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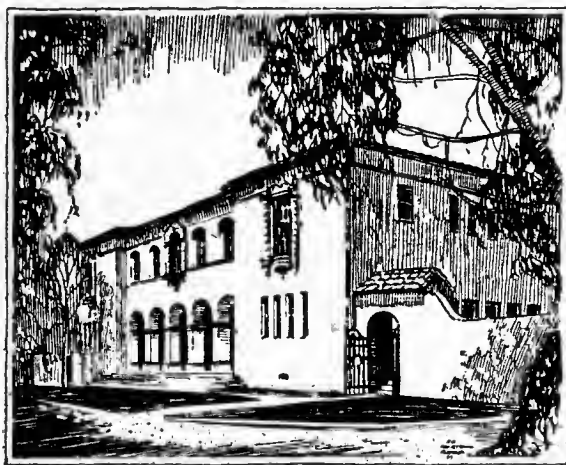
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No. 11

Annotated List of the
Amphibians and Reptiles of the
Southern Border of California

BY L. M. KLAUBER

Curator of Reptiles, Zoological Society of San Diego



SAN DIEGO, CALIFORNIA
AUGUST 15, 1934

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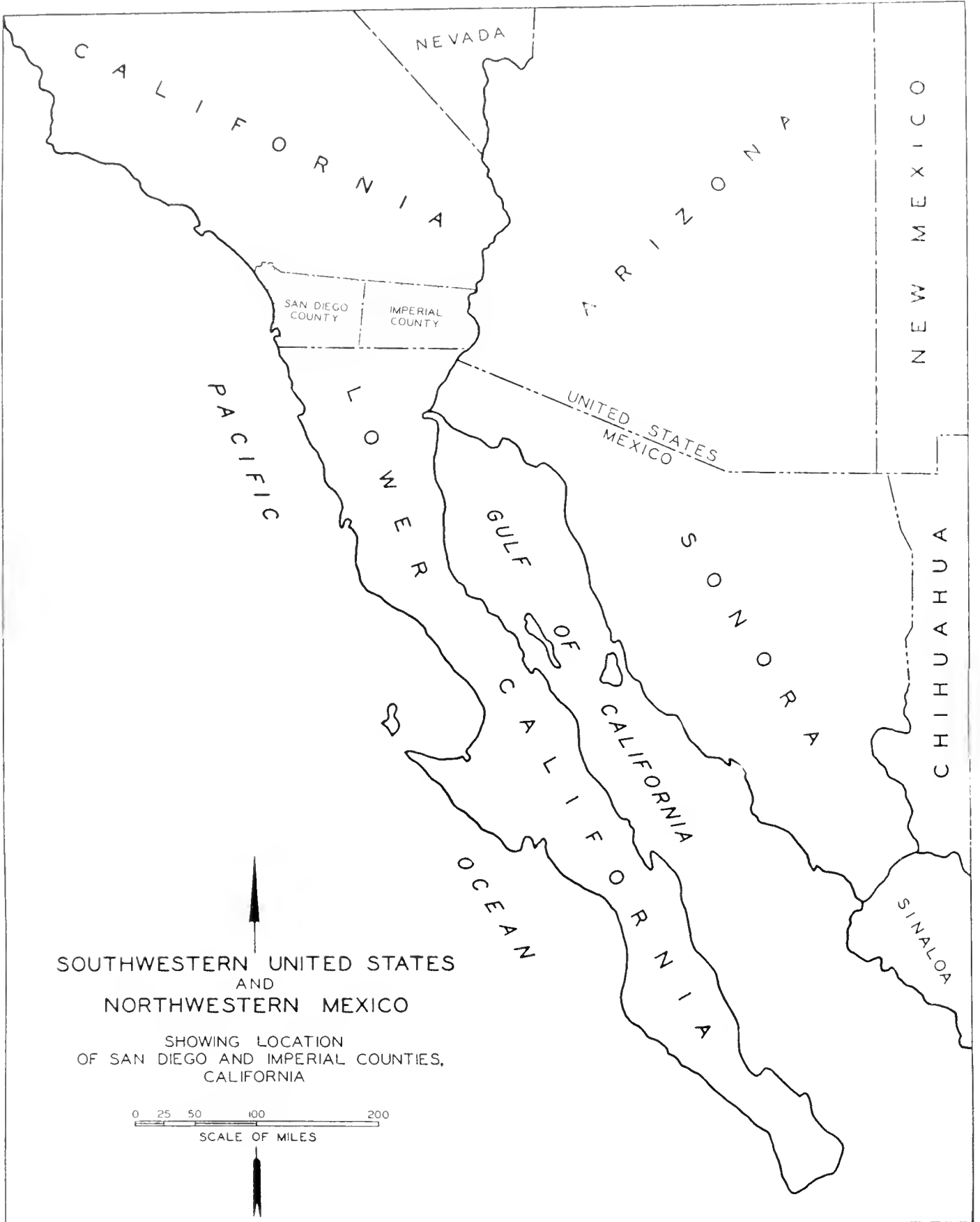
ANNOTATED LIST OF THE AMPHIBIANS AND REPTILES
OF THE SOUTHERN BORDER OF CALIFORNIA

BY L. M. KLAUBER

Curator of Reptiles, Zoological Society of San Diego

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ANNOTATED LIST OF THE AMPHIBIANS AND REPTILES OF
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BY L. M. KLAUBER

The climate and topography of San Diego and Imperial Counties, the two southern border counties of California, lend interest to a study of their amphibian and reptilian faunas because of the wide variations in habitat conditions experienced within comparatively short distances. As one leaves the coastal plain at the Pacific there are encountered, first, inland valleys and mesas; then chaparral and granite covered foothills; and, finally, a range of oak- and pine-clad mountains containing peaks reaching an altitude of somewhat over 6500 feet. Continuing eastward there is a precipitous and rock-strewn slope, which descends, with sharply increasing aridity, to the basin of the Colorado Desert, part of which is below sea-level with a depression reaching minus 250 feet. Temperatures are diverse; there is an equable belt along the coast, winter snows in the mountains, and intense summer heat on the desert. Rainfall increases from 10 inches per annum at the coast to 50 inches in the mountains, and then declines to less than 2 inches in the desert. There results from these ecological conditions an equally complex fauna with many interesting problems of relationships and ranges.

For convenience in reference the animals treated herein have been divided into five groups, to which letters have been assigned as follows:

- A NEWTS AND SALAMANDERS (Tailed Amphibians)
- B FROGS AND TOADS (Tailless Amphibians)
- C LIZARDS
- D SNAKES
- E TORTOISES AND TURTLES

Because of the arid condition of most of the area under consideration, groups A and E, which are largely dependent on moisture, are rather poorly represented, there being only five species of each found in this territory. Group B, the frogs and toads, are also dependent on moisture, but are rather well represented by 13 species because of the presence of two distinct faunas, the coastal and inter-mountain. Groups C and D, the lizards and snakes, many of which prefer the arid condition typical of this territory, number no less than 28 and 33 species (or subspecies) respectively.

Most amphibians and reptiles are not only harmless but are desirable citizens because of their destruction of noxious insects and rodents.

None of the lizards found in this territory is venomous; the Gila Monster, the only poisonous lizard found in the United States, is not native to California.

Of the snakes there are no dangerously venomous species in this

area, or indeed anywhere in California, except rattlesnakes. All rattlesnakes have rattles, even when first born, and therefore can readily be distinguished from the harmless species. One other snake in the territory is presumed to be mildly venomous; this is the Lyre Snake, a nocturnal and relatively rare species. There is reason to believe that its bite could not possibly be dangerous to a human being.

The garter snakes are somewhat obnoxious because of their destruction of useful fish, frogs, and toads. Aside from these and the rattlers, all other local snakes should be preserved, for they are of great benefit to farmer and gardener.

