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DISTRIBUTION OF AMPHIBIANS AND REPTILES ON ISLANDS IN THE GULF OF CALIFORNIA

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ABSTRACT

The distribution records and updated nomenclature for the amphibians and reptiles on the islands in the Gulf of California are presented. Five new populations of lizards, and 14 previously unrecorded populations of snakes are reported. Nomenclatorial problems are noted for about 20% of the species complexes of reptiles.

RESUMEN

Se presentan los registros de distribución y se ponen al dia los nombres científicos para los anfibios y réptiles de las islas del Golfo de California. Se anuncian cinco poblaciones nuevas de lagartijas y 14 poblaciones de culebras que no había sido documentados previamente. Se notan problemas con la taxonomía de los complejos de especies de réptiles.

INTRODUCTION

The herpetofauna on the islands in the Gulf of California has received considerable attention from taxonomists, systematists, biogeographers, and ecologists within the past 15 years; Case (1975, 1983) reviewed the colonizing ability and community structure of the lizards, Wilcox (1978) and Wright et al. (in prep.) examined the effect of island age in determining the number of species on islands, and Murphy (1983*a*,

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1983*b*) and Wright et al. (in prep.) examined the evolutionary origin of the insular populations. Moreover, there have been several significant taxonomic revisions of particular groups, for example, Ballinger and Tinkle (1972), Dixon (1966), and Murphy (1983*a*). In light of the considerable attention now given to this particular insular herpetofauna by researchers, this updated checklist has been prepared.

In their checklist, Soulé and Sloan (1966) noted the occurrence of about 260 populations of amphibians and reptiles on the islands in the Gulf of California. Their list included 33 genera with about 60 species divided into 109 subspecies. Subsequently, about 50 new populations have been found and many nomenclatorial changes have been made. In this checklist, we report 311 populations composed of 34 genera including 85 species and 143 subspecies. Soulé and Sloan (1966) provided insular records for 45 islands; our list is expanded to include data for 49 islands. Records for islands off the Pacific Coast of Baja California are provided by Savage (1967) and Wilcox (1980).

The annotated list of reptiles and amphibians of the islands in the Gulf of California (Table 1) is based on Soulé and Sloan (1966) with taxonomic and distributional updating from Ballinger and Tinkle (1972), Campbell and Christman (1982), Dixon (1966), Etheridge (1961), Gehlbach (1971), Goodrich et al. (1978), Grismer (1984), Hall (personal communication to R.W.M. regarding *Sceloporus magister sensu lato*), Hall and Smith (1979), Harris and Simmons (1978), Klauber (1972), Montanucci et al. (1975), Murphy (1974, 1975, 1983*a*), Murphy and Ottley (1980), Ottley et al. (1980), Ottley and Tanner (1978), Phelan and Brattstrom (1955), Powers (1974), Powers and Banta (1973, 1974, 1976), Radcliffe and Maslin (1975), Rau and Loomis (1977), Robinson (1974), Ruth (1974), Seib (1978), Smith (1972), Smith and Larsen (1973), Smith and Smith (1976), Smith and Tanner (1974), Tanner (1966, 1981), Walker et al. (1966), and Wilson (1970, 1973), and unpublished records from recent collections. The localities of most islands referred to in this report are shown in Figs. 1 and 2 and/or in Case and Cody (1983). It should be noted that our undocumented, preliminary version of this checklist (Murphy and Ottley, 1983) contains errors introduced in typesetting. *Coleonyx* (*Anarbylus*) *switaki* is incorrectly listed as occurring on Isla Tortuga (it occurs on Isla San Marcos) and *Sauromalus ater ater* is incorrectly listed as occurring on Isla Cerralvo. Herein we add *Eridiphas slevini* to the herpetofauna of Isla Coronados.

In order to provide a testable classification to those unfamiliar with the systematic and taxonomic problems of the Gulf herpetofauna, we base our nomenclature on the presumed sequence of cladogenic events. We believe the classification and taxonomy should reflect the evolutionary history of the organisms, and thus contain the greatest information content. As a basis for taxonomic decisions, the testable principles of holophyly (Hennig, 1966; Farris, 1979) are utilized; two taxa must have shared the same common ancestor to be assigned to the same taxonomic level. For example, if three populations, A, B, and C, are related, and A and B shared the same most recent common ancestor (thus being more closely related to each other than either is to C), then if populations A and C are considered conspecifics, population B must also be considered conspecific with both A and C. Similarly, if population A is accorded a taxonomic rank (e.g., species) higher than B and C (conspecific subspecies), then both B and C also must be elevated to a rank equivalent to A; populations B and C cannot be contained within the same lower taxonomic rank conspecific because population B is genealogically closer to A.

Strict application of the principles of holophyly to the Gulf insular herpetofauna involves one problem. Historically, the land bridge islands were formed at essentially the same time (Fig. 3). Thus, polychotomous relationships likely reflect geologic and thus phylogenetic reality of herpetofaunal populations on islands in the Gulf of California. Because polychotomous relationships exist, how are the principles of holophyly applied to the nomenclature of insular populations? The nomenclature should contain the maximum amount of information about the phylogenetic relationships of various insular populations. Clearly no nomenclatorial problem would exist if all terminal branches were accorded identical taxonomic rank; nor would any problem exist if all of the polychotomous terminal branches (island populations and the peninsular population) were considered to be unique, endemic taxa at the same taxonomic level (all subspecies or species, etc.). It is acceptable, although not necessarily preferable, to consider some of the terminal branches to represent endemic taxa and others to be the same as the peninsular population; it is possible to invoke the hypothesis that the unique populations are older. However, it is unacceptable to consider two or more insular populations as belonging to the same taxon exclusive of the peninsular population unless it can be demonstrated by cladistic methods that one population was derived from the other via overwater dispersal, or that the insular populations were contiguous after separation from their respective peninsular populations. This latter situation does occur; Isla Mejia, for example, is a land bridge island to Isla Angel de la Guarda, and vice versa, but neither of these islands were connected with the peninsula during the last glaciation (Fig. 3; Murphy, 1983*a*). However, some taxa are considered to be restricted to multiple Gulf land bridge islands and in these cases major nomenclatorial problems exist because the taxonomy does not reflect evolutionary relationships. Taxonomic groups having taxonomic problems by these criteria are so noted in Table 1.

Table 1.—*Distribution of reptiles and amphibians on islands in the Gulf of California. "Status" symbols are: C = on peninsula of Baja California; E = of peninsular origin and endemic to one island; R = of peninsular origin and restricted to multiple islands; N = mainland Mexico taxon; S = mainland Mexico origin and endemic to one island; M = mainland Mexico origin and restricted to multiple islands; U = unidentified and/or unassigned in last revision; X = sight record.*

Taxon	Status	Insular distribution
Class Amphibia		
Family Bufonidae		
Bufo punctatus	C	Cerralvo, Espiritu Santo-Partida Sur, Tiburon
Family Pelobatidae		
Scaphiopus couchi	C	Cerralvo, Espiritu Santo-Partida Sur
Class Reptilia		
Subclass Anapsida		
Order Testudines		
Family Testudinidae		
Gopherus agassizi	N	Tiburon
Subclass Lepidosauria		
Order Squamata		
Suborder Sauria (Lizards)		
Family Gekkonidae		
Coleonyx switaki	C	San Marcos
Coleonyx variegatus peninsularis	C	Coronados, Espiritu Santo-Partida Sur, San Jose
Coleonyx variegatus slevini[1]	R	San Marcos, Santa Ines
Coleonyx variegatus sonoriensis	N	Tiburon
Coleonyx variegatus subsp.	X	Angel de la Guarda, Danzante
Phyllodactylus angelensis	R	Angel de la Guarda, Mejia, Pond
Phyllodactylus apricus[1]	E	Las Animas
Phyllodactylus bugastrolepis	E	Santa Catalina
Phyllodactylus homolepidurus nolascoensis	S	San Pedro Nolasco
Phyllodactylus nocticolus acorius[1]	E	San Diego
Phyllodactylus nocticolus angulus	R	Salsipuedes, San Lorenzo Norte, San Lorenzo Sur
Phyllodactylus nocticolus circus[1]	E	San Ildefonso
Phyllodactylus nocticolus coronatus[1]	E	Coronados
Phyllodactylus nocticolus estebanensis[1]	R	Pelicano, San Esteban, Tiburon
Phyllodactylus nocticolus nocticolus[1]	C	Carmen, Cayo, Coyote, Danzante, La Ventana, Monserrate, Piojo, San Francisco, San Jose, San Marcos
Phyllodactylus partidus	E	Partida Norte
Phyllodactylus santacruzensis	E	Santa Cruz

