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Amphibians and Reptiles of the Rogue River Basin, Oregon Author(s): Henry S. Fitch Source: American Midland Naturalist, Vol. 17, No. 3 (May, 1936), pp. 634-652 Published by: The University of Notre Dame Stable URL: <u>http://www.jstor.org/stable/2419939</u> Accessed: 29/12/2014 12:59

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Amphibians and Reptiles of the Rogue River Basin, Oregon

Henry S. Fitch

The region drained by the Rogue River includes parts of Jackson, Josephine, and Curry counties, in southwestern Oregon, and of Siskiyou and Del Norte counties in northwestern California. Roughly, it is bounded on the east, south, and north by the crests of the Cascade, Siskiyou, and Umpqua mountains. It comprises an irregular area having a maximum breadth of about 120 miles west to east and of perhaps half that distance from north to south.

This area is possessed of varied climate and rough topography. The coastal belt supports dense forests of Douglas fir, coast hemlock, tan oak, California laurel, and Port Orford cedar. To the mouth of the Illinois River at Agness, for more than 40 miles the Rogue River runs through a deep gorge. The region of this gorge, and its counterparts on the tributary Illinois and Applegate rivers, is dry and rugged; Garry and golden oaks, manzanita, and buck-brush (*Ceanothus cuneatus*) are some of the plants most characteristic of the steeper slopes. A few miles west from Grants Pass the head of the main gorge opens out into a valley, most of which is under cultivation. The foothills around the valley include areas of dry, open grassland, as also areas of chaparral, oak, and madrone. At high altitudes this scrub type of forest grades into yellow pine and Douglas fir. Yet higher, discontinuous belts of Canadian and Hudsonian life zones partly surround the valley, forming more or less effective barriers to some species of amphibians and reptiles.

During the 25 years of my residence in this region, I gained general familiarity with its fauna. However, no specimens were preserved and no field notes were written until the summer of 1932. In the summers of 1934 and 1935 I made collections and notes on nearly all the species, and trips were made to parts of the area not previously visited, notably along the lower course of Rogue River. Most of the specimens collected, representing all the species except *Batrachoseps attenuatus* and *Contia tenuis* have been deposited in the Museum of Vertebrate Zoology, University of California. Numbers given are as of the herpetological catalogue in the Museum, unless otherwise indicated. From time to time I have kept under observation in large outdoor cages many individuals of most of the species here discussed.

In the following accounts it is my aim to summarize the geographic, zonal, and ecologic distribution of each form found within the area, and to include observations on its natural history. Specific localities are mentioned for rare species represented by few localities; but for common species represented by many records, these have been summarized in general statements. All localities mentioned may be found on the U. S. Geological Survey topographic maps or on national forest maps.

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To members of my family, especially to my father, Mr. Chester Fitch, I am indebted for many specimens and some observations.

Triturus similans Twitty-OREGON NEWT

Although newts of the Rogue River Basin seem to be of this species, it is possible that the observations here recorded apply to more than one form.

Newts occur in permanent creeks and ponds throughout the area. On Aug. 2, 1933, at the source of Joe Creek, 6000 feet, Siskiyou Mountains, within a forest of mountain hemlock, many individuals were found in a shallow pool covering about an acre. Two specimens (Mus. Vert. Zool.) were collected on July 16, 1926, at Crater Lake, 6000 feet. The species is not common in swift-running creeks of the dry foothills, and it is absent from streams which dry up in summer. It is most abundant near the coast in slow moving streams, where standing water is always present.

On May 24, 1935, at Lobster Creek, newts were abundant in stagnant pools; most of the females had spawned, but the plump appearance of some in one densely shaded pool indicated they still contained eggs. Five mated pairs of newts in this pool comprised about half the number present. Two single females, evinced interest, in a peculiar manner, in different sticks floating on the surface. One would nose along a stick and then would turn to bring her cloaca to an adjacent position. At the same time she would grasp the stick firmly between her hind legs.

Breeding females had the type of cloaca figured and described by Twitty (1935) as characteristic of *similans*, with lips forming a conical elevation.