Where statements are made concerning habitats and ranges, as for instance "west of the mountains", "eastern slope", etc., it should be understood that reference is made to the situation in San Diego and Imperial Counties; such statements are not to be considered of general application in other localities unless so specified.

In the brief notes which follow it has been possible to touch only on some of the most conspicuous characteristics of color and pattern. Individuals differing from the more typical forms will often be found. Lizard descriptions, of use in classification, are particularly difficult because of their lack of conspicuous patterns or marks. These notes are not intended as a key for identifying the amphibians and reptiles of the area; accurate keys involve the use of technical terms, particularly of scalation, which would here be out of place. Suitable keys will be found in some of the works listed in the bibliography.

A—NEWTS AND SALAMANDERS (Tailed Amphibians)

A 1 Pacific Newt *Triturus torosus* (Rathke)

This newt is found in localities where permanent water is available. While usually present in the pools of streams during the spawning season, it spends most of its life on land. As is the case with most amphibians, night is the time of its greatest activity; in the daytime, unless in water, it will usually be found hidden in leaves or under logs. In San Diego County it has been collected in Boulder and Cedar Creeks, and in the vicinity of De Luz. The color is burnt orange above and yellow below. It can readily be distinguished from the other salamanders in this territory by the rough texture of its skin and the absence of regular vertical grooves along the sides of the body.

A 2 Southern Slender Salamander *Batrachoseps attenuatus leucopus* Dunn

This little salamander, which somewhat resembles an angleworm with short legs, is quite common in moist areas; it is particularly plentiful in San Diego gardens, where it will be found under stones or boards. Although widely distributed on the western slope, it has been taken at only a few points east of the mountains, one locality being Coyote Moun-

tain in Imperial County. It is the only tailed amphibian thus far reported from that county. It aestivates during the long, rainless summer.

A 3 Yellow Blotched Salamander *Ensatina croceater* (Cope)

This salamander is a denizen of the mountains, having been taken at such points as Palomar, Cuyamaca, and Laguna; it is rarely found below the 4000 foot contour. It is usually discovered in or under rotting logs, or in leaf-mold. It has been found abroad at night, particularly during the mild rains of spring or autumn. It is distinguished from the other salamanders of this area by its coloration, which consists of large yellow or orange blotches on a black or purplish ground-color. There is usually a light crescent-shaped blotch on the head with the points engaging the eyes.

A 4 Orange Salamander *Ensatina eschscholtzii* Gray

The Orange Salamander appears to be quite rare in San Diego County, having thus far been reported only from the Sequoia Mine near Dulzura, and at Barrett Dam. It is a uniform dark-orange in color, but can be distinguished from the somewhat similarly colored Pacific Newt by its smoother skin and the presence of vertical grooves on the sides of the body.

A 5 Arboreal Salamander *Aneides lugubris lugubris* (Hallowell)

San Diego County appears to be the southerly limit of the range of the Arboreal Salamander. It is fairly well scattered throughout the western part of the county, but seems to be uncommon. It is reddish brown in color, with yellow dots sometimes in evidence. It can be distinguished from the other local salamanders by certain of its teeth, which can be felt if the finger be rubbed gently forward across the underside of the upper lip; in our other salamanders these are absent.

B—FROGS AND TOADS (Tailless Amphibians)

B 1 Western Spadefoot Toad *Scaphiopus hammondi* Baird

This toad is well distributed through western San Diego County, but is not particularly common. It is small in size and can be distinguished from the other local toads by the vertical pupil of its eye, all others having horizontal pupils. It is most readily found after a rain storm. Like all the toads it is usually active at night, and reverts to streams or ponds during the spawning season.

B 2 Colorado River Toad *Bufo alvarius* Girard

This large, smooth-skinned toad is quite plentiful along the Colorado River and in some irrigated sections of the Imperial Valley. It is not found in San Diego County. It can be distinguished from the other toads in this territory by its smooth skin, unspotted, olive-green coloration (in the adults), and large size. When annoyed it can exude a poison from its skin glands which may be quite serious and even fatal to small

animals. Dogs have been known to die from the effect of this poison when they have attempted to seize one of these toads with their teeth. Many amphibians have protective skin poisons of this character, for they are soft bodied and slow, and would otherwise be defenseless against animal enemies.

B 3 Arroyo Toad *Bufo californicus* Camp

This toad is a resident of the dry arroyos and sandy river bottoms of western San Diego County, from the mountains to the coast. It is smaller than the common California Toad of the same area, and may be readily distinguished therefrom by the absence of the light line down the center of the back. It is light-brown, mottled with darker, and often has a light cross on the head. It has not been found east of the mountains. The call is a beautiful, penetrating trill with a peculiar ventriloquistic quality which makes it difficult to determine the direction from which it emanates.

B 4 Great Plains Toad *Bufo cognatus* Say

This is the common toad of the banks of the Colorado River and the irrigated sections of the Imperial Valley; it has not been found in San Diego County. In the spring its harsh, chattering call is to be heard nightly in the irrigated fields. Like all the toads it is highly beneficial to farmers because of its destruction of injurious insects. The usual pattern is a series of even-edged dark-gray blotches on a lighter gray background.

B 5 Rocky Mountain Toad *Bufo woodhousii* Girard

This toad, like the preceding, is found along the Colorado River and in the Imperial Valley. It can be distinguished from the Great Plains Toad by its larger size, slimmer shape, and less conspicuous spots. The most westerly point of collection so far reported is Harper Well. The call resembles the bawling of a calf. Feed this toad sow bugs and watch it snap them up with its unfolding tongue; both the effective distance and the accuracy are astonishing.

B 6 California Toad *Bufo boreas halophilus* Baird and Girard

This is the common toad of the coastal area of southern California, reaching Imperial County only on the western edge at Mountain Spring and Carrizo. It can be distinguished from the other coastal toads by the prominent light line down the center of the back and the absence of black cutting edges on the hind feet. It is very plentiful in moist areas, and about San Diego gardens, where it pays rent by taking toll of the insect pests. Sometimes great numbers of these toads are noted on the paved streets of the city in the night during the first autumn rains.

B 7 Desert Toad *Bufo punctatus* Baird and Girard

This is a true desert resident, found on the eastern slope of the mountains and on the desert about the infrequent water holes. Here it existed long before the Imperial Valley was irrigated. It can be recognized by

its sharp nose, small round parotoid glands, flat body, and the absence of black cutting edges on the hind feet. The call is a high trill.

B 8 Canyon Tree Frog *Hyla arenicolor* Cope

This tree frog, or tree toad, is a dweller on canyon boulders in stream beds; often one or more will be found clinging to a rock in a shallow depression and so resembling the stone in color and texture as to be discovered with difficulty. It is found on both sides of the mountains, but does not seem to be present in the irrigated sections of the desert, although it does occur in Arizona. It can be distinguished from our other tree frog by the rough texture of the skin and the absence of a dark stripe back of the eye. In this territory the *Hylas* (tree frogs) can be segregated from the larger *Ranas* (pond frogs), by the fact that the former have adhesive pads or disks on the fingers, and do not possess the extensive webs between the toes that are seen on the latter.

B 9 Pacific Tree Frog *Hyla regilla* Baird and Girard

This is the common frog of the coastal area, whose loud croaking is to be heard nightly in the spring about every puddle, pond, and creek. The noise made is surprising for so small a creature. It has the capacity to change its color considerably and may be bright-green, gray, or brown in almost any shade. There is always a dark stripe back of the eye. It is found in Imperial County only on the western edge, at such points as Mountain Spring and Carrizo.

B 10 California Red-legged Frog *Rana aurora draytonii* Baird and Girard

This is the large frog which frequents the ponds and streams on both sides of the mountains. It is usually found where the water is permanent and when disturbed takes refuge in the weeds at the bottom. It has not been collected in Imperial County. It may be distinguished from the other frogs of the genus *Rana* in this territory (except the Leopard Frog) by the ridges on the sides of the body, and from that frog by the absence of the conspicuous oval blotches which characterize the latter.