Table 1.—*Continued.*

Taxon	Status	Insular distribution
Phyllodactylus tinklei[1]	E	Rasa
Phyllodactylus tuberculosus saxatilis	N	Farallon
Phyllodactylus unctus	C	Ballena, Cerralvo, Espiritu Santo-Partida Sur, Gallina
Family Iguanidae		
Callisaurus draconoides carmenensis	C	Carmen, Coronados, San Francisco, Santa Ines, San Jose, San Marcos
Callisaurus draconoides draconoides	C	Cerralvo, Espiritu Santo-Partida Sur
Callisaurus draconoides inusitatus	N	Tiburon
Callisaurus draconoides rhodostictus	C	Encantada Grande, Smith
Callisaurus draconoides splendidus	E	Angel de la Guarda
Crotaphytus collaris dickersonae	S	Tiburon
Crotaphytus insularis insularis	E	Angel de la Guarda
Ctenosaura hemilopha conspicuosa	M	San Esteban, Lobos
Ctenosaura hemilopha insulana	E	Cerralvo
Ctenosaura hemilopha nolascensis	S	San Pedro Nolasco
Dipsosaurus dorsalis carmenensis[1]	R	Carmen, Coronados
Dipsosaurus dorsalis catalinensis	E	Santa Catalina
Dipsosaurus dorsalis dorsalis	C	Angel de la Guarda, Encantada Grande, San Marcos
Dipsosaurus dorsalis lucasensis	C	Cerralvo, Espiritu Santo-Partida Sur, Monserrate, San Jose
Gambelia wislizenii wislizenii	N	Tiburon
Petrosaurus mearnsi mearnsi	C	El Muerto
Petrosaurus mearnsi slevini	R	Angel de la Guarda, Mejia
Petrosaurus thalassinus repens	C	Danzante
Petrosaurus thalassinus thalassinus	C	Espiritu Santo-Partida Sur
Phrynosoma solare	N	Tiburon
Sator angustus	M	San Diego, Santa Cruz
Sator grandaevus	S	Cerralvo
Sauromalus ater ater[1]	R	Danzante, Espiritu Santo-Partida Sur, San Diego, San Francisco, San Jose, Santa Cruz
Sauromalus ater shawi	E	San Marcos
Sauromalus hispidus[2]	R	Angel de la Guarda, Cabeza de Caballo, Granite, La Ventana (X), Mejia, Piojo, Pond, Smith, San Lorenzo Norte, San Lorenzo Sur
Sauromalus klauberi	E	Santa Catalina
Sauromalus obesus townsendi	N	Tiburon
Sauromalus slevini[1]	R	Carmen, Coronados, Monserrate

Table 1.—*Continued.*

Taxon	Status	Insular distribution
Sauromalus varius[3]	R	Lobos (X), Pelicano, San Esteban
Sceloporus clarki clarki	N	San Pedro Nolasco, Tiburon
Sceloporus hunsakeri	C	Ballena, Espiritu Santo-Partida Sur
Sceloporus lineatulus	E	Santa Catalina
Sceloporus magister magister	N	Tiburon
Sceloporus monserratensis	C	Carmen, Coronados, Monserrate, San Jose
Sceloporus orcutti	C	Carmen, Coronados, San Francisco, San Ildefonso, San Jose, San Marcos, Tortuga
Sceloporus zosteromus	C	Espiritu Santo-Partida Sur
Urosaurus microscutatus	C	Carmen, Coronados, Danzante, Espiritu Santo-Partida Sur, Las Animas, San Francisco, San Jose, San Marcos
Urosaurus nigricaudus	C	Ballena, Espiritu Santo-Partida Sur, Gallina, Gaviota
Urosaurus ornatus schotti	N	Tiburon
Uta antiqua	R	Salsipuedes, San Lorenzo Norte, San Lorenzo Sur
Uta nolascensis	S	San Pedro Nolasco
Uta palmeri	E	San Pedro Martir
Uta squamata	E	Santa Catalina
Uta stansburiana elegans	C	Ballena, Calaveras,[4] Carmen, Cayo, Cholludo, Coloradito, Coronados, Coyote, Danzante, Encantada Grande, Espiritu Santo-Partida Sur, Las Galeras, La Ventana, Piojo, San Francisco, San Ildefonso, San Jose, San Marcos, Smith, Tortuga
Uta stansburiana taylori	N	Angel de la Guarda, Granite, Mejia, Partida Norte, Pond, Rasa, San Esteban, Tiburon
Uta stansburiana subsp.	U	El Muerto, Patos, Pelicano
Uta sp.	E	Monserrate
Family Teiidae		
Cnemidophorus catalinensis	E	Santa Catalina
Cnemidophorus ceralbensis	E	Cerralvo
Cnemidophorus estebanensis	S	San Esteban
Cnemidophorus hyperythrus danheimae	E	San Jose

Table 1.—*Continued.*

Taxon	Status	Insular distribution
Cnemidophorus hyperythrus hyperythrus	C	Espiritu Santo-Partida Sur, Carmen, Coronados, San Francisco, San Marcos
Cnemidophorus hyperythrus pictus	E	Monserrate
Cnemidophorus martyris	E	San Pedro Martir
Cnemidophorus tigris bacatus	S	San Pedro Nolasco
Cnemidophorus tigris canus	R	Salsipuedes, San Lorenzo Norte, San Lorenzo Sur
Cnemidophorus tigris celeripes	R	San Francisco, San Jose
Cnemidophorus tigris dickersonae	R	Angel de la Guarda, Partida Norte, Pond
Cnemidophorus tigris gracilis	N	Tiburon
Cnemidophorus tigris maximus	C	Espiritu Santo-Partida Sur
Cnemidophorus tigris rubidus	C	Carmen, Coronados, Danzante, San Marcos
Cnemidophorus tigris tigris	C	Smith
Suborder Serpentes		
Family Leptotyphlopidae		
Leptotyphlops humilis boettgeri	C	Cerralvo
Leptotyphlops humilis humilis	C	Danzante
Leptotyphlops humilis levitoni	E	Santa Catalina
Leptotyphlops humilis lindsayi	E	Carmen
Family Boidae		
Lichanura trivirgata trivirgata	C	Cerralvo, San Marcos, Tiburon
Lichanura trivirgata subsp.	R	Angel de la Guarda, Mejia
Family Colubridae		
Chilomeniscus cinctus	C	Monserrate, San Jose, San Marcos
Chilomeniscus punctatissimus[1]	E	Espiritu Santo-Partida Sur
Chilomeniscus savagei	E	Cerralvo
Elaphe rosaliae	C	Danzante
Eridiphas slevini marcosensis	E	San Marcos
Eridiphas slevini slevini	C	Cerralvo, Coronados, Danzante
Hypsiglena torquata catalinae	E	Santa Catalina
Hypsiglena torquata klauberi	C	Angel de la Guarda, Mejia
Hypsiglena torquata gularis	E	Partida Norte
Hypsiglena torquata ochrorhyncha	C	Cerralvo, San Francisco, San Jose, San Lorenzo Sur
Hypsiglena torquata tiburonensis[1]	M	San Esteban, Tiburon
Hypsiglena torquata tortugaensis	E	Tortuga
Hypsiglena torquata venusta	C	Carmen, Danzante, San Marcos
Hypsiglena torquata ssp.	E	Monserrate
Lampropeltis getulus californiae	C	Angel de la Guarda, Cerralvo, Monserrate, Salsi-

