1917, p. 110.

RANGE.—Southwestern Arizona to southern Lower California.

LOWER CALIFORNIAN RECORDS.—Cape St. Lucas, Cope, 1861, p. 293; Angel de la Guardia Island, Streets, 1877, p. 39; La Paz, Yarrow, 1882, p. 73; Santa Margarita Island, Las Huevitas, Sierra El Taste, San José del Cabo, Van Denburgh, 1894a, p. 450; Santa Rosalia, Mulege, San Ignacio, Mocquard, 1899, p. 331; Parral, San Matias, Meek, 1905, p. 18; Agua Caliente, Van Denburgh and Slevin, 1921a, p. 72.

Two specimens (A. M. N. H. No. 5646 and U. S. N. M. No. 64587) of this species were collected by the Albatross Expedition at Miraflores.

One typical pale specimen, U. S. N. M. No. 37566, comes from the Cocopah Mountains, east base, collected by the Biological Survey Expedition.

### ***Crotalus goldmani*,<sup>1</sup> new species**

DIAGNOSTIC CHARACTERS.—Allied to *Crotalus mitchellii* by the separation of the rostral and nasal plates by a row of scales; distinguished by: (1) dark reddish brown coloration, with the dark markings more nearly rhombic, and with light centers; (2) scales narrower and more convex; (3) supraocular plate broken up into three or four small scales.

RANGE.—Known only from the type locality.

TYPE.—U. S. N. M. No. 37573, ♂; El Piñon, Lower California, 5300 feet; July 9, 1905; E. W. Nelson and A. E. Goldman.

DESCRIPTION OF TYPE.—Habitus apparently stout, tail short, muzzle short; scales of top of head small, somewhat convex; canthus rostralis obtuse; rostral slightly higher than wide; a single row of scales between rostral and nasal; two preoculars, with two loreals between them and the posterior nasal, on each side; upper labials, 18–19; lower labials, 16–17; a small triangular area of small scales (8 or 9) between the loreal pit, the nasals, and the labials; supraocular divided into four scales on one side, three on the other, but with the fourth indicated; scales rather convex, especially on the head and tail, only the first row smooth; ventral plates, 180; subcaudals, 25; dorsal scales, 23–27–21.

Total length, 850 mm.; tail-length to base of rattle, 70 mm.

General color brownish; ventrals with irregular brown punctation; back with rhombic markings of darker brown, as long as wide; on the anterior part of the body they are notched on the mid-line; posteriorly they become wider and narrower, with seven dark bands on the top of the tail, the last three nearly black.

In view of the known variability in the scutellation of *C. mitchellii*, the present specimen may prove to be merely an abnormal one of that species. *C. mitchellii*, however, has not previously been recorded from the Pacific slope of the San Pedro Martir Mountains. It is typically a desert species, although it ranges into the lower border of the upper Sonoran life zone in California (4500 feet, at Asbestos Spring, east slope of the San Jacinto Mountains). The conditions described at El Piñon by Nelson (1921, p. 20) indicate thoroughly non-arid habitat conditions.

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<sup>1</sup>Named for Mr. A. E. Goldman, Bureau of Biological Survey, associated with Dr. E. W. Nelson in the Lower Californian explorations of the Bureau of Biological Survey.

The true status of *C. goldmani*, therefore, remains to be cleared up, and in naming it, I hope to have emphasized the fact that it presents a problem for investigation.

### Key to the Species of *Crotalus* in Lower California and Adjacent Islands

1. Superciliary scales produced into a horn-like process.....*C. cerastes*.  
Superciliary scales flat.....2.
2. Nasal plate separated from the rostral by one or two rows of small scales...3.  
Nasal in contact with the rostral.....4.
3. Supraocular a single shield.....*C. mitchellii*.  
Supraocular broken up into several plates.....*C. goldmani*.
4. Top of head anteriorly with three pairs of enlarged scales in contact.. *C. molossus*.  
Top of head anteriorly with small scales.....5.
5. Rostral wider than high.....*C. enyo*.  
Rostral higher than wide (rarely nearly as wide as high).....6.
6. Canthus rostralis often ill-defined; coloration reddish, markings indistinct in adult; pattern of side of head as in *C. atrox*.....*C. exsul*.  
Canthus rostralis distinct, dorsal rhombs distinct.....7.
7. Tail light with three to six black rings; light postsuperciliary line reaches the scale row next to the labials anterior to the angle of the mouth. (*C. atrox*) 8.  
Tail with more numerous crossbands, less sharply defined; postsuperciliary line passes behind angle of mouth.....*C. oreganus*.
8. Dorsal rhombs with a light spot on each side (as in *C. molossus*), sometimes confluent.....*C. tortugensis*.  
Dorsal rhombs not as above.....9.
9. Ventral plates 197-200.....*C. atrox elegans*.  
Ventral plates fewer, maximum 195.....10.
10. Dorsal rhombs sharply defined; light borders well defined laterally.  
*C. atrox lucasensis*.  
Dorsal rhombs less distinct, especially at the sides, the coloration without strong contrast.....*C. atrox atrox*.

*Crotalus tortugensis* is not sufficiently characterized to make its place in the above key certain; I have tentatively placed it as an ally to *C. atrox*.

### TESTUDINATA

#### *Pseudemys ornata nebulosa* (Van Denburgh)

*Chrysemys nebulosa* VAN DENBURGH, 1895, p. 84, Pls. IV-VI.

*Pseudemys ornata nebulosa* STEJNEGER AND BARBOUR, 1917, p. 120.