B 11 Sierra Madre Yellow-legged Frog *Rana boylei muscosa* Camp

This is a smaller frog than the preceding and can be distinguished therefrom by its yellow rather than red legs, and by the absence of ridges on the sides of the body. In San Diego County it is a mountain form, and, in fact, has been found at only one point, namely, in Doane Valley on Palomar Mountain.

B 12 Leopard Frog *Rana pipiens pipiens* Schreber

This is the most widespread frog in North America, being found from the Atlantic Coast almost to the Pacific, and far down into Mexico. It has, no doubt, been present along the Colorado River for a long time past, but whether it came into the Imperial Valley with irrigation or lived in the overflow lakes (Blue, Mesquite, Badger, Pelican, etc.) is not known.

However, at present it is to be found throughout the irrigated areas in both the Yuma and Imperial districts. It can be recognized by the even-edged, elliptical spots on the back. It has not been reported from San Diego County.

B 13 Bullfrog *Rana catesbeiana* Shaw

This is the frog which furnishes, to a very large extent, the frogs' legs of commerce. It is not native to California, but has been imported for the purpose of starting "frog farms". Escaping from these, it has become established wild at various points in California, including in San Diego County, Lake Hodges, Sweetwater Lake, and probably other points as well. It is the largest frog found in the United States. It can be distinguished from our native frogs by the fact that the tympanum (external ear) is larger than the eye, especially in the males, while the contrary is true in the natives.

C—LIZARDS

C 1 Tubercular Gecko *Phyllodactylus tuberculatus* Wiegmann

This peculiar little nocturnal dweller of the rocks is more properly a native of Lower California and mainland Mexico, for in the United States it has been found only in San Diego and Imperial Counties, where it has been collected along the Mountain Spring grade, near Yaqui Well, and at Coyote Mountain. In the daytime it may be found by prying off rock flakes or raising cap-rocks. It can be distinguished from all other lizards of this territory by the little circular pads on its toes, which permit it to cling to smooth rock surfaces. It is spotted gray in color.

C 2 Western Gecko *Coleonyx variegatus* (Baird)

This is a small, white lizard with red-brown bands or blotches on the back. It is nocturnal and may frequently be seen scurrying across the highway in the light of the auto head-lamps. It emits a faint squeaking noise when caught. This lizard is distinguished from other local species by the soft quality of the skin and the tiny scales which cover the head, these being no larger than those on the body. It ranges from the coast to the Colorado River but is more plentiful on the desert.

C 3 Desert Crested Lizard *Dipsosaurus dorsalis dorsalis* (Baird & Girard)

This is a large, white lizard with red-brown blotches on the back and brown rings on the tail. It is rather common throughout the desert area, particularly in sandy flats about mesquite hummocks; it is not found on the coastal side of the mountains. The crest from which it receives its name is not particularly prominent, but consists of a row of somewhat enlarged and protruding scales down the center of the back; by these it can be distinguished from all other lizards in the territory. It is largely herbivorous, preferring the blossoms of plants when it can obtain them.

C 4 Western Collared Lizard *Crotaphytus collaris baileyi* Stejneger

This lizard is a dweller amongst the rocks, particularly the tumbled

boulders on the desert side of the mountains; it is not found on the coastal slope. It is quite variable in color, often being green, blue, olive, or brown. The males usually have a double collar of black. The body is covered with tiny circular scales.

C 5 Leopard Lizard *Crotaphytus wislizenii* Baird and Girard

The Leopard Lizard is widely distributed throughout the southwest, but does not seem to be particularly common anywhere. While essentially a desert species, it occasionally strays across the mountains and a few have been taken as far west as Potrero. It receives its common name from the nature of its pattern, being spotted like a leopard. The tail is usually barred. It feeds not only on insects, but on young lizards of other species.

C 6 Chuckwalla *Sauromalus obesus* (Baird)

The Chuckwalla is the large black lizard so often seen amongst the rocks on the desert side of the mountains, at such points as the Mountain Spring grade and in the Sentenac Canyon, for it is essentially a rock dweller. It feeds on flowers and leaves, and is said to be a favorite food of the desert Indians. When a Chuckwalla seeks refuge in a rock crevice it puffs its body up with air and is difficult to extricate. It can readily be distinguished from all other lizards in this territory by its large size, for it is considerably larger and heavier, although no longer, than any of our other native lizards.

C 7 Fringe-footed Sand Lizard *Uma notata* Baird

This lizard is primarily a sand dweller and is especially plentiful in the sand hills west of Yuma. However, it is spread throughout the desert, wherever there are sandy areas, and has been found in eastern San Diego County near Dry Lake. Through evolution it has acquired, on the toes of the hind feet, elongated scales which look like feathers, and which aid in navigating the loose sands. When alarmed it runs with great swiftness and then plunges under the surface of the sand with a swimming motion, a sharp-edged snout aiding in this maneuver. The marks on the back resemble bull's-eyes; from these it is sometimes called the Ocellated Sand Lizard. On the sides the adult males have black lines, or blotches, on an orange background. On the underside of the tail there are several black cross-bands. This lizard may be distinguished from the Zebra-tailed Lizard by the elongated scales on the toes; in other particulars they somewhat resemble each other.

C 8 Desert Zebra-tailed Lizard *Callisaurus draconoides gabbii* Cope

This is the commonest lizard in most of the sandy areas of the desert and is probably the swiftest. So rapidly does it travel that when going across the line of sight it is extremely difficult to follow with the eye. The back is light grayish in color and the adult males have on each side a patch of green, across which there are one or more diagonal black bars. Across the under side of the tail there is a series of black bars from which the lizard gets its name; as it runs the tail is curled over the back so that

these bars are visible. On the desert side of the mountains it is found to an altitude of 3000 feet but does not cross to the western slope.

C 9 Giant Rock Uta *Uta mearnsi* Stejneger

This is a large, smooth-scaled, flat lizard which is quite plentiful amongst the boulders along the desert slope of the mountains, but is found nowhere else in either San Diego or Imperial Counties; that is to say, it occurs neither on the coastal slope nor out in the desert. When not frightened it moves over the rocks with a peculiar waddling motion, but when alarmed it is capable of astonishing acrobatic feats, and can even run upside-down on the under-side of a boulder. It is most active in early morning and evening. In color it is dark-gray, speckled with lighter. The tail is barred with light and dark rings; there is a black collar across the shoulders.

C 10 Long-tailed Brush Lizard *Uta graciosa* (Hallowell)

This small, slim lizard is a dweller in the desert brush. It usually rests head downward on the limbs of bushes and is very difficult to find, so closely can it match the bark in color, for it has a considerable power of color change. The normal color is light-gray, dorsally, and blue below. When alarmed it hides like a squirrel on the opposite side of the trunk from the intruder and finally takes refuge in holes at the base of the bush. It is strictly a desert species and is not found on the coastal side of the mountains.

C 11 Small-scaled Lizard *Uta microscutata* Van Denburgh

This is a small, black, or dark-gray lizard, with yellow or orange throat. The body scales on the back are small and of uniform size. It is found in some numbers in the Jacumba-Mountain Spring region and occasionally in the chaparral area on the western slope; this is the only part of the United States in which it occurs, as it is primarily a resident of Lower California. It is generally a rock dweller, but takes refuge in ground holes.

C 12 Arizona Tree Lizard *Uta ornata symmetrica* Baird

This is a small, slim lizard, which, in California, is found only along the banks of the Colorado River. It can be distinguished from the other lizards of the genus *Uta* which inhabit this territory by the fact that there are several rows of enlarged scales down the middle of the back, but with the central row smaller than those which border it on either side. The color is gray; the throat of the males is yellow, and there is a blue patch on each side of the belly. On the banks of the Colorado it usually frequents the willows and mesquite, but in central Arizona it is a rock dweller.