Table 1.—*Continued.*

Taxon	Status	Insular distribution
		puedes, San Lorenzo Norte, San Lorenzo Sur, Tortuga
Lampropeltis getulus catalinensis	E	Santa Catalina
Lampropeltis getulus nigrita	N	San Pedro Martir
Masticophis barbouri[1]	E	Espiritu Santo-Partida Sur
Masticophis bilineatus bilineatus	N	Tiburon
Masticophis bilineatus slevini	S	San Esteban
Masticophis flagellum fuliginosus	C	Carmen, Cerralvo, Coronados, Danzante, Espiritu Santo-Partida Sur, Monserrate, San Ildefonso, San Jose, San Marcos
Masticophis flagellum cingulum	N	Tiburon
Phyllorhynchus decurtatus arenicolus	E	Monserrate
Phyllorhynchus decurtatus decurtatus	C	Cerralvo, San Jose, San Marcos
Phyllorhynchus decurtatus perkinsi	C	Angel de la Guarda
Pituophis melanoleucus affinis	N	Tiburon
Pituophis melanoleucus bimaris	C	San Jose
Rhinocheilus lecontei lecontei	C	Cerralvo
Salvadora hexalepis hexalepis	N	Tiburon
Salvadora hexalepis klauberi	C	San Jose
Sonora semiannulata	C	San Jose, San Marcos
Tantilla planiceps planiceps	C	Carmen
Trimorphodon biscutatus lyrophanes	C	Cerralvo, Danzante, San Marcos
Family Elapidae		
Micruroides euryxanthus euryxanthus	N	Tiburon
Family Viperidae		
Crotalus atrox	N	San Pedro Martir, Santa Cruz, Tiburon
Crotalus catalinensis	E	Santa Catalina
Crotalus cerastes cercobombus	N	Tiburon
Crotalus enyo cerralvensis	E	Cerralvo
Crotalus enyo enyo	C	Carmen, Espiritu Santo-Partida Sur, San Francisco, San Jose, San Marcos
Crotalus mitchellii angelensis	E	Angel de la Guarda
Crotalus mitchellii mitchellii	C	Carmen, Cerralvo, Espiritu Santo-Partida Sur, Monserrate, Salsipuedes, San Jose
Crotalus mitchellii muertensis	E	El Muerto
Crotalus mitchellii pyrrhus	C	Piojo, Smith
Crotalus molossus estebanensis	S	San Esteban
Crotalus molossus molossus	N	Tiburon

Table 1.—*Continued.*

Taxon	Status	Insular distribution
Crotalus ruber lucasensis	C	Danzante, Monserrate, San Jose
Crotalus ruber lorenzoensis	E	San Lorenzo Sur
Crotalus ruber ruber	C	Angel de la Guarda, Pond, San Marcos
Crotalus tigris	N	Tiburon
Crotalus tortugensis	S	Tortuga

[1] Taxon of questionable status because of holophyly and/or biogeographic problems.
[2] Distributions on islas Smith, Cabeza de Caballo, La Ventana and Piojo probably the result of Indian activity (Aschmann, 1959).
[3] Distributions on islas Pelicano and Lobos probably the result of Indian activity.
[4] The record for this island is listed as "a small islet just south of Isla Smith" and we assume this to be Isla Calaveras.

Aside from the application of the principles of phylogenetic systematics to the determination of taxonomic categories, the problem of the species concept must be considered. In working with insular populations, we have not found either the "Biological Species Concept" (Mayr, 1963) or the "Evolutionary Species Concept" (Wiley, 1978) to be universally applicable. To gain some degree of consistency, however, populations on land bridge islands were considered to be accorded subspecific rank at most, except where such considerations would create new nomenclatorial combinations. We believe this approach is justified because 1) land bridge island populations have not been isolated for a long period of time, 2) the land bridge islands were formed at least four times, once with each advance of the Laurentide Glacier, apparently without formation of "new" species, and 3) there is a general consensus among systematists who have worked with land bridge island populations that the subspecific rank is the highest appropriate rank. The former ideas are supported by electrophoretic studies (Murphy, 1983*a*, unpublished data; Murphy and Ottley, 1980), which failed to resolve unique alleles in island populations, suggesting that recontact would result in interbreeding.

Following the guidelines outlined above we encountered several additional taxonomic problems in our review and in a few cases the taxonomic ranks of populations have been shifted from the species to subspecies level and vice versa; however, in doing so we have intentionally avoided creating new nomenclatorial combinations pending detailed evaluation. Moreover, it was occasionally necessary to list populations as "subsp." for unidentified or undescribed subspecies, and "sp." for species pending further revisionary work and/or evaluation (Table 1).