RANGE.—Southern Lower California.

LOWER CALIFORNIAN RECORDS.—Los Dolores, Agua Caliente, San José del Cabo, Van Denburgh, 1895, p. 85.

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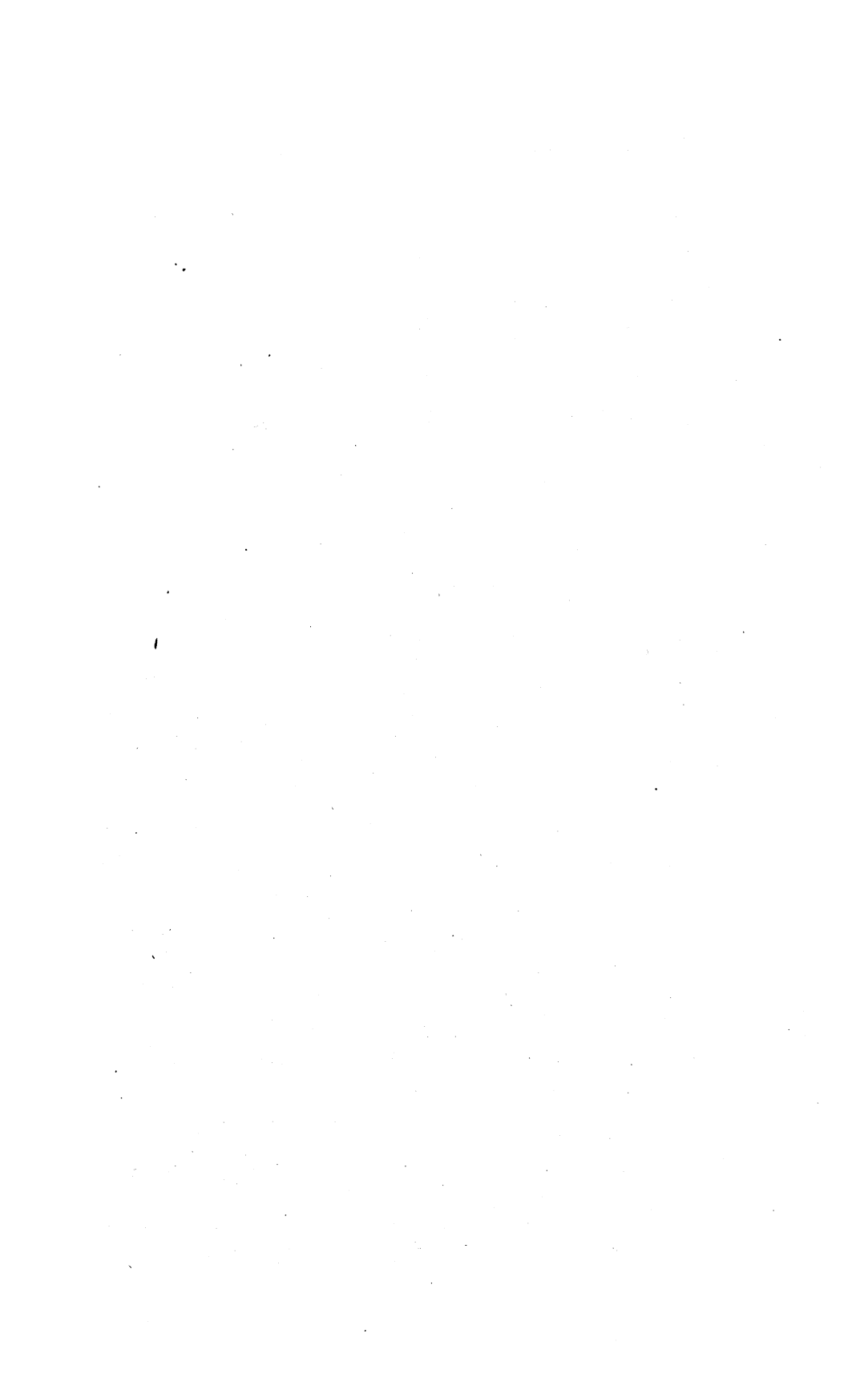
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**PLATES XLVII to LVII**

#### PLATE XLVII

Valley of the San José River looking westward, the town of San José del Cabo visible at the foot of the distant hills. The luxuriant vegetation of the irrigated fields of the river bottom (at left) contrasts with the sparse growth, among which cacti may be distinguished, on the rise of ground (at right). Most of the species of reptiles characteristic of the Cape fauna may be found here.