C 13 California Side-blotch Lizard *Uta stansburiana hesperis* Richardson

This is an extremely common lizard, widespread in San Diego County, but replaced in Imperial by the subspecies next described. It lives in all

habitats from the coast to the mountains. It is quite variable in color, generally mottled gray or brown, and usually can be distinguished by a conspicuous black or dark-blue blotch back of the arm pit on each side of the body. It is a small lizard, plentiful alike in sand, rocks, or brush. It usually takes refuge in ground holes.

C 14 Desert Side-blotch Lizard *Uta stansburiana stejnegeri* Schmidt

This is a desert form of the Side-blotch Lizard and is found from the desert slope of the mountains east to the Colorado River and beyond. It is somewhat lighter in color than the previous subspecies, but likewise may be recognized by the dark blotch on the side. Some herpetologists do not consider this and the preceding form to warrant subspecific differentiation.

C 15 Western Fence Lizard *Sceloporus occidentalis biseriatus* Hallowell

This is the common Blue-bellied or Fence Lizard of the coastal area, where it is extremely plentiful in rocks and brush, or about farm houses. Like most of the lizards it is very useful because of its destruction of noxious insects. It does not range into the desert and in Imperial County probably occurs only in the vicinity of Boulder Park. As is the case with all lizards of the genus *Sceloporus* each dorsal scale has a sharp ridge, or keel, down the center. Also this genus is without a fold in the skin across the throat, a characteristic possessed by most of the other genera in this territory. The Fence Lizard is gray-brown or olive above, with wavy cross bands; there is a blue patch on each side of the belly and the backs of the thighs are yellow.

C 16 Southern Mountain Swift *Sceloporus graciosus vandenburgianus* Cope

This is a mountain form, which may be distinguished from the previous species by the fact that the scales of the back are smaller than in the Western Fence Lizard, when specimens of the same body size are compared; also the backs of the thighs are not yellow. The two forms live together at altitudes of 4500 to 5000 feet, but at higher points the Mountain Swift is likely to be the more plentiful. It is most often found running about fallen logs. It does not grow to so large a size as the Western Fence Lizard. There is often considerable russet in the dorsal color; the males have two bright-blue blotches below.

C 17 Desert Scaly Lizard *Sceloporus magister magister* Hallowell

This large lizard is characterized by a long, sharp point on the tip of each scale. It is quite plentiful along the Colorado River in the mesquite and somewhat less so at the foot of the desert slope of the mountains. It does not cross the mountains to the coastal side, although it has been taken near Warner's Ranch. The males are beautifully colored with green, blue, yellow, and black, and are characterized, also, by a black collar or bib which is wider on the lower side than above. The under

surfaces are usually blue and black. Apparently it prefers trees or shrubs to rocks for a habitat.

C 18 Granite Scaly Lizard *Sceloporus orcutti* Stejneger

This lizard frequents the granite boulders on both slopes of the mountains. It likewise has sharp pointed scales but these are somewhat less pronounced than in the previous species. It is extremely wary and therefore difficult to capture unless cornered in a rock crevice. The young have cross-rings but the adults are generally unicolor, the males being brownish or bronze above and deep-blue below. This is a larger and heavier bodied lizard than the more common Western Fence Lizard.

C 19 Southern California Horned Toad *Phrynosoma blainvillii blainvillii* Gray

This is the common horned toad of the coastal area of southern California. It is quite plentiful on the western side of the mountains, especially in the spring. It probably enters Imperial County only in the vicinity of Boulder Park. The horned toads seem to live largely on ants and other insects. Of course horned toads are not true toads—they are lizards; but the appellation has been used so long that it is impossible to change the popular name. Horned toads have the peculiar ability, when alarmed or annoyed, especially if by a dog, of spurring blood in a thin stream out of the eye. Evidently this is for the purpose of frightening the attacking animal, as the blood seems to be quite harmless.

C 20 Desert Horned Toad *Phrynosoma platyrhinos* Girard

This is the common horned toad of the desert areas; here it is found everywhere, particularly in localities of mixed rock and sand. It does not occur on the coastal slope. As is the case with all horned toads, this lizard can vary its color through a considerable range.

C 21 Flat-tailed Horned Toad *Phrynosoma m'callii* (Hallowell)

This horned toad seems to prefer sandy situations. It is much less common and widespread than the previous species, from which it may be distinguished by circular spots on the back and a dark line down the center. The horns are somewhat more delicate and sharper than those of the Desert Horned Toad. It has been collected only in true desert situations, eastward from the foot of the desert slope.

C 22 Southern California Alligator Lizard *Gerrhonotus scincicauda webbiai* Baird

This is the large lizard which is often referred to as a "snake lizard"; it is found in the moister areas on the coastal plain and the western slope of the mountains, and is especially common in San Diego gardens. Although it has a vicious appearance, having a large and broad head, it is quite harmless, its bite being nothing more than a pinch. It drops its tail even more readily than most lizards and therefore few adult specimens are found with complete, original tails. A regenerated tail can always be dis-

tinguished from an original tail as it is stubbier and less spotted. In color this lizard is light-gray with the back mottled or banded with red, brown, or black. The scales of the back are strongly ridged.

C 23 California Legless Lizard *Anniella pulchra* Gray

This is the only legless lizard found in southern California. It looks, of course, like a snake, but can be distinguished from the true snakes by the fact that it has eyelids. It is subterranean in habit and is usually found in sandy soils, or hiding under rocks or debris. It is especially common along the coast. It has never been taken in Imperial County, but may be expected in the vicinity of Boulder Park, as it has been collected at Jacumba. It is cream or silver-gray above with a black line down either side; below it is yellow.

C 24 Granite Night Lizard *Xantusia henshawi* Stejneger

This small, flat lizard seems to be restricted exclusively to granite and other rocks of flaky character. It is found on both slopes of the mountains. It comes out only at night, but may be collected in the day-time by prying rock flakes from parent boulders; when the lizards are first discovered they are light-struck and can be easily caught. In color it is gray-black, broken into blotches by a tracery of irregular yellow lines. When exposed to the light the light lines widen and the pattern becomes a series of dark-gray blotches on a light-gray ground.

C 25 Yucca Night Lizard *Xantusia vigilis* Baird

This is the smallest of all our local lizards. It is exclusively a desert dweller and is most easily found in the daytime by over-turning fallen yucca or ocotillo stems. It may be distinguished from the other local lizards (except its relative the Granite Night Lizard and the Tubercular Gecko) by the absence of eyelids. From the gecko it can be distinguished by its lack of toe discs, and from the Granite Night Lizard, by being cylindrical rather than flat, as is the latter. It is speckled gray in color. It feeds on termites.

C 26 California Orange-throated Lizard *Cnemidophorus hyperythrus hyperythrus* Cope

This is a slim, long-tailed lizard inhabiting the coastal areas. It is not found far up into the mountains, nor on the eastern slope. It is distinguished by its orange colored throat and four or five well-defined, longitudinal, light lines down the back, which is brown. The head is slim with pointed snout.

C 27 Desert Whiptail Lizard *Cnemidophorus tessellatus tessellatus* (Say)

The Desert Whiptail Lizard is found from the coast to the Colorado River, but is more plentiful from the chaparral area eastward than on the coastal plain. On the desert it is common in both sandy and rocky habitats. It is a long-tailed lizard and the tail is not so often lost as in many other species. Normally, it moves with a deliberate and character-

istic jerky motion, but when alarmed it can run with great speed. Some herpetologists consider the coastal individuals as belonging to a separate subspecies, *C. t. stejnegeri*.