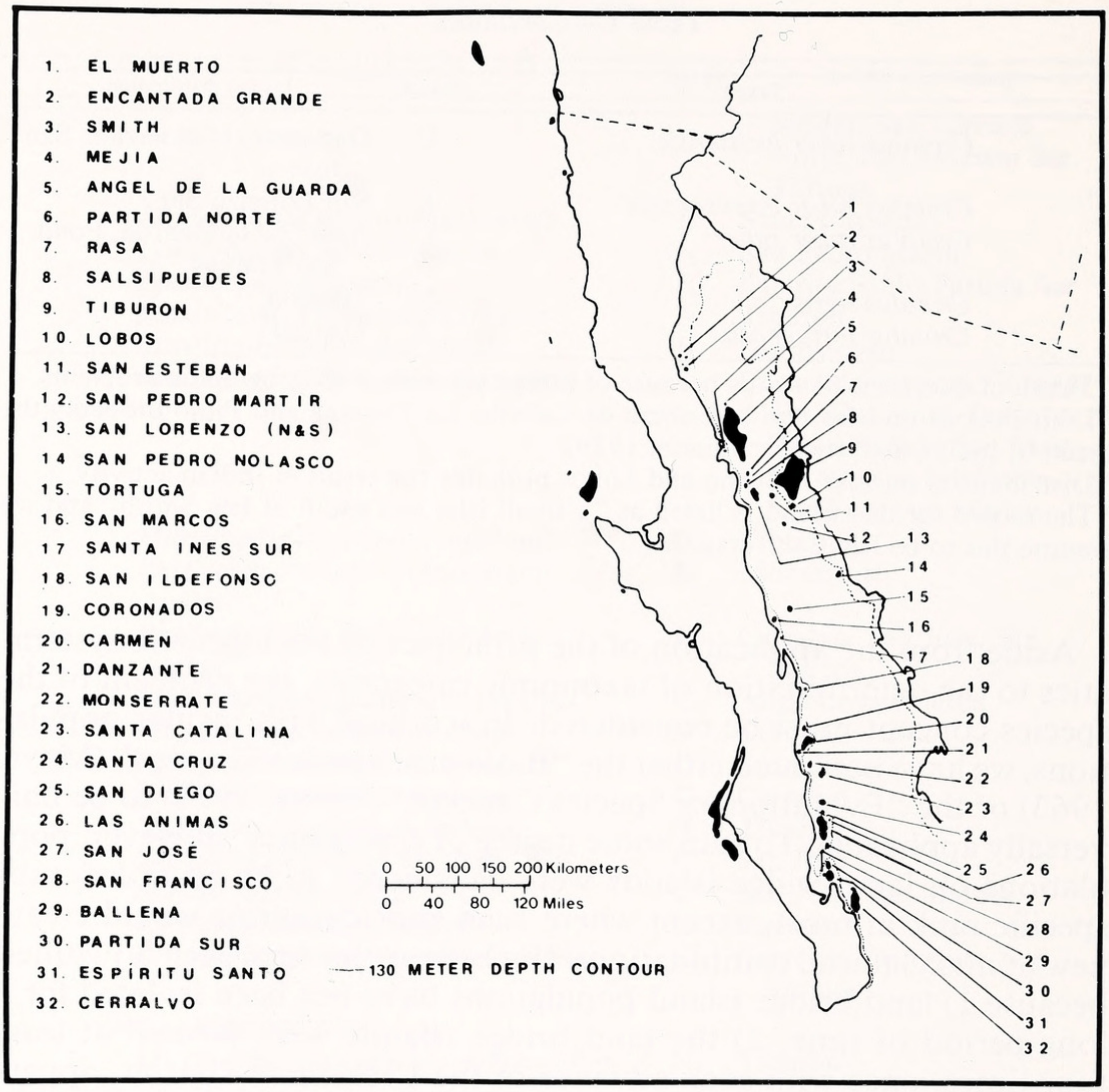

Fig. 1.—The major islands in the Gulf of California referred to in this report.

New and Problematic Insular Records

Voucher specimens for the new insular records are deposited in the collections of the M. L. Bean Life Science Museum, Brigham Young University (BYU), Provo, Utah, the California Academy of Sciences (CAS), San Francisco, California, the San Diego Museum of Natural History (SDSNH), San Diego, California, the Los Angeles County Museum of Natural History (LACM), Los Angeles, California, the University of Arizona (UAZ), Tucson, Arizona, and the Carnegie Museum of Natural History (CM), Pittsburgh, Pennsylvania.

Lizards

Coleonyx switaki (Murphy)

A population of barefoot geckos was found on Isla San Marcos in 1978. The lizards were observed on north-facing slopes of Arroyo de la Tanaria, usually in steep, boulder-strewn regions and small, adjoining

Fig. 2.—The land bridge islands in the Gulf of California in the region of Bahia de Los Angeles.

arroyos, from May through July. Specimens were found to be most active between 45 min after sundown and midnight. No *C. switaki* were found in the flat portions of the main arroyo where *C. variegatus slevini* is very abundant. Synpatry between the two species is apparently

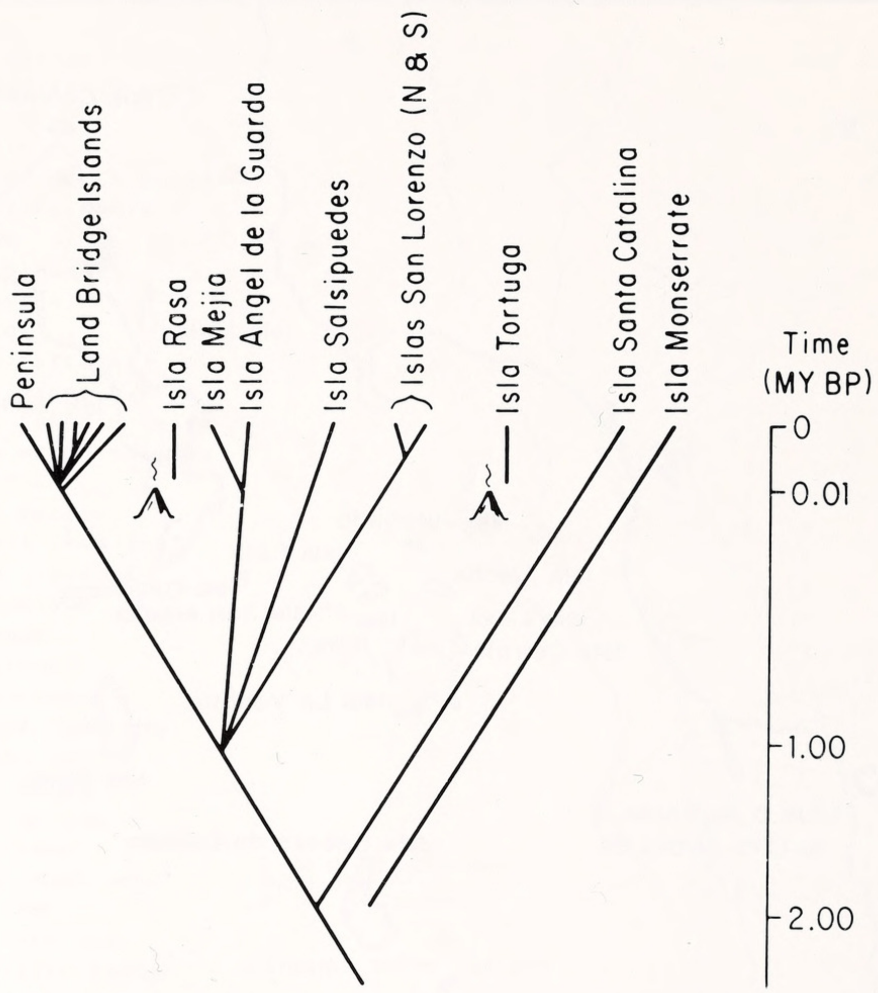

Fig. 3.—A vicariogram depicting the relationships and relative ages of many of the islands in the Gulf of California. The multiple formations of land bridge islands are not depicted for clarity. Note that if this history were used to imply phylogenetic relationships of populations on the various islands, polychotomous cladogenic branching points would result.

confined to the ecotone between the floor of Arroyo de la Taneria and a few meters up the slopes. The parapatric distributions may result in part from *C. switaki* feeding upon the smaller *C. variegatus*; we have observed this behavior after placing specimens of both species in a 10 l bucket shortly after capture.

A morphometric summary of three specimens was reported by Fritts et al. (1982); the specimens were listed as being from the "vicinity of Santa Rosalia." Based on those three specimens (CAS 147349, 147351–52), and three specimens from Isla San Marcos (BYU 34501, CM 95398, LACM 135946), a series including three adult females and three adult males, we report the following variation: body length 72–85 mm, postnasals 2, granules in contact with nasals 10 ± 1.9 (mean ± 95%

confidence limits and range), scales of eye fringe 42.1 ± 4.6 (38–45), enlarged supralabials 10 ± 1.9 (9–11), infralabials 13.4 ± 1.8 (12–15), midbody transverse tubercles 16.7 ± 2.0 (15–18), preanal pores 6.8 ± 2.3 (6–9), subdigital lamellae on fourth finger 14.3 ± 1.0 (14–15), subdigital lamellae on fourth toe 18.3 ± 1.2 (17–19), yellow pattern bands from forelimbs to caudal constriction 11.4 ± 1.3 (10–12). Our counts for supralabials are lower than those reported by Fritts et al. (1982); we restricted our counts to enlarged scales.

Coleonyx variegatus (Baird) subsp.

Two adult specimens were collected at Puerto Refugio on the north end of Isla Angel de la Guarda by John Ottley on 20 June 1974 between 2100 and 2200 hours. Both specimens were taken on desert hardpan among clumps of thick, low (< 1 m) brush. Unfortunately, both of these specimens were apparently lost in transit.

A second new insular record for the banded gecko is Isla Danzante. Steve Strand (UCLA) found a single adult individual on 28 July 1976 at the north end of Isla Danzante; the individual was released after identification. Because no voucher specimen is available, subspecific assignment is not possible.

Phyllodactylus angelensis Dixon

This leaf-toed gecko, previously restricted to islas Angel de la Guarda and Pond, is known from a single specimen (BYU 41103) from Isla Mejia. This immature female, measuring 32 mm snout–vent length, was found beneath a large rock at 1445 hours on 15 April 1973 by John Ottley.