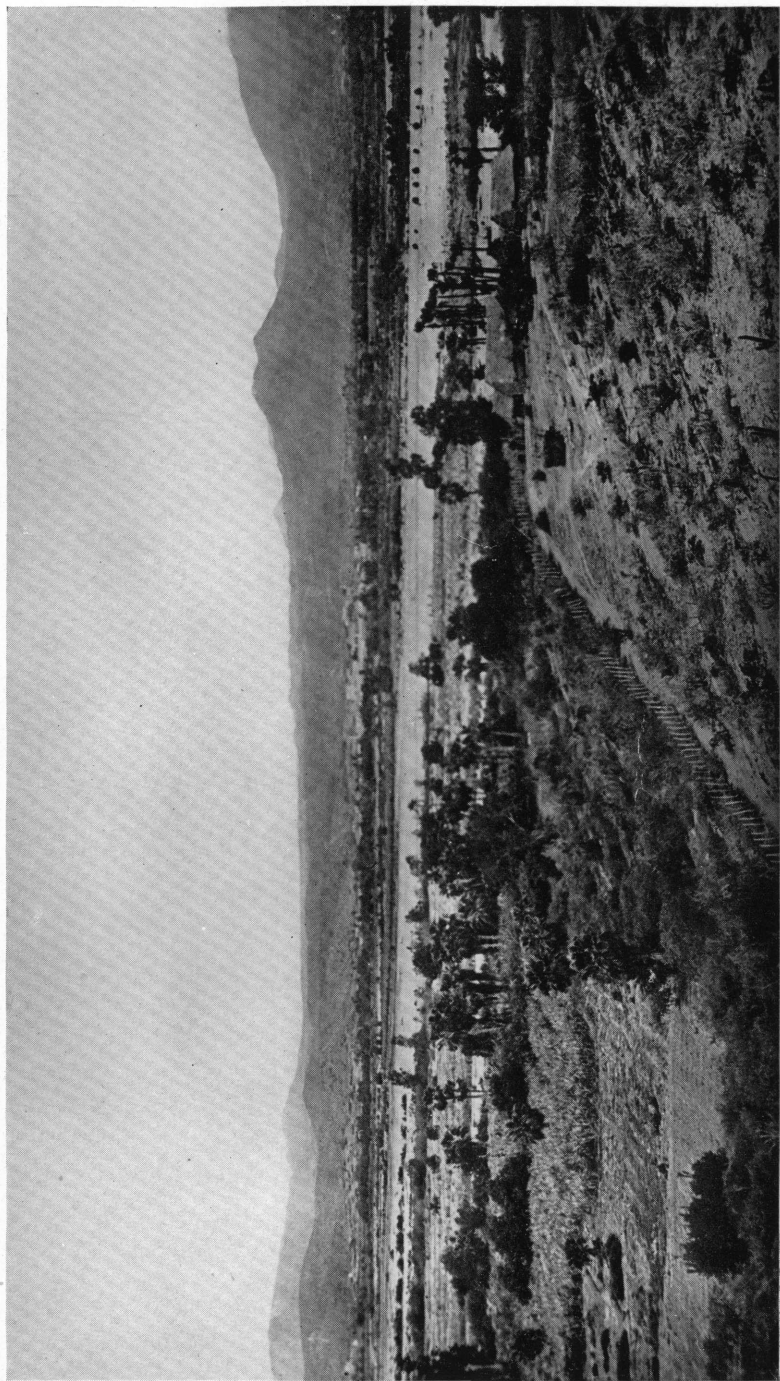


PLATE XLVIII

Agua Verde Bay. The abrupt eastern escarpment of the mountains, with a narrow stretch of coastal plain is characteristic of the topography of the gulf coast of Lower California. *Callisaurus ventralis gabbii* and *Verticaria hyperythra schmidtii* are among the reptiles characteristic of this locality, and of this side of the peninsula.



PLATE XLIX

*Sauromalus varius* Dickerson. A. M. N. H. No. 5618, San Esteban Island,  $\times \frac{1}{2}$   
(total length 458 mm.).