C 28 Western Skink *Eumeces skiltonianus* (Baird and Girard)

The skink, which is a smooth-scaled lizard, is restricted to moist localities, where it is usually found in fallen leaves or under stones. The young are characterized by brown bodies with light longitudinal stripes and brilliant blue tails. In age this coloration is lost, the largest specimens being uniformly brown, with reddish heads. By some herpetologists these large specimens are considered to belong to a separate species.

D—SNAKES

D 1 Western Worm Snake *Leptotyphlops humilis humilis* (Baird and Girard)

This tiny subterranean snake looks like an angleworm, except that it is more cylindrical in shape. However, it is a true snake and close observation will show it to be covered with scales. It can readily be distinguished from the California Legless Lizard by the eyes, which are rudimentary and seem hardly more than black dots. The tail ends in a sharp point, but it is not, of course, a sting. The snake is usually found in the course of excavations or under stones. It inhabits the western slope from the mountains to the coast; on the eastern slope it probably intergrades with the Desert Worm Snake.

D 2 Desert Worm Snake *Leptotyphlops humilis cahuilae* Klauber

The Desert Worm Snake has been collected at the foot of the mountains on the desert side and likewise along the Colorado River. It may readily be distinguished from the Western Worm Snake by its lighter color, for whereas the latter has the seven dorsal scale-rows colored dark-brown, the desert form has five dorsal scale-rows faintly spotted with light-brown. These worm snakes attain a length of about twelve inches with a diameter of one-quarter inch. Young specimens are the size of a large darning needle.

D 3 California Boa *Lichanura roseofusca roseofusca* Cope

The California Boa occurs from the coast to the foot of the mountains on the desert side, more often in rocks or chaparral. It has not been collected in the desert proper, although a closely allied subspecies is found in Arizona. This snake grows to an extreme length of about three and a half feet, and is a small relative of the great boas and pythons of the tropics. It is the tamest of our local snakes, almost never attempting to bite. It moves in a slow, deliberate way and is therefore easy to capture. Its food consists primarily of rodents. In color it may be russet, or metallic gray, or a mixture of these two; sometimes the reddish color will be in the form of three highly irregular, longitudinal stripes on a gray background. Snakes from the desert side of the mountains are usually some-

what lighter in color. This snake can be differentiated from the other harmless snakes in this area by the fact that the top of the head is covered with small scales instead of plates.

D 4 San Diegan Ring-neck Snake *Diadophis amabilis similis* Blanchard

This little snake is plentiful in the moist areas on the coastal side of the mountains; it is particularly common in San Diego gardens. It grows to an extreme length of about eighteen inches. The usual coloration comprises a dark-green head with an orange ring across the nape of the neck; back of this the body is light olive-green. On the under side the snake is brilliant yellow in color, darkening to orange or vermilion on the under side of the tail; the yellow is generally profusely speckled with black. This snake has the peculiar characteristic, when annoyed or frightened, of twisting its tail into a corkscrew and at the same time turning it upside down, so that the tail appears to be a brilliant red spiral. It feeds on insects, worms, and salamanders.

D 5 Western Yellow-bellied Racer *Coluber constrictor mormon* Baird and Girard

This snake is the western representative of the famous Blacksnake or Black Racer of the Atlantic states. As we proceed westward across the country, the Black Racer gradually becomes the Blue Racer of the Mississippi Valley states, and finally the Western Yellow-bellied Racer of the Pacific Coast. Our local representative does not grow to so large a size as the eastern snakes, and probably rarely exceeds four feet in length. In this locality it occurs almost entirely on the coastal side of the mountains, as it prefers moist areas; it is often found in mountain meadows. It has never been collected in Imperial County. In color the adults are uniform olive-green above and yellow or cream below; the young are spotted. San Diego County is near the southern limit of its range; to date it has not been collected in Lower California, although it will no doubt be found along the northern border. It feeds on rodents, birds, and amphibians.

D 6 Red Racer *Masticophis flagellum frenatus* (Stejneger)

This is a large, swift-moving snake which is difficult to catch. It is found everywhere in San Diego and Imperial Counties except on the higher mountain peaks; on the desert it lives in both arid and cultivated situations. It is highly variable in color, and while usually reddish or even bright-pink, is occasionally yellow, brown, or gray. Most of the coastal specimens have a black head and neck, often with cross-rings or white. This snake grows to a length of at least six feet, but even a large specimen has no great bulk because of its attenuated form. It lives largely on rodents and is therefore beneficial to the farmer; occasionally it eats snakes, lizards, and birds. It is extremely alert and vicious, and will bite quickly when caught, although, of course, it is entirely non-poisonous and therefore harmless.

D 7 Black Whip Snake *Masticophis piceus* (Cope)

The Black Whip Snake is closely related to the Red Racer and is much like it in all characteristics except color. Above it is a black or dark-brown without conspicuous marks of any kind; below it is straw colored. While plentiful in Lower California and some parts of southern Arizona, it barely enters California and in this state has been taken only in San Diego County between Dulzura and Campo.

D 8 California Striped Racer *Masticophis lateralis* (Hallowell)

This is the slimmest of our racers and the most difficult to capture. It occurs in San Diego County from the coast to the desert side of the mountains, but not on the desert proper; it barely enters Imperial County in the southwestern corner. In color it is black or brown above, with a thin but sharply contrasting white or yellow line down each side, these lines distinguishing it readily from all other snakes in this territory. Below it is yellow or straw colored, changing to a beautiful coral-pink beneath the tail. It prefers rocks or brushy situations, and seems to live largely on rodents and lizards. It reaches a length somewhat exceeding five feet.

D 9 Western Patch-nosed Snake *Salvadora grahamiae hexalepsis* (Cope)

The Patch-nosed Snake is racer-like in form, being long and thin with a whip-like tail, but it can be readily distinguished from the racers by a central stripe of gray or yellow down the back; and from the California King Snake and Pacific Garter Snake, which also have a center stripe, by the presence of a greatly enlarged and protruding scale on the front of the nose. Coastal specimens are dark-gray, or almost black, and the mid-dorsal stripe is yellow. Specimens from the desert are much lighter and the central stripe is wider; there may also be other stripes on the sides, which give the entire snake a grayish appearance. This snake reaches an extreme length of about four feet. It is found everywhere in San Diego and Imperial Counties except on the highest mountains.

D 10 Desert Leaf-nosed Snake *Phyllorhynchus decurtatus* (Cope)

This is essentially a desert species, preferring sandy areas and ranging up the eastern slope of the mountains only as far as such localities as Mountain Spring and the San Felipe Valley. It is a short, rather stubby snake, with an exaggerated scale on its nose from which it derives its common name; the maximum length is about eighteen inches. It is white or cream in color, with a series of square, reddish-brown blotches down the back. It apparently feeds on insects. It is widely distributed in the Southwest, from the Death Valley region far down into Lower California, and in southern Nevada and western Arizona.

D 11 Western Glossy Snake *Arizona elegans occidentalis* Blanchard

This snake occurs in both San Diego and Imperial Counties but although widely distributed, except on the higher mountains, is not partic-

ularly common. It looks much like a gopher snake, except that the scales are smooth, whereas those of the gopher snake have central longitudinal ridges or keels; also the Glossy Snake has a slimmer head proportionate to the neck. In color it is light-brown with dark reddish-brown blotches on the back; however, the desert specimens have a ground color of cream rather than brown. It grows to a length of about three and a half feet. It feeds on rodents and lizards and seems to be largely nocturnal.

D 12 San Diegan Gopher Snake *Pituophis catenifer annectens* Baird and Girard

This is the commonest snake in the coastal area (with the possible exception of one of the garter snakes) and is likewise the most beneficial, as it lives exclusively on mice, rats, gophers, and other rodents. It is yellow or buff in color, with an irregular series of dark-brown or black blotches on the back. It grows to a length of somewhat over five feet. It ranges all over western San Diego County and to the foot of the mountains on the desert slope, but on the desert proper it is replaced by the subspecies next listed. It is most common in the spring months, particularly April and May, for these constitute the peak of the snake season in the Southwest. Later, in the hot sections, most snakes restrict their activities to the evening or night hours.