Sauromalus ater ater Duméril

Seven adult specimens of this subspecies (BYU 34494–34495, 34740–34744), collected on 27–28 June 1978 by J. Cram, M. Mahlstedt and us, represent the first chuckwalla record for Isla Danzante. These chuckwallas have a gray-brown ground color, heavily mottled with small, brown spots. Four specimens have a fourth transverse band that is typical of the subspecies, but two specimens have only a single band at the shoulders, and one lacks bands entirely. This population is assigned to the subspecies *S. a. ater* due to similarity of meristic characters (see Shaw, 1945). Specimens most closely approximate *S. a. ater* in the number of caudals (27.4 ± 2.7; mean ± 95% confidence limits), dorsals (29.0 ± 7.9), and ventrals (137.6 ± 29) (one specimen [BYU 34740] has a high ventral count [170] with all others ranging between 125 and 137). However, humeral counts (35.3 ± 3.5) are much closer to those given for *S. slevini*.

Uta Baird and Girard

The Isla Monserrate population of side-blotched lizards has been referred to *U. stansburiana elegans,* a peninsular and land bridge island subspecies (Ballinger and Tinkle, 1972). Electrophoretic investigations of this group have yielded the surprising result that this population is biochemically well differentiated from peninsular populations. Indeed, the Monserrate Island population and *Uta squamata* from Isla Santa Catalina are electrophoretically the most unique populations in the genus in terms of allozyme characteristics (Murphy, 1983*a*). These data suggest that both the Isla Santa Catalina and the Isla Monserrate populations have been isolated for a period of time greater than that of any other insular population of *Uta.* If this is true, then the Isla Monserrate population must also be considered a distinct species to maintain a holophyletic phylogeny and classification, especially if one accepts the taxonomy of Ballinger and Tinkle (1972). Hence, this population is listed as "*Uta* sp." in this checklist (Table 1).

Snakes

Leptotyphlops humilis humilis Baird and Girard

A female blind snake (BYU 34730) was collected on the north end of Isla Danzante by John Ottley on 28 June 1978 at 2130 hours. The specimen was found crawling in an open area near a rock outcropping about 20 m above sea level. The total length is 223 mm, tail length 9 mm. There are 14 scale rows at midbody, 13 subcaudals, 253 scales between the rostral and spine of the tail, 12 rows around the tail, and 7 dorsal rows with a medium brown pigment. The specimen has a lower number of dorsal scales between the rostral and tail spine than other members of the subspecies (see Murphy, 1975); however, there is a highly significant positive correlation ($P < .01$) between the number of dorsal scales of individual snakes and latitude of collecting site (Murphy, unpublished data). This specimen represents the southernmost record for this subspecies and thus a lower number of dorsal scales is expected.

Chilomeniscus stramineus (Cope)

Although Powers and Banta (1974) report this snake as being taken from Isla Cerralvo, their description of the aberrant specimen precludes definite assignment to this species; therefore, for the moment, the record is excluded from Table 1.

Elaphe rosaliae (Mocquard)

Two specimens of this rare rat snake have been collected from Isla Danzante by Steve Strand (UCLA). The first specimen, a "large" snake, was found on 2 August 1975 on the northern portion of the island and then released. The second specimen, documented by a complete shed skin (BYU 37106), was collected on 26 October 1977, also on the northern region of the island. In November 1979, it measured approximately 1004 mm total length with a 149 mm tail. There are 287 ventrals, 78 caudals (divided), and smooth dorsals that number 30 behind the head, 33 at midbody, and 23 just anterior to the tail. The anal plate is divided. Preoculars are 1-1 (left-right), postoculars 2-2, suboculars 6-6, supralabials 10-10, and infralabials 12-13. The snake is rust-colored above and cream below (see Ottley and Jacobsen, 1983). This rat snake appears very similar to other Baja California peninsula specimens (Dowling, 1957).

Eridiphas slevini (Tanner)

A new insular record of this species is reported herein for Isla Coronados through the courtesy of Francisco Reynoso (Universidad Autonoma de Baja California Sur, La Paz, Mexico); the voucher specimen is in the UABCS collection.

Eridiphas slevini marcosensis Ottley and Tanner

This subspecies, restricted in distribution to Isla San Marcos, was recently described (Ottley and Tanner, 1978) on the basis of two specimens. An additional specimen (BYU 37642), an adult female, was collected on 21 July 1979 at about 2300 hours on a high, steep slope on the south side of Arroyo de la Taneria. It was found crawling among gypsum boulders. Meristic characters are as follows: 195 ventrals, 57 subcaudals, 23 scale rows (at 100th ventral), 8-8 supralabials, 10-10 infralabials, 1-1 preoculars, 2-2 postoculars, 1-1 loreal, 1+2-1+2 temporals, dorsal blotches 65, 426 mm total length, 73 mm tail length, and 16.7 mm head length (in 70% ethanol). There are fewer ventrals than previously reported for the subspecies (Ottley and Tanner, 1978); however, the number is greater than reported for peninsular specimens and, along with the relatively small head and large number of dorsal blotches, remains diagnostic of the subspecies.

Hypsiglena torquata klauberi Tanner

An adult female (BYU 41285) containing three developing eggs was collected from Isla Mejia on 15 April 1973 by Thomas Cozens beneath a rock on the south side of the island in late afternoon. This specimen measures 341 mm including the 48 mm tail. Ventral count is 190, with 45 subcaudals, and 21 scale rows at midbody. The nape blotch is greatly enlarged posteriorly (6 scale rows across, 3–5 longitudinally), contacting the lateral blotches. The anterior projection from the nape blotch is unusual in that it misses the parietals by one scale, and the posterior half is less than half a scale wide. The general pattern is typical of *H. t. klauberi* except in having a very light ground color.

A single specimen also represents the first record of the San Diego night snake on Isla Angel de la Guarda. The subadult female (BYU 33207) was collected on Isla Angel de la Guarda during December 1969 by Benjamin H. Banta. The specimen measures 287 mm in length, with a 46 mm tail. Ventrals number 177, subcaudals 51, with 21 dorsal scale rows at midbody. The anal scale is divided. There are 71 dorsal blotches on the body, but the tail is irregularly patterned with a pinpoint stipling and minute irregular blotches. The nape pattern is greatly enlarged posteriorly, as in the specimen from Isla Mejia, and is well separated from the left lateral blotch but contacting the right. The anterior projection of the nape blotch is 3 scales long and 2 wide, the length of which is composed of one complete scale row with a bissected row at each side. The stomach of this specimen contained an adult side-blotched lizard (*Uta stansburiana taylori*).

Hypsiglena torquata ochrorhyncha Cope

A spotted night snake was found on 23 March 1967 by Wilmer W. Tanner and Ronald Morris coiled beneath a boulder at about mid-morning on the south end of Isla San Lorenzo Sur. The subadult female (BYU 30214) is 232 mm in length including the 44 mm tail. There are 180 ventrals, 48 subcaudals, 21 dorsal scale rows at midbody. The anal plate is divided. Loreals are 1-1, parietals are separated from lower postoculars. The gular scales, although not as large as those of *H. torquata gularis,* are substantially larger than those of other known insular populations. The blotches number 20 on the tail and 62 on the body. There are 3 rows of lateral spots. The nape pattern is fairly typical of this subspecies; it is not enlarged posteriorly and does not contact the lateral head blotches. However, there are two small round spots, one on each side of the anterior projection of the nape blotch creating a rather unique pattern. This specimen is tentatively assigned to the subspecies *H. t. ochrorhyncha* until additional material becomes available. Although most characters are within the range of variation ascribed to this subspecies by Tanner (1966), the number of dorsal blotches is higher, the gular scales are larger, and the nape pattern appears to be distinctive.

Hypsiglena torquata venusta Mocquard

An immature female (BYU 33659) was collected by us on 29 June 1978 at 2300 hours when it fell from the top of the cliff into our path along the beach on the northwest side of Isla Danzante. It is 244 mm in total length; the tail is 35 mm long. There are 181 ventrals, 48 subcaudals, and 21 scale rows at midbody. The specimen lacks distinct separation of the dorsal blotches, although it is similar to *H. t. venusta* in the other characters.