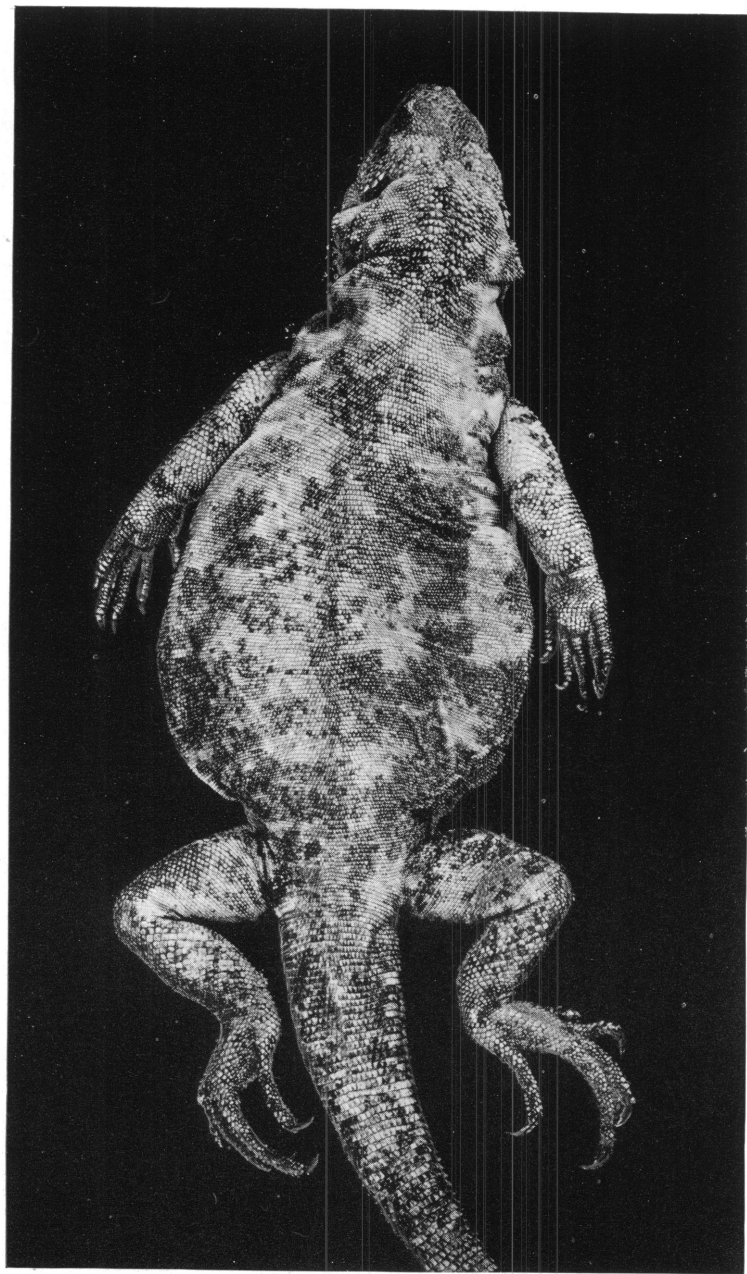
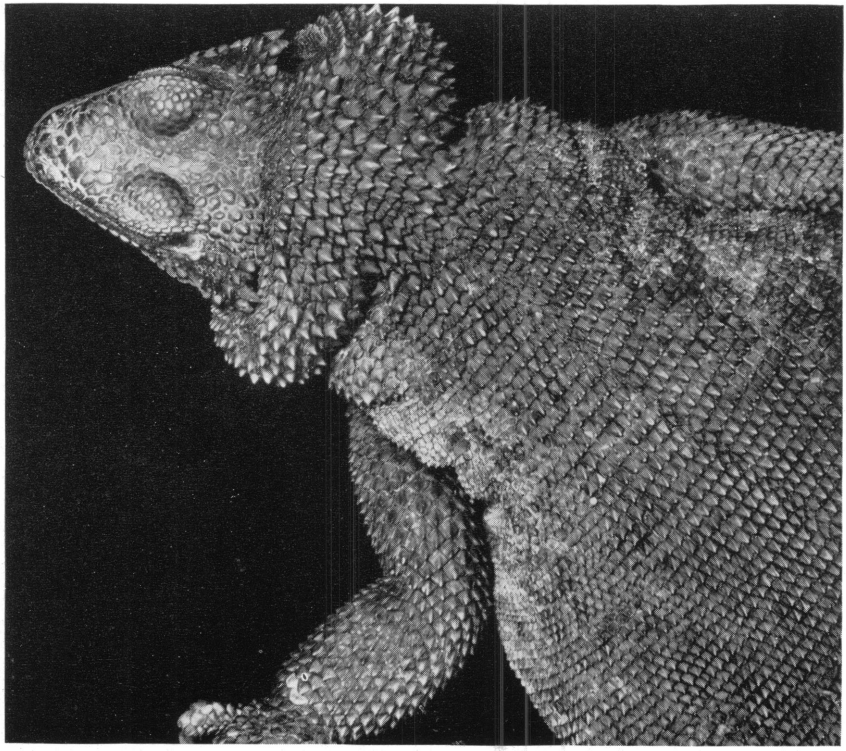


PLATE L

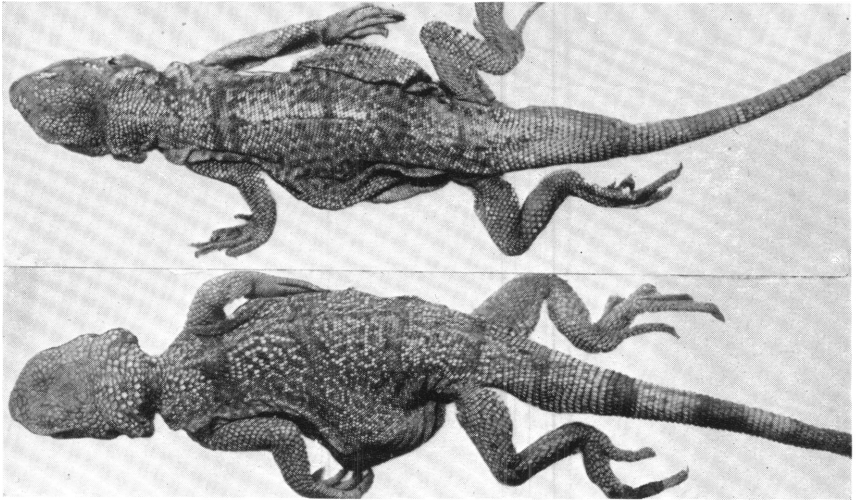
Fig. 1. *Sauromalus hispidus* Stejneger. A. M. N. H. No. 5608, Angel de la Guardia Island. To show spinous character of nuchal scales in the adult.

Fig. 2. *Sauromalus hispidus* Stejneger, U. S. N. M. No. 64572, same locality. To show transverse dorsal bands of the juvenile coloration. (Neck constricted by label.)

Fig. 3. *Sauromalus ater* Duméril. A. M. N. H. No. 6808, La Paz. To show the similarity of the juvenile coloration and the difference in nuchal scales in a specimen of approximately the same size as *S. hispidus* in Fig. 2.