D 13 Desert Gopher Snake *Pituophis catenifer deserticola* Stejneger

This is the common gopher snake of the Imperial Valley and the desert region round about, where it is at home in both arid and irrigated sections. It is lighter in color and has fewer spots than the San Diegan Gopher Snake. It is a friend of the farmer and should be everywhere protected. In San Diego County it occurs only on the eastern edge at such points as Carrizo and Borego Valley.

D 14 California Striped King Snake *Lampropeltis californiae* (Blainville)

This King Snake differs from nearly all other snakes of this genus by being longitudinally striped instead of ringed. The body color is usually reddish-, or chocolate-brown, with a single yellow or white stripe down the center of the back. Sometimes this stripe is irregular in outline, or it may even be broken into dashes. This snake grows to a length of about four feet. It is most plentiful on the coastal side of the mountains; on the eastern slope it is rare and is never found on the desert. It lives on rodents, snakes, lizards, and birds.

D 15 Pacific King Snake *Lampropeltis getulus boylii* (Baird and Girard)

The Pacific King Snake is the commonest of the king snakes of this area. It is plentiful everywhere in San Diego County and ranges to the foot of the mountains on the eastern slope, thus reaching Imperial County in the southwestern corner. The usual coloration is an alternating series of chocolate-brown and white, or straw-colored, rings. These may be of

varying width, sometimes the light and sometimes the dark rings being the wider. This snake is reputed to be the natural enemy of the rattlesnake, but as a matter of fact will never attack a rattlesnake merely for a battle. However, as snakes constitute a large of its diet (as well as rodents, lizards and birds) it will attack and eat a young rattlesnake when in search of food. It is said to be immune to rattlesnake bite. It is often known as Boyle's King Snake. A large adult approaches four feet in length.

D 16 Yuma King Snake *Lampropeltis getulus yumensis* Blanchard

This snake, which, in California, has thus far been collected only on the banks of the Colorado River in the vicinity of Winterhaven and Yuma, is much like the Pacific King Snake in coloration, except that the chocolate-brown rings are much wider than the lighter rings, and the latter, instead of being white, are buff or light-brown, so that they are not conspicuous as in the Pacific King Snake. The Yuma King Snake has not yet been found in the Imperial District, but will no doubt eventually reach there from the river by way of the irrigation canals.

D 17 Mountain King Snake *Lampropeltis multicincta* (Yarrow)

This is one of the most beautiful snakes in the United States. It is ringed with white, black, and brilliant red. The red rings are always bounded on either side by black and often do not completely encircle the body as do the white and black rings. This is a somewhat smaller species than the three other king snakes of this area and rarely exceeds a length of thirty inches. It is essentially a mountain snake, being seldom found below an altitude of 4000 feet; it has been collected on all of our peaks above this contour, except the desert range of the Santa Rosas. It has usually been called the Coral King Snake, but this name is objectionable because of possible confusion with the true Coral Snake, a venomous genus which does not occur in California.

D 18 Long-nosed Snake *Rhinocheilus lecontei* Baird and Girard

This snake is found both on the coastal and desert sides of the mountains, although not on the peaks themselves. It is highly variable in color and is therefore somewhat difficult to identify. The most common pattern, particularly on the western slope, consists of alternate black and red rings on a white or cream background. However, neither the black nor the red is solid color; especially is this the case on the sides, where each dark scale is usually spotted with cream. On the desert side of the mountains the red is often absent. This snake grows to a length of about three feet and seems to live largely on lizards. It is seldom abroad in the daytime, evidently being active only in the evening or at night.

D 19 Shovel-nosed Ground Snake *Sonora occipitalis* (Hallowell)

This little snake is a desert dweller, particularly in sandy areas; it has not been collected to the westward of Mountain Spring or La Puerta. It

is a small snake, seldom exceeding fifteen inches in length, and like most of the desert species is exclusively nocturnal. In the daytime it burrows in the sand, for which its shovel-shaped nose is an effective tool. In color it is white, or cream, with alternating black and red, transverse rings. Sometimes the rings encircle the body; at others they are only cross-bars on the dorsal surface. In some specimens the red rings are not well defined, being more like blotches, and, in fact, in some specimens, the red is entirely absent. This little snake has the peculiar habit of lunging out in every direction when it is excited, but does this with closed mouth so that it does not seem to be trying to bite.

D 20 Striped Ground Snake *Sonora episcopa* (Kennicott)

This little snake is a desert species, but apparently prefers the irrigated to the dry sections. It is quite common at various points in the Imperial Valley, but has been found at only one locality in San Diego County, namely Carrizo Stage Station. In color it is grayish-brown, each scale-edge being slightly lighter so that it seems to have a network of light lines or series of thin longitudinal stripes. Down the center of the back there is a brilliant vermilion stripe, which is its most characteristic feature, and will serve readily to distinguish it from all other snakes in this area. It reaches a maximum length of about eighteen inches.

D 21 Banded Burrowing Snake *Chilomeniscus cinctus* Cope

This small desert snake is moderately common in central Lower California and southeastern Arizona, but is extremely rare in southern California, only two specimens having been reported therefrom, one of which was collected in the vicinity of what is now Winterhaven, Imperial County. It is a small, white snake with transverse black rings, and is not unlike the Shovel-nosed Ground Snake, except in the number of dorsal scale rows, which are thirteen as compared with fifteen in the Shovel-nose.

D 22 Spotted Night Snake *Hypsiglena ochrorhynchus* Cope

The Spotted Night Snake is primarily a rock-dwelling species, and in the daytime can be found only under stones or in rock crevices. It is a small snake, seldom exceeding eighteen inches in length. The head is rather wide and flat, and on each side of the neck there is a large, brown blotch which is its most characteristic feature. The body is light-brown in color, with a series of dorsal blotches of dark-brown. It apparently lives on insects and small lizards. It is found on both sides of the mountains, but not on the floor of the desert, although it does occur to the eastward in Arizona and beyond.

D 23 Pacific Garter Snake *Thamnophis sirtalis infernalis* (Blainville)

The Pacific Garter Snake, like all of the garter snakes, prefers moist areas, where it lives largely on frogs and toads. It is of slimmer shape than the other garter snakes of this area, and may be recognized by the bright-yellow mid-dorsal line, the red blotches in the dorsal pattern on

each side of the central line, and the bluish ventral color. It is by no means common in San Diego County, as this is the southern limit of its range. So far it has not been collected south of the San Dieguito River, and only on the coastal plain. It reaches a length of about three feet.

D 24 Southern California Garter Snake *Thamnophis ordinoides hammondii* (Kennicott)

This is by far the commonest garter snake to be found in southern California. It is extremely plentiful about streams and ponds on the coastal side of the mountains and on the easterly slope as well, wherever there is water. It reaches Imperial County only at Carrizo. This garter snake is greenish or brownish, sometimes with more or less prominent dark blotches. It can be readily distinguished from the others in this area by the fact that it has no mid-dorsal light stripe, except occasionally a short dash at the neck. It lives on amphibians and fish and is therefore a rather undesirable citizen. It reaches a length of about three feet, but smaller specimens are more common.

D 25 Mountain Garter Snake *Thamnophis ordinoides elegans* (Baird and Girard)

The Mountain Garter Snake has been reported only from Laguna Mountain and even here its presence is not a certainty. Except for the presence of a yellow or orange stripe down the center of the back, it is much like the preceding species.

D 26 Desert Garter Snake *Thamnophis marcianus* (Baird and Girard)

This is the only garter snake thus far reported from the irrigated sections of the Imperial Valley or the banks of the Colorado River. It is brownish in color with a grayish mid-dorsal line. There are usually black spots, often crescent shaped, scattered along the back. It has been found as far westward as Dixieland, Imperial County.