Hypsiglena torquata Gunther subsp.

Michael D. Robinson collected a male night snake on the northwest side of Isla Monserrate at Ensenada de las Galitas on 18 June 1970. The specimen (UAZ 32959) has 197 ventrals, 54 subcaudals, 8-8 supralabials, 10-10 infralabials, 2-2 preoculars, 2-2 postoculars, 1-2 loreals, and 21 scale rows at midbody. The anal scale is divided. There are 75 dorsal blotches on the body excluding the tail; the first 10 are distinctly separated dorsally.

Phyllorhynchus decurtatus decurtatus (Cope)

Six specimens of this subspecies (BYU 33682–33686, 34765) were collected from Arroyo de la Taneria on Isla San Marcos as previously reported (Murphy and Ottley, 1980). The first five specimens were found by John C. Cram and John Ottley during 1–2 June 1978 on warm nights between 2030 and 2300 hours; a sixth was collected on 20 July 1979 at 2100 hours by Larry E. Hunt. Most were found lying motionless beneath bushes or along the edges of the arroyo. There are three juveniles and three adults. The following meristic and pattern variability was found (mean $\pm$ 95% confidence limits; bilateral counts are grouped): ventrals in males (n = 4) 163.5 $\pm$ 3.8, in females (n = 2) 174–175; subcaudals in males 33.5 $\pm$ 1.1, in females 26–27; scale rows at midbody 19.2 $\pm$ 0.8; supralabials 6.3 $\pm$ 0.9; infralabials 8.9 $\pm$ 0.6; oculars 8.2 $\pm$ 0.8; loreals 2.2 $\pm$ 0.8; body blotches 28.5 $\pm$ 7.2, split body blotches 3.3 $\pm$ 4.6; tail blotches 6.5 $\pm$ 1.6.

As noted above, five of the six specimens have their dorsal blotches split and thus resemble *P. decurtatus arenicolus* from Isla Monserrate. However, none of these specimens fall within the range of number of blotches set by Savage and Cliff (1954) for *P. d. arenicolus.* By meristic characters and coloration the Isla San Marcos specimens are most similar to the subspecies *P. d. decurtatus,* the only exception being slightly higher subcaudal counts in the females.

Pituophis melanoleucus bimaris Klauber

A single adult female Baja California gopher snake, LACM 23234 (originally UCLA 16408) was collected on 1 September 1964 by Kenneth K. Asplund on Isla San Jose. The specimen has 256 ventrals, 61 divided subcaudals, and a divided anal scale. There are 9 supralabials with the 5th contacting the eye, 12 infralabials, single loreals, 31 scale rows behind the head, 33 at midbody and 26 just proximal to the tail, 2-2 (left-right) preoculars and 3-5 postoculars. Body blotches number 37 plus 9 on the tail; the first 7 and last 30 blotches are blackish-brown in color (in 70% ethyl alcohol) with the cream interspaces being narrower than the blotches; there are 9 less dense brown blotches between the anterior and posterior blackish-brown blotches with the lighter cream interspaces being approximately equal in width. The ventral scales are cream anteriorly becoming progressively more pigmented posteriorly. The specimen is readily assigned to *P. m. bimaris* on the basis of the blackish-brown anterior body blotches. The Baja California gopher snake has previously been recorded from islas Santa Margarita and Magdalena on the Pacific Coast of Baja California del Sur (Klauber, 1946).

Sonora semiannulata Baird and Girard

An adult female (BYU 34766) was collected on 20 July 1979 by John Ottley in front of the commissary in the mining town on the southwest region of Isla San Marcos. Apparently it had been killed several days earlier and consequently was found in poor condition; the posterior one fourth of the body is missing. Fragments of two developing eggs remained in the body cavity. Despite the poor condition of the specimen the coloration appears typical; the dorsal scales are drab-brown with lighter edges. Black stippling appears to be more concentrated on the dorsal scales than usual but we are uncertain if this is due to individual variation or specimen condition.

Trimorphodon biscutatus lyrophanes (Cope)

Two specimens were collected in the vicinity of Arroyo de la Taneria on the southwest portion of Isla San Marcos. The first, a subadult female (BYU 33673), was collected on 3 June 1978 at 2300 hours by John C. Cram near the top of the steep, north-facing slope of Arroyo de la Taneria about 1 km from the western beach. This snake measures 508 mm overall with a tail 78 mm in length. There are 29 body blotches and 15 tail blotches. Ventrals number 236, subcaudals 65, midbody dorsal scale rows 23. The anal scale is undivided. The second specimen, an adult female (BYU 33674), was collected on 18 June 1978 by Robert Murphy. It was found at 2040 hours crawling in an area of sparse low brush about 200 m from the west shoreline on the south side of Arroyo de la Taneria. Measurements for this snake are 818 mm total length including the 120 mm tail. Body blotches number 32; the tail has 15. There are 237 ventrals, 63 subcaudals, and 24 scale rows at midbody. The anal plate is undivided. Both specimens are easily recognized as being typical of the subspecies *T. b. lyrophanes* which is known from the adjacent peninsula. However, the parietals on both snakes are heavily sutured, nearly divided diagonally.

A second new insular record for the Baja lyre snake is documented by a single specimen (CAS 153841) collected on Isla Danzante about 1 km south of the north end of the island at about 23 m elevation on flat desert hardpan near *Perognathus* (pocket mouse) burrows. The snake was found at 2100 hours on 30 August 1977 by Steve Strand (UCLA). In meristic pattern it appears to be typical of *T. biscutatus lyrophanes* (see Gehlbach, 1971). There are 33 body blotches plus 18 on the tail, about 222 ventrals, 66 caudals, and 22 scale rows at midbody. The snake measures about 560 mm with the tail comprising 83 mm. The specimen is in poor condition making the total length and number of ventrals only estimates. The anal plate is not divided.

Crotalus enyo enyo (Cope)

Three specimens (BYU 34604–34606), all males, were collected in Arroyo de la Taneria on Isla San Marcos. The first was collected on 2 June 1978 at 2130 hours by John C. Cram at the edge of a trash dump. The second specimen was taken by us on 17 June 1978 after it had fallen into a water well at the goat corral and drowned. The third rattlesnake was found by Robert Murphy on 18 June 1978 at 2200 hours as it lay in a resting coil on a pile of rubbish near the center of the arroyo about 1.5 km from the western shoreline.

These specimens fall within the range of variation of the subspecies *C. e. enyo* as defined by Klauber (1931:363) in meristic characters and coloration. The following counts were taken from BYU 34604–34606, respectively: ventrals 165, 172, 169; subcaudals 28, 29, 27; scale rows at midbody 25, 25, 25; supralabials 13-13, 14-14, 14-14; infralabials 14-14, 15-14, 14-15; scales bordering rattle 10, 10, 10; scale rows at midtail 13, 13, 13; body blotches 33, 36, 31. Contrary to the general trend of dwarfism in insular snake populations commented on by Soulé and Sloan (1966), these rattlesnakes are quite large; two are in excess of 800 mm, and one (BYU 34606) is only 49 mm from matching Klauber's (1972) record of 895 mm for the subspecies.

Crotalus mitchellii mitchellii (Cope)

An adult male (SDSNH 44359) was collected on Isla Salsipuedes by the Vermillion Sea Expedition on 23 March 1962. It measures 807 mm in total length with a tail of 67 mm; rattle width is 15.7 mm; head is contained in the total length 24 times. There are 33 body blotches and 4 tail rings. Ventrals number 170, subcaudals 25, supralabials 17-17, infralabials 17-15, rattle segments 8 and equal in width to each other. The last supralabials are about twice as long as the preceding scales. Coloration (in alcohol) is a light cream-yellow background with blotches composed of black to dark brown stippling that frequently run together to form larger spots, a few of which are greater than 1 mm in diameter; the tail is light grayish-white in background with rings darkest dorsally blending to gray laterally; the ventrals are immaculate cream-yellow. Thus all characters of this specimen agree with the description of *C. m. mitchellii* (Klauber, 1972).