1



2

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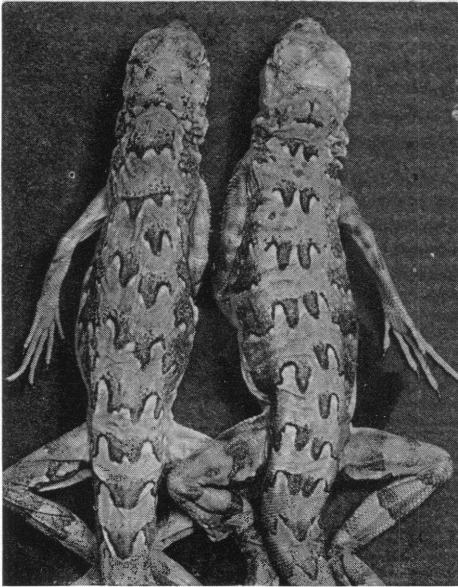
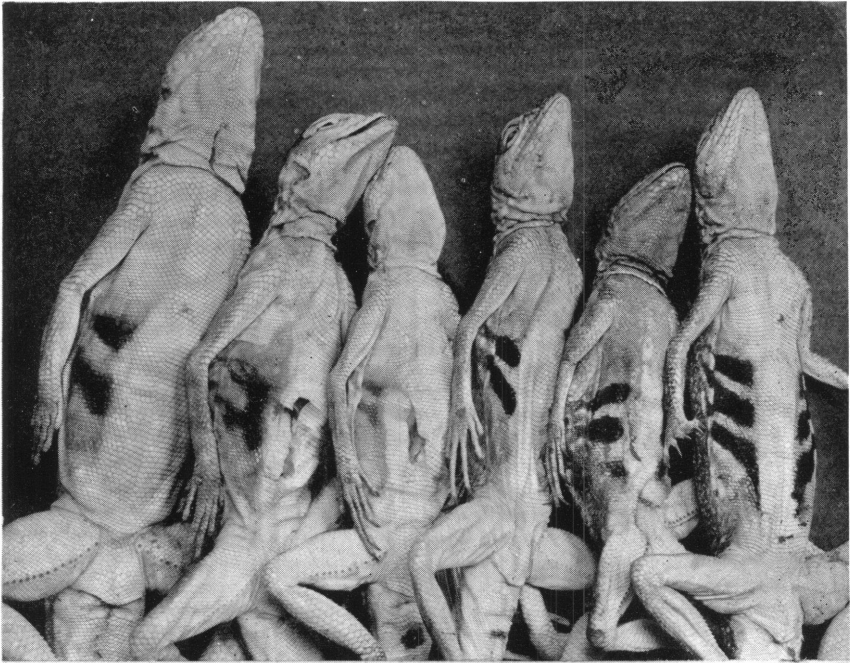
PLATE LI

Fig. 1. Ventral coloration in males of the several species of *Callisaurus*. From left to right, *C. ventralis ventralis* Hallowell, A. M. N. H. No. 2451; *C. ventralis inusitatus* Dickerson, A. M. N. H. No. 5334; *C. splendidus* Dickerson, A. M. N. H. No. 5372; *C. ventralis gabbii* Cope, A. M. N. H. No. 5308; *C. draconoides* Blainville, U. S. N. M. No. 64514; and *C. crinitus* Cope, A. M. N. H. No. 5502. The coloration of *C. ventralis myurus* (not figured) is indistinguishable from that of *C. ventralis ventralis*.

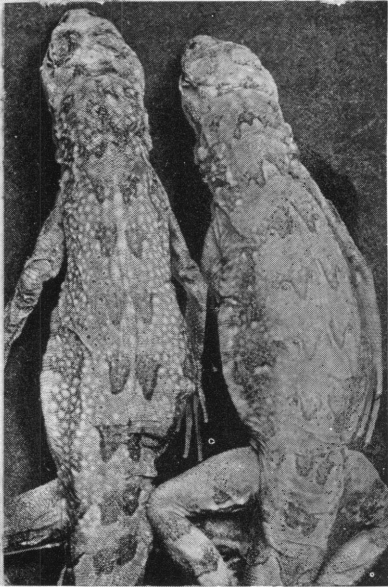
Fig. 2. *Callisaurus draconoides* Blainville, normal dorsal coloration; A. M. N. H. No. 5659 (left) and U. S. N. M. No. 64518 (right).

Fig. 3. Same species, light color phase; A. M. N. H. No. 5391 (left) and U. S. N. M. No. 64514 (right).