D 27 California Black-headed Snake *Tantilla eiseni* Stejneger

This is a tiny, slim snake, nocturnal in habit, so that in daylight it is only found in the course of excavations, or under rocks. It can be readily distinguished from all other snakes in this vicinity by its black head and pinkish, unicolor body. Often there is a white collar back of the head. The color on the under-side is pink and is unspotted. The length rarely reaches fifteen inches. These snakes are usually found in colonies of from two to half dozen, but when they are discovered they are so agile in escaping that a collector is lucky to catch more than one.

D 28 California Lyre Snake *Trimorphodon vandenburghi* Klauber

The Lyre Snake is a nocturnal species and in the daytime will be found only under rocks or in crevices. It is a slim snake with a wide, distinct head and prominent, protruding eye. It reaches a length of about three feet. In color it is light-brown with a series of dorsal dark-brown blotches. Desert specimens are more often gray as to ground

color, with brown blotches. The blotches are split across by a light transverse mark so that each appears to be divided into two halves, which is one of the characteristics by which the snake may be recognized. It is not particularly common but is widespread in San Diego County, especially in rocky areas and eastward to the foot of the mountains. In Imperial County it has been collected only on the Mountain Spring grade.

All of the snakes hitherto mentioned are non-poisonous and therefore harmless, with the possible exception of the last named, which has tiny fangs in the back part of its mouth; these while no doubt dangerous to its lizard food, would probably be harmless to human beings. The only truly venomous reptiles found in San Diego or Imperial Counties are the rattlesnakes, the descriptions of which follow.

D 29 Desert Diamond Rattlesnake *Crotalus atrox* Baird and Girard

The Desert Diamond Rattlesnake is the largest and probably the most dangerous rattlesnake in this area. It is confined to the desert and has not been taken west of Carrizo Stage Station at the eastern foot of the mountains. It seems to be moderately common in some areas in Imperial County, particularly in sandy sections; it is rare, if found at all, in the irrigated sections. This is the largest rattlesnake found in the West, reaching a length of six feet or even more. It is characterized by a fawn or pink ground color, upon which there is a series of punctated, dark-brown diamonds edged with lighter scales. The tail is in marked color-contrast to the rest of the body, comprising alternating black and ash-gray rings.

D 30 Red Diamond Rattlesnake *Crotalus ruber* Cope

This rattler, in contrast to the previous species, is more lethargic and peaceful. It occurs from the coast to the desert slope of the mountains, but not on the desert proper and has not been collected eastward of the Mountain Spring grade. It is brick-red or reddish-brown in color, with a series of diamond-shaped marks on the back, outlined with white or straw. The tail is in sharp contrast with the rest of the body, consisting of alternating whitish and black rings. This snake occasionally grows to a length approaching six feet and is the largest rattler found on the coastal side of the mountains; however, the majority of adults hardly reach four and a half feet. It is most plentiful in the granite and chaparral area of the western foothills. Like most of the rattlers, it feeds largely on rodents, particularly ground squirrels and rabbits.

D 31 Pacific Rattlesnake *Crotalus confluentus oregonus* Holbrook

This is the most plentiful rattlesnake on the coastal side of the mountains; it does not occur on the floor of the desert. It is a wide-ranging subspecies, being found from British Columbia south to the San Pedro Martir Mountains in Lower California; also in central Arizona. It varies considerably in coloration, but in this area is usually gray or grayish-brown, with a series of black or dark-brown blotches down the back.

Some specimens, particularly from the mountain areas, are almost entirely black, and the snake is not infrequently referred to in this district as the Black Diamond Rattler. It grows to a length of about four feet. It has a powerful venom and is a thoroughly dangerous snake. While the young will eat lizards, rodents are the usual food.

D 32 Speckled Rattlesnake *Crotalus mitchellii* (Cope)

This rattler, which prefers rocky, chaparral areas for its habitat, is rarely found on the coastal plain, but is more common from the thousand-foot contour eastward across the mountains to their foot on the desert slope. It is also occasionally found along the Colorado River. It is rather difficult to describe because of its considerable variation in color, for it may be gray, brown, pink, or salmon-red. Down the back there is a series of indefinite blotches which are sometimes diamond shaped, but often rings. The most characteristic quality of the coloration is the speckled appearance, for the blotches are seen to be made up of groups of small dots. As is the case with most of the rattlers, this snake lives largely on rodents. It reaches somewhat over four feet in length.

D 33 Sidewinder *Crotalus cerastes* Hallowell

The Sidewinder is exclusively a desert species, and therefore does not range into the desert foothills except in a few isolated sandy valleys, as for instance, at La Puerta. It is a rather small rattler, rarely exceeding thirty inches in length. It can be easily recognized by the prominent horns over the eyes, for which reason it is often called the "Horned Rattler". It gets its other name from a characteristic sidewise looping motion which is quite different from the usual method of progression of a snake. This permits it more readily to traverse shifting sands. It is not so dangerous as most people believe, the bite being much less effective than that of other species in this area, which being larger, have more venom. However, it is not to be trifled with. It feeds on small mammals and lizards.

E—TORTOISES AND TURTLES

E 1 Sonoran Mud Turtle *Kinosternon sonoriense* Le Conte

This turtle has, in California, been collected only on the banks of the Colorado River; it does not yet seem to have reached the Imperial Valley. It is aquatic in habit and seldom leaves the water.

E 2 Pacific Mud Turtle *Clemmys marmorata* (Baird and Girard)

This is the common turtle of the streams, ponds, and reservoirs on the western slope of the mountains and the coastal plain; it seldom leaves the water and dives to the bottom when frightened. It lives on animal food. Adult specimens reach a length of about eight inches.

E 3 Desert Tortoise *Gopherus agassizii* (Cooper)

This tortoise is widely distributed throughout the desert wastes of the southwest, where it can be seen taking its way slowly and sedately across

the sandy flats. It reaches a length of 12 inches or more, and, with its high domed body, is a heavy animal. It is largely a vegetarian, feeding on the blossoms and leaves of the hardy desert plants; some individuals will eat insects in captivity.

E 4 Pacific Green Turtle *Chelonia agassizii* Bocourt

This is a tropical sea turtle which has occasionally visited the California coast, and has been taken in San Diego Bay. It is the sea turtle which is most used for food; it attains a weight of 600 pounds.

E 5 Pacific Leather-back Turtle *Dermochelys schlegelii* (Garman)

This is a wide-ranging oceanic turtle which occasionally visits the California coast, usually in the neighborhood of San Diego. It reaches a weight of $\frac{3}{4}$ of a ton and a length of nine feet, and is the largest now existing representative of the turtle-tortoise order.

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The following figures illustrate typical examples of each of the several kinds of reptiles and amphibians described in this list.

(Photographs except Rattlesnakes published by courtesy of the California Academy of Sciences).