Crotalus ruber Cope

Although Harris and Simmons (1978) described the Isla Monserrate population of red diamond rattlesnakes, *Crotalus ruber,* as an endemic subspecies, we concur with McCranie and Wilson (1979) in not recognizing the incomplete "preliminary" description of the population. Consequently, the subspecific notation should be considered a *nomen suspectum* (and not a *nomen nudum* as McCranie and Wilson [1979] stated). The Isla Monserrate population of red diamond rattlesnakes is accordingly referred to as *C. ruber lucasensis.* Moreover, Harris and Simmons (1978) revived *C. ruber elegans* for the red diamond rattlesnake population on Isla Angel de la Guarda. However, we feel that their justification is inadequate, necessitating further investigation before their recommendation can be seriously considered.

COMPLETENESS OF THE DISTRIBUTIONAL RECORDS

This review summarizes and increases the known insular populations of lizards by only nine new populations, seven of which are for nocturnal geckos in the genera *Coleonyx* and *Phyllodactylus.* We believe that even though a few populations of geckos remain to be discovered, the distributional data base for lizards is better than 90% complete; this view is supported by lizard distribution patterns on Gulf islands (Murphy 1983*b*). In contrast, this review summarizes and increases the known insular populations of snakes by 30% over that of Soulé and Sloan (1966). Even though this increase is substantial, the records are undoubtedly incomplete; but just how incomplete are they? If we find a strong correlation between the number of snake species and any independent variable on the various Gulf islands, we may make an estimation of completeness of our records, predicting the number of insular snake populations which remain to be discovered. In the course of this investigation, the number of snakes was found to be significantly correlated with the number of lizards on the various Gulf islands ($P < .01$).

All islands have not received equal collecting effort. As evidence in support of this assertion, this checklist increases the snake fauna of Isla San Marcos by 100%, and Isla Danzante by 130% since Soulé and Sloan (1966). Because there is no unbiased method to identify poorly collected islands, we simply defined well collected islands as those having received at least 10 man-nights of collecting. On two such islands, Tortuga and Monserrate, one more species of snake than lizard is found, and on islas Danzante, San Pedro Martir, and San Marcos the number of species of snakes equals the number of species of lizards. On Isla San Marcos we have spent substantial efforts collecting yet expect to find at least one additional species of snake, the blind snake, *Leptotyphlops humilis,* and possibly the Baja California rat snake, *Elaphe rosaliae,* which occurs on the peninsula opposite this island. Therefore, the maximum number of species of snakes on the islands may equal the number of species of lizards plus 1 or 2, except on very small islands. It is thus possible to estimate the total number of snake populations, and therefore estimate the completeness of the distributional records. From these data we may estimate the snake distributional records to be roughly 50% complete.

One of us (Ottley) has spent considerable time collecting on one small island, Isla Mejia. Although four species of lizards have been recorded from this island only two snake species have been found. This finding of a lower number of snake species may be true for many very small islands; that is, the number of snake species on the small islands may not exceed the number of lizard species by one or two. Indeed, this would not be surprising considering that many snake species occupy a higher trophic level and consequently would be expected to occur in lower densities; small islands may be too small to support snake populations large enough to survive environmental bottlenecks. Moreover, many small islands do not provide appropriate habitat for many small, burrowing snake species. If we consider the number of snake species to equal the number of lizard species on the Gulf islands, and not to exceed them by one or two, our estimation of completeness is about 70%.

Because distributional records for snakes are likely only 70% complete we caution against their use in statistical analyses attempting to discern causative factors limiting the number of species of reptiles on Gulf of California islands (Case, 1983). Inasmuch as the distributional data for the lizards are far more complete we urge only these distributional data be used for such analyses; the predictive equations derived for the lizards (Wright et al., in preparation) should be generally applicable for the snakes as well because the number of lizards and snakes on the various Gulf islands are highly significantly correlated.

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LITERATURE CITED

ASCHMANN, H. 1959. The central desert of Baja California: demography and ecology. Ibero-Americana: 42. Univ. California Press, Berkeley, 282 pp.

BALLINGER, R. E., AND D. W. TINKLE. 1972. Systematics and evolution of the genus *Uta* (Sauria: Iguanidae). Misc. Publ. Mus. Zool., Univ. Michigan, 145:1–83.

CAMPBELL, H. W., AND S. P. CHRISTMAN. 1982. The systematic status of *Phyllorhynchus decurtatus porelli* Powers and Banta. J. Herpetol., 16:182–183.

CASE, T. J. 1975. Species numbers, density compensation, and colonizing ability of lizards on islands in the Gulf of California. Ecology, 56:3–18.

———. 1983. The reptiles: ecology. Ch. 7, pp. 159–209, *in* Island biogeography in the Sea of Cortez (T. J. Case and M. L. Cody, eds.), Univ. California Press, Los Angeles, xii + 508 pp.

CASE, T. J., AND M. L. CODY (eds.). 1983. Island biogeography in the Sea of Cortez. Univ. California Press, Los Angeles, xii + 508 pp.

DIXON, J. R. 1966. Speciation and systematics of the gekkonid lizard genus *Phyllodactylus* on the islands in the Gulf of California. Proc. California Acad. Sci., 4th ser., 33:415–452.

DOWLING, H. G. 1957. A taxonomic study of the ratsnakes, genus *Elaphe* Fitzinger. V. The *rosaliae* section. Occas. Papers Mus. Zool., Univ. Michigan, 583:22.

ETHERIDGE, R. 1961. Additions to the herpetofauna of Isla Cerralvo in the Gulf of California, Mexico. Herpetologica, 17:57–60.

FARRIS, J. S. 1979. The information content of the phylogenetic system. Syst. Zool., 28:483–519.

FRITTS, T. H., H. L. SNELL, AND R. L. MARTIN. 1982. *Anarbylus switaki* Murphy: an addition to the herpetofauna of the United States with comments on relationships with *Coleonyx*. J. Herp. 16:39–52.

FROST, D. 1983. Relationships of the Baja California ground snakes, genus *Sonora*. Trans. Kansas Acad. Sci. 86:31–37.

GEHLBACH, F. R. 1971. Lyre snakes of the *Trimorphodon biscutatus* complex: a taxonomic resume. Herpetologica, 27:200–211.

GOODRICH, R. L., R. W. MURPHY, J. NYHAN, AND M. J. WONG. 1978. Geographic distribution: *Masticophis flagellum* and *Crotalus ruber lucasensis*. Herpetol. Rev., 3:108.

GRISMER, L. L. 1984. A reevaluation of the lizard genus *Anarbylus* Murphy and its cladistic relationships to *Coleonyx* Gray. Herpetologica, 39:394–399.

HALL, W. P., AND H. M. SMITH. 1979. Lizards of the *Sceloporus orcutti* complex of the Cape Region of Baja California. Breviora, 452:26.

HARRIS, H. S., JR., AND R. S. SIMMONS. 1978. A preliminary account of the rattlesnakes with the description of four new subspecies. Bull. Maryland Herpetol. Soc., 14:105–211.

HENNIG, W. 1966. Phylogenetic systematics. Univ. Illinois Press, Urbana, 263 pp.

KLAUBER, L. M. 1931. *Crotalus tigris* and *Crotalus enyo,* two little known rattlesnakes of the southwest. Trans. San Diego Soc. Nat. Hist., 6:353–370.