1



2



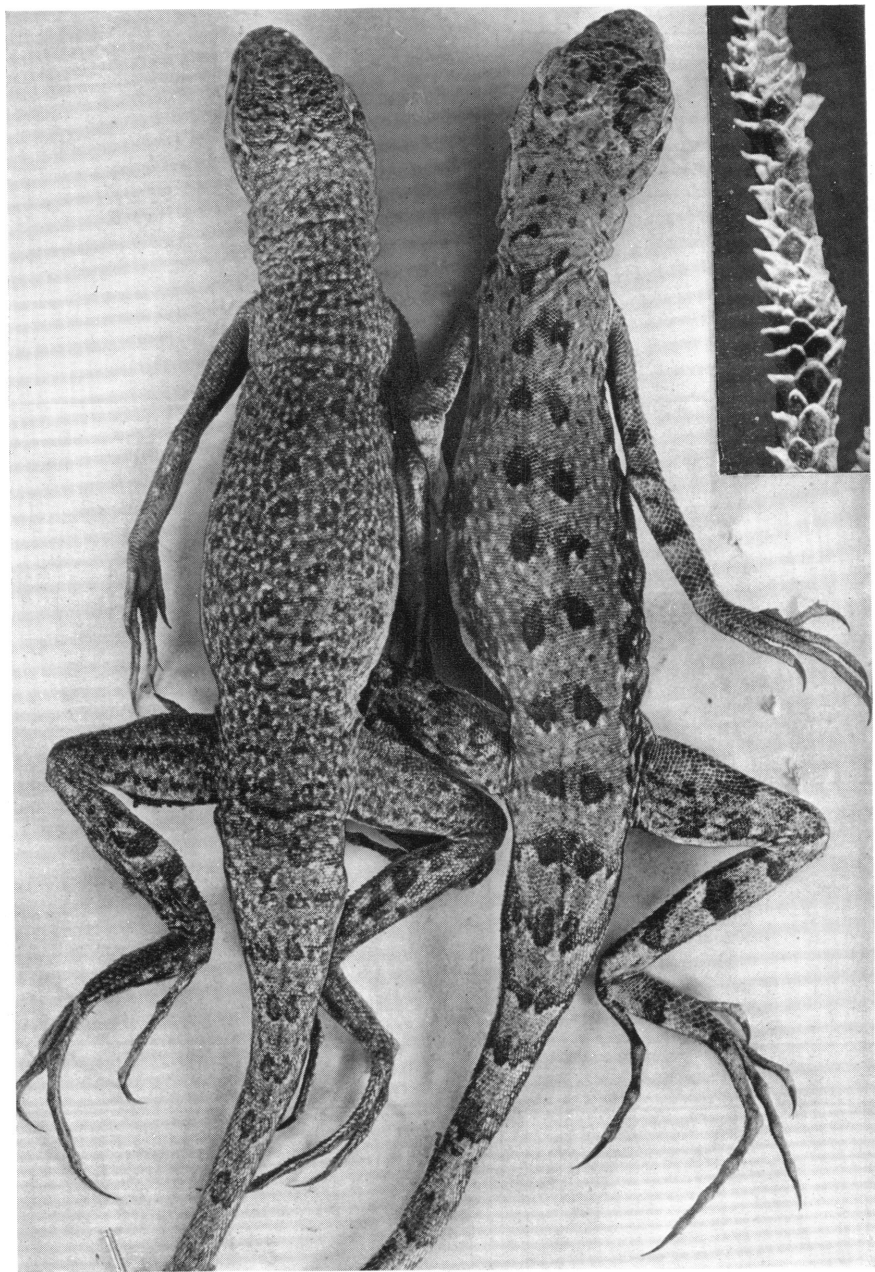
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PLATE LII

Fig. 1. *Callisaurus crinitus* Cope, U. S. N. M. No. 64530. To show the characteristic, finely maculate dorsal coloration.

Fig. 2. *Callisaurus ventralis inusitatus* Dickerson, A. M. N. H. No. 5317. To show extreme elongation of body and limbs, and dorsal color pattern.

Fig. 3. Enlarged view of the lateral digital scales of the fourth toe of *Callisaurus crinitus* which form the "fringe."



1

2

PLATE LIII

Fig. 1. *Uma notata* Baird, A. M. N. H. Nos. 22240 (right) and 22241 (left). To show dorsal color pattern and stout, short-legged habitus.

Fig. 2. Enlarged view of the base of the fourth toe of *Uma notata*, Field Mus. No. 1203, to show scales of the digital fringe