FIG. 1. TAILED AMPHIBIAN
Orange Salamander *Ensatina eschscholtzii*



FIG. 2. TAILLESS AMPHIBIAN
California Toad *Bufo boreas halophilus*



FIG. 3. LIZARD
Western Collared Lizard *Crotaphytus collaris baileyi*

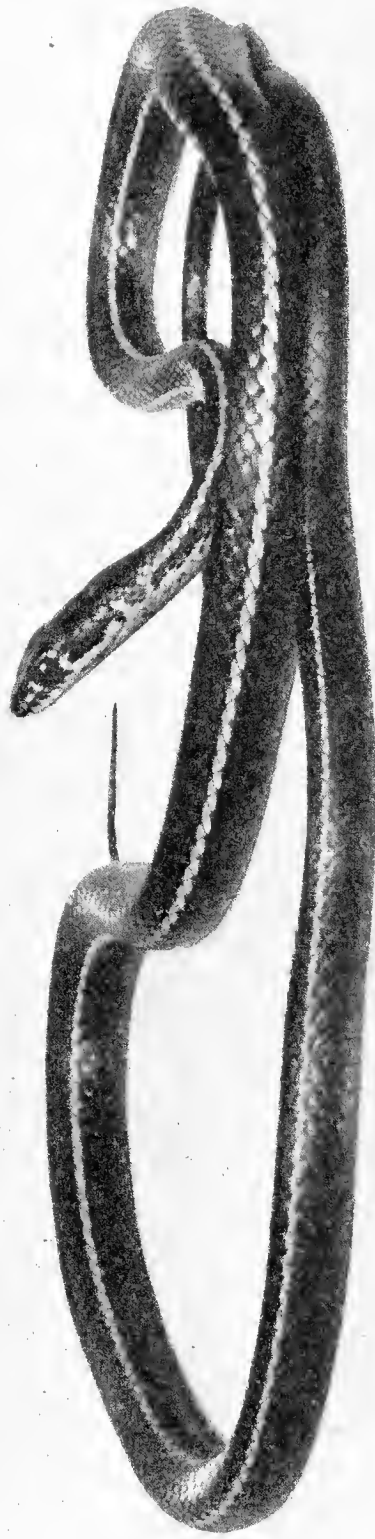
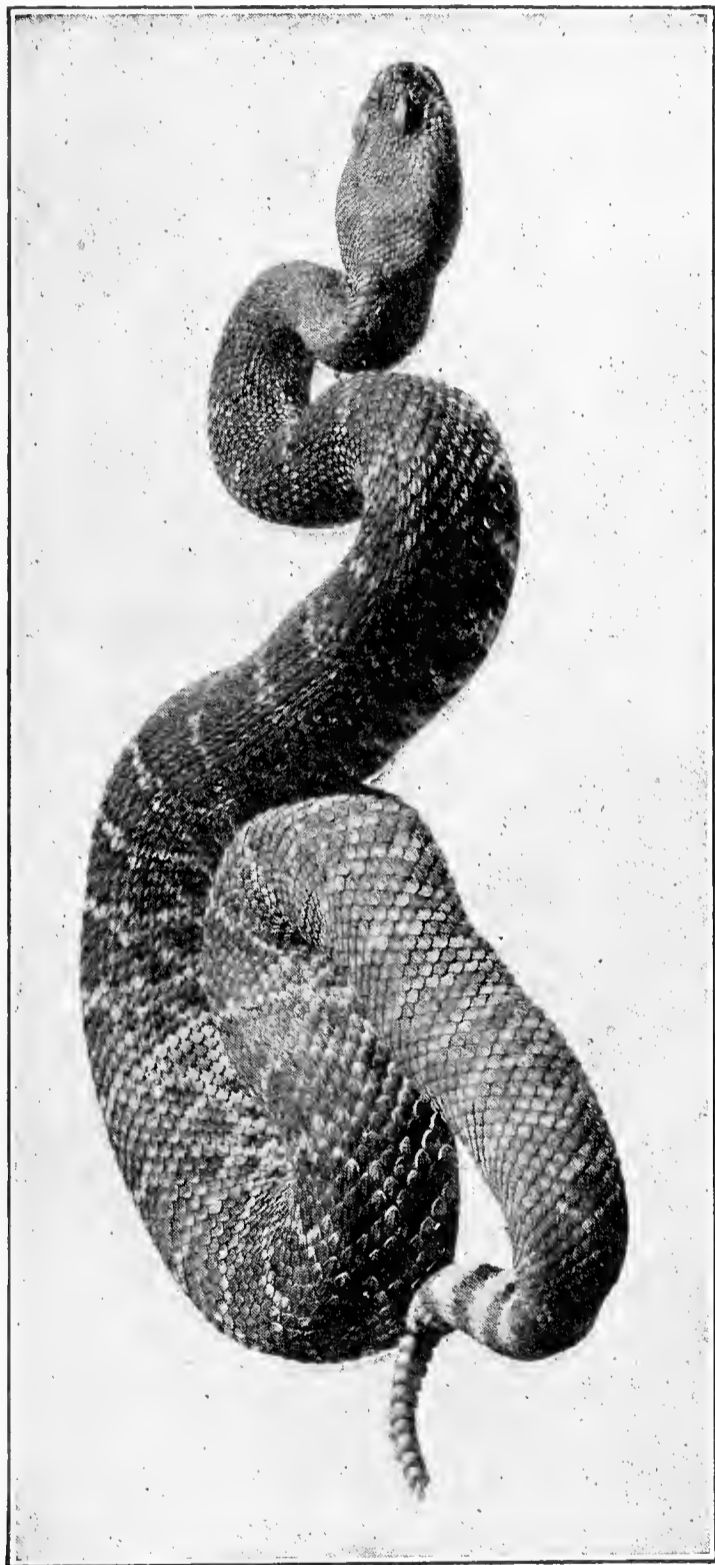


FIG. 4. HARMLESS SNAKE
California Striped Racer *Masticophis lateralis*



FIGS. 5 AND 6. RATTLESNAKES
Red Diamond Rattlesnake *Crotalus ruber*
Pacific Rattlesnake *Crotalus confluentus oregonus*

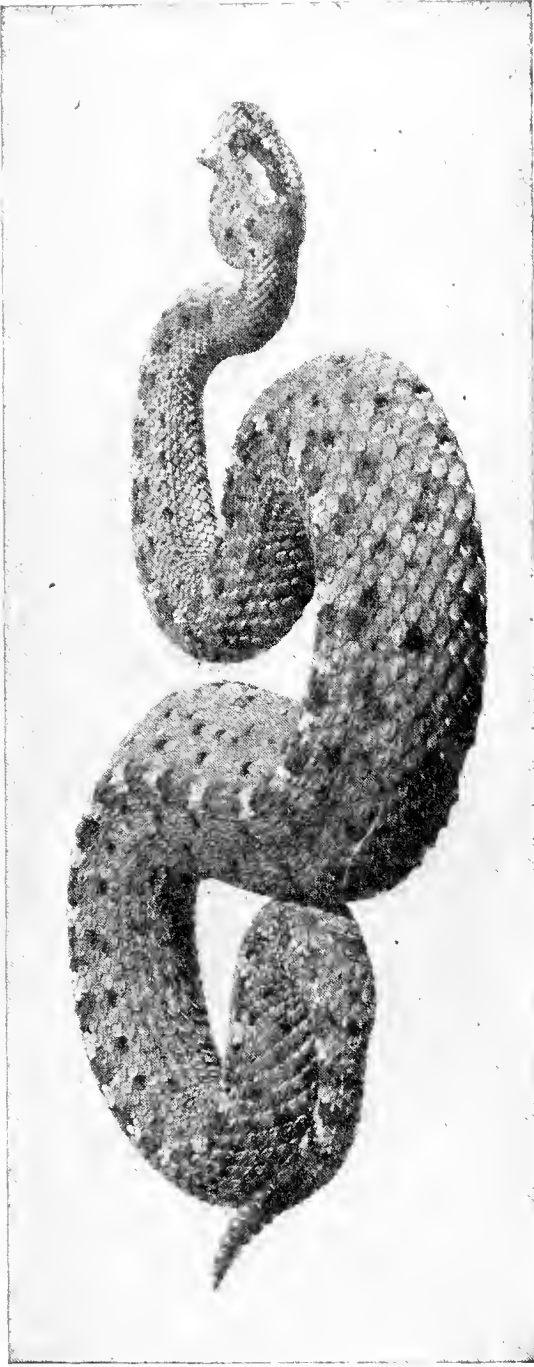


FIG. 7. RATTLESNAKE
Sidewinder *Crotalus cerastes*



FIG. 8. TURTLE
Pacific Mud Turtle *Clemmys marmorata*