———. 1946. The gopher snakes of Baja California, with descriptions of new subspecies of *Pituophis catenifer.* Trans. San Diego Soc. Nat. Hist., 11:1–40.

———. 1972. Rattlesnakes: their habits, life histories, and influence on mankind. Univ. California Press, Berkeley, 2nd ed., 2 vol., xxx + 1533 pp.

MAYR, E. 1963. Animal species and evolution. Belknap Press, Cambridge, Massachusetts, 797 pp.

MCCRANIE, J. R., AND L. D. WILSON. 1979. Commentary on taxonomic practice in regional herpetological publications: a review of *A preliminary account of the rattlesnakes with the description of four new subspecies* by Herbert S. Harris, Jr., and Robert S. Simmons (1978. Bull. Maryland Herpetol. Soc., 14(3):105–211), with comments on other Harris and Simmons rattlesnake papers. Herpetol. Rev., 10: 18–21.

MONTANUCCI, R. R., R. W. AXTELL, AND H. C. DESSAUER. 1975. Evolutionary divergence among collared lizards (*Crotaphytus*), with comments on the status of *Gambelia.* Herpetologica, 31:336–347.

MURPHY, R. W. 1974. Geographic distribution: *Coleonyx variegatus.* Herpetol. Rev., 5:107.

———. 1975. Two new blind snakes (Serpentes: Leptotyphlopidae) from Baja California, Mexico with a contribution to the biogeography of peninsular and insular herpetofauna. Proc. California Acad. Sci., 4th ser., 40:93–107.

———. 1983*a*. Paleobiogeography and genetic differentiation of the Baja California herpetofauna. Occas. Papers California Acad. Sci., 137:1–48.

———. 1983*b*. The reptiles: origin and evolution. Ch. 6, pp. 130–158, *in* Island biogeography in the Sea of Cortez (T. J. Case and M. L. Cody, eds.), Univ. California Press, Los Angeles, xii + 508 pp.

MURPHY, R. W., AND J. R. OTTLEY. 1980. A genetic evaluation of the leafnose snake, *Phyllorhynchus arenicolus.* J. Herpetol., 14:263–268.

———. 1983. A distributional checklist of the reptiles and amphibians on the islands in the Sea of Cortez. Appendix 6.1 and 6.2, pp. 429–437, *in* Island biogeography in the Sea of Cortez (T. J. Case and M. L. Cody, eds.), Univ. California Press, Los Angeles, xii + 508 pp.

OTTLEY, J. R., AND E. E. JACOBSEN. 1983. Pattern and coloration in juvenile *Elaphe rosaliae* with notes on natural history. J. Herpetol., 17:189–191.

OTTLEY, J. R., R. W. MURPHY, AND G. V. SMITH. 1980. The taxonomic status of the rosy boa *Lichanura roseofusca* (Serpentes: Boidae). Great Basin Nat., 40:59–62.

OTTLEY, J. R., AND W. W. TANNER. 1978. New range and a new subspecies for the snake *Eridiphas slevini.* Great Basin Nat., 38:406–410.

PHELAN, R. L., AND B. H. BRATTSTROM. 1955. Geographic variation in *Sceloporus magister.* Herpetelogica, 11:1–14.

POWERS, A. L. 1974. The systematic status of *Trimorphodon lyrophanes* Cope on Cerralvo Island, Gulf of California, Mexico. Bull. Maryland Herpetol. Soc., 10: 53–55.

POWERS, A. L., AND B. H. BANTA. 1973. *Hypsiglena ochrorhyncha ochrorhyncha* (Cope) recorded from Cerralvo Island, Gulf of California, Mexico. Bull. Maryland Herpetol. Soc., 9:112–114.

———. 1974. *Chilomeniscus stramineus* (Cope) recorded from Cerralvo Island, Gulf of California, Mexico. J. Herpetol., 8:386–387.

———. 1976. *Lichanura trivirgata* Cope recorded from Cerralvo Island, Gulf of California, Mexico. Bull. Maryland Herpetol. Soc., 12:119–121.

RADCLIFFE, C. W., AND T. P. MASLIN. 1975. A new subspecies of the red rattlesnake, *Crotalus ruber,* from San Lorenzo Sur Island, Baja California Norte, Mexico. Copeia, 1975:490–493.

RAU, C. S., AND R. B. LOOMIS. 1977. A new species of *Urosaurus* (Reptilia, Lacertillia, Iguanidae) from Baja California, Mexico. J. Herpetol., 11:25–29.

ROBINSON, M. D. 1974. Chromosomes of the insular species of chuckwalla lizards (genus *Sauromalus*) in the Gulf of California, Mexico. Herpetologica, 30:162–167.

RUTH, S. B. 1974. A kingsnake from Isla Tortuga in the Gulf of California, Mexico. Herpetologica, 30:97–98.

SAVAGE, J. M. 1967. Evolution of the insular herpetofauna. Pp. 219–227, *in* Proceedings of the symposium on the biology of the California islands, Santa Barbara Botanic Garden, Santa Barbara, California.

SAVAGE, J. M., AND F. S. CLIFF. 1954. A new snake, *Phyllorhynchus arenicola,* from the Gulf of California, Mexico. Proc. Biol. Soc. Washington, 67:69–76.

SEIB, R. L. 1978. Geographic distribution: *Coleonyx variegatus peninsularis* and *Crotalus mitchellii pyrrhus.* Herpetol. Rev., 9:22.

SHAW, C. E. 1945. The chuckwallas, genus *Sauromalus.* Trans. San Diego Soc. Nat. Hist., 10:296–306.

SMITH, H. M. 1972. The Sonoran subspecies of the lizard *Ctenosaura hemilopha.* Great Basin Nat., 32:104–111.

SMITH, H. M., AND K. R. LARSEN. 1973. The name of the Baja California Cape wormsnake. Great Basin Nat., 34:94–96.

SMITH, H. M., AND R. B. SMITH. 1976. Synopsis of the herpetofauna of Mexico. Vol. 3. Source analysis and index for Mexican reptiles. John Johnson, N. Bennington, Vermont.

SMITH, N. M., AND W. W. TANNER. 1974. A taxonomic study of the western collared lizards, *Crotaphytus collaris* and *Crotaphytus insularis.* Brigham Young Univ. Sci. Bull., 19:1–29.

SOULÉ, M., AND A. J. SLOAN. 1966. Biogeography and distribution of the reptiles and amphibians on islands in the Gulf of California, Mexico. Trans. San Diego Soc. Nat. Hist., 14:137–156.

TANNER, W. W. 1966. The night snakes of Baja California. Trans. San Diego Soc. Nat. Hist., 14:189–196.

———. 1981. A new *Hypsiglena* from Tiburon Island, Sonora, Mexico. Great Basin Nat., 41:139–142.

WALKER, J. M., H. L. TAYLOR, AND T. P. MASLIN. 1966. Evidence for recognition of the San Esteban whiptail lizard (*Cnemidophorus estebanensis*). Copeia, 1966:498–505.

WILCOX, B. A. 1978. Supersaturated island faunas: a species-age relationship for lizards on post-Pleistocene land-bridge islands. Science, 199:996–998.

———. 1980. Species number, stability, and equilibrium status of reptile faunas on the California islands. Pp. 551–564, *in* The California islands: proceedings of a multidisciplinary symposium (D. M. Power, ed.), Santa Barbara Museum of Natural History, Santa Barbara, California.

WILEY, E. O. 1978. The evolutionary species concept reconsidered. Syst. Zool., 27: 17–26.

WILSON, L. D. 1970. The coachwhip snake, *Masticophis flagellum* (Shaw): taxonomy and distribution. Tulane Stud. Zool., 10:31–95.

———. 1973. *Masticophis.* Cat. American Amphib. Rept., pp. 144.1–144.2.

WRIGHT, S. J., R. W. MURPHY, AND B. MINOR (in prep.). History vs. equilibrium: relict populations on islands.