1

2

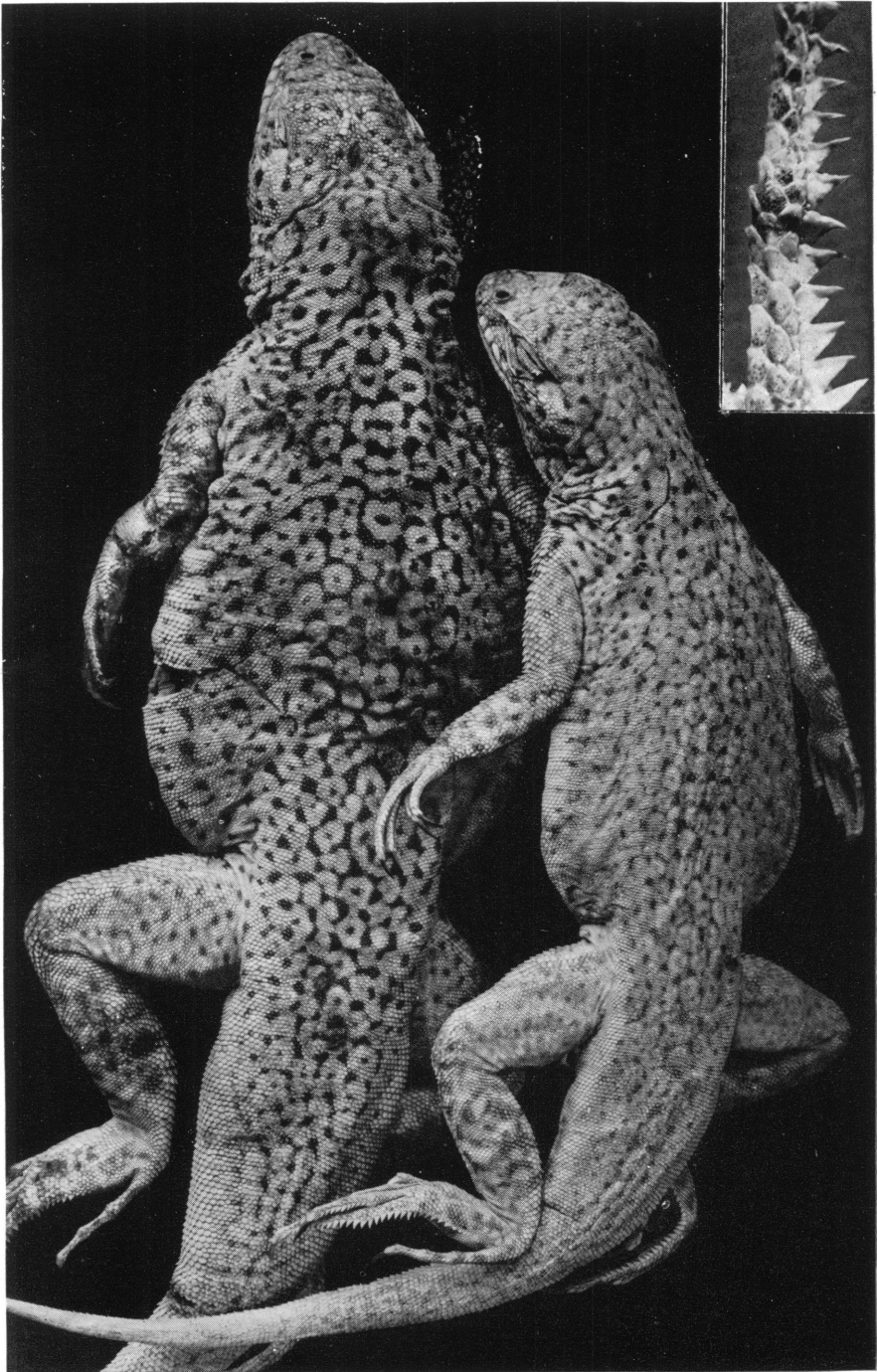


PLATE LIV

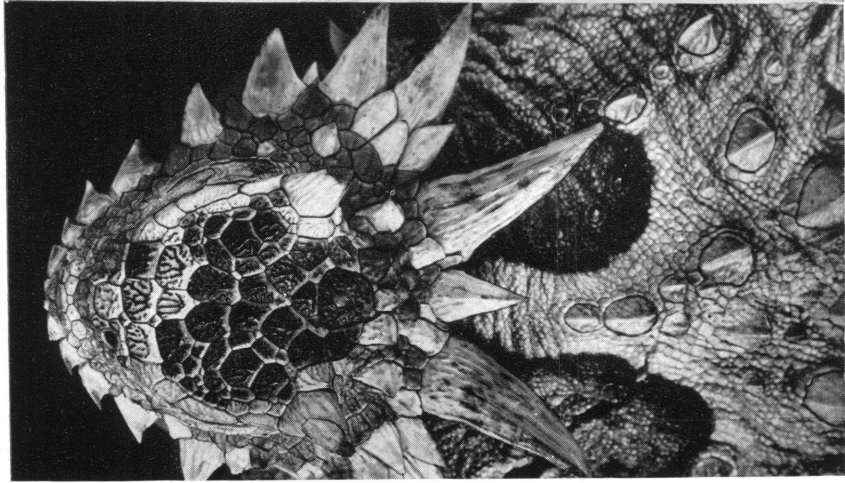
Fig. 1. *Phrynosoma coronatum* Blainville, U. S. N. M. No. 64465.

Fig. 2. *Phrynosoma blainvillii blainvillii* Gray, Field Mus. No. 1074, Trinidad,  
Lower California.

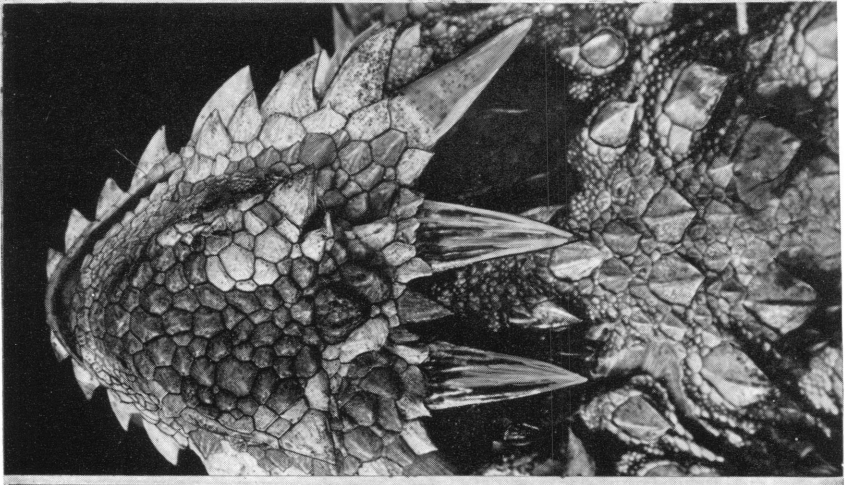
Fig. 3. *Phrynosoma nelsoni*, new species, paratype, Field Mus. No. 1127, San  
Quintin, Lower California.

To show the character of the frontal scales.

1



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PLATE LV

*Phrynosoma jamesi*, new species, U. S. N. M. No. 64450, type.

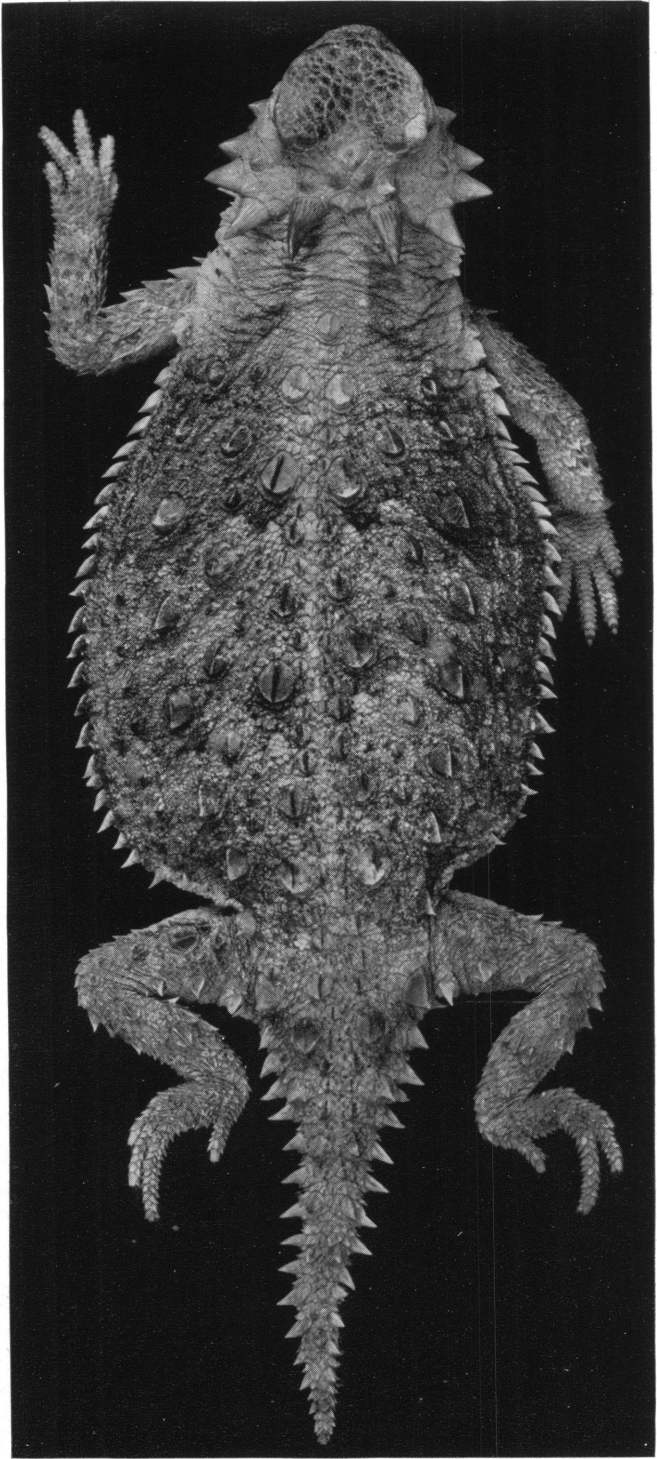


PLATE LVI

*Phrynosoma jamesi*, new species, A. M. N. H. No. 5497, paratype. Enlarged views of head.

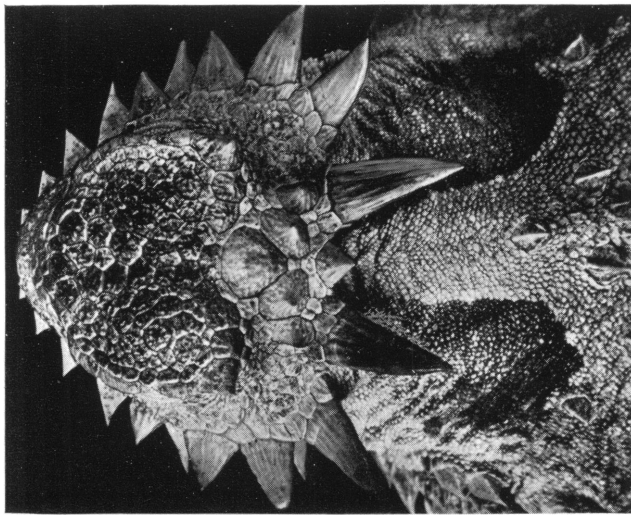
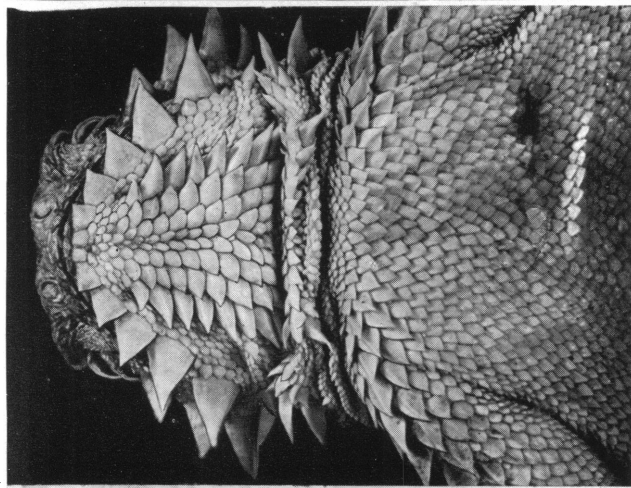
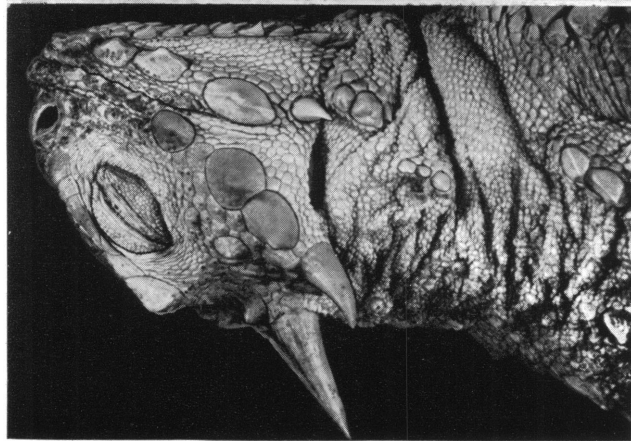


PLATE LVII

*Cnemidophorus celeripes* Dickerson, U. S. N. M. No. 64444, San José Island.