I found no eggs of newts under natural conditions, although I often searched for them in pools where breeding adults were abundant. A captive temale from Little Butte Creek near Rogue River, deposited eggs singly. On May 15, 1934, numerous larva about an inch long were found in a pond at Burns Creek, Curry County. One was taken from the stomach of a gray garter snake from this locality.

In ten specimens from Lobster Creek, and two from Crater Lake, the palatine teeth are arranged in straight converging series in a V-shaped pattern as figured for *similans* by Twitty.

On May 21, 1935, near Lobster Creek a young newt (no. 18541) apparently newly metamorphosed, head and body length of 34 mm., was dug out of a rock slide in company with Olympic and green-backed salamanders.

Ambystoma macrodactylum Baird—Long-toed SALAMANDER

The long-toed salamander has been collected at widely separated localities within the area, and apparently occurs irrespective of life zone. Slevin (1930, p. 30) records it as abundant at Crater Lake, and seven specimens (Mus. Vert. Zool.) came from this locality. I collected one at Lost Creek, 4000 feet, on July 17, 1932 (no. 14950).

I have found it elsewhere only on the valley floor below 2000 feet. There,

it is the first amphibian to spawn in the spring. The eggs are laid sometimes singly, but more often several in a cluster. Freshly laid eggs have been found between mid-February and mid-March, but none later.

Adults are rarely seen, although judging from the abundance of egg masses, they must be common. During the breeding season I have captured them by dragging a net along the bottoms of shallow pools where the salamanders lie concealed in the mud or under the masses of green algae. At the same time of year, I have found numbers of them together under boards in slimy mud at the edges of the ponds or ditches containing their eggs.

At other times of year no adults could be found in the vicinity of water. It is obvious that during most of the year they are subterranean in habit, because eggs and larvae are found in creeks which dry up completely in summer. In winter and spring, individuals are sometimes found in damp ground at a distance from water. I found five under logs, one under a board pile, and two in holes around roots of trees in an orchard. It is possible that at high altitudes where there is permanent water, the species is more aquatic. The seven specimens from Crater Lake were taken on June 16 and July 16, 1926.

In May, 1935, at Belmont Orchard, 6 miles south of Medford, numerous large larvae were found in an open well about 8 feet deep and 6 feet wide in an orchard. The salamanders stayed near the bottom in muddy water and debris, except when they appeared momentarily at the surface for air, as the larger ones did frequently. Tree-toad tadpoles were swarming at the surface of the water; each one examined had a piece gone from the end of the tail. In some as much as half of the tail was missing.

About twelve salamander larvae were transferred to an aquarium with many of the tadpoles. The salamanders attacked the tadpoles and bit at them whenever they came within reach. Several times a salamander was found swallowing a tadpole whose diameter exceeded that of its own body. The prey was swallowed either head first or backwards. The salamanders caught and killed several tadpoles too large to be swallowed. By the time the last one had disappeared, the salamanders were already attacking each other, and most of them had mutilated fins. They ate small strips of raw meat and chopped earthworms. Most of this lot transformed in June although two had not begun to lose their gills by mid-July.

Some salamanders, kept in the aquarium several weeks after metamorphosis, were clumsy in the water after loss of their gills and broad tail fins. Others transferred to a terrarium seemed to thrive.

Dicamptodon ensatus (Eschscholtz)—MARBLED SALAMANDER

The marbled salamander is abundant in the humid coastal region. Farther inland it is less common, but it occurs in certain creeks in dry open woods or in chaparral. In such situations larvae attain large size. Of three larvae over a foot long one was caught by a fisherman in Rogue River south of Table Rock, one was captured in a shallow pool in Birdseye Creek, and another was reported in East Fork, Illinois River by D. H. Johnson. Dry conditions prevailing in these localities seem unfavorable for a large terrestrial salamander. Possibly the species is neotenic in this part of its range.

Two specimens taken in the coastal region at Lobster Creek had already completed metamorphosis although much smaller than those recorded above; 166 mm. and 138 mm. in length.

Stomachs of five larvae from Squaw Creek, 5000 feet, Siskiyou Mountains, contained 2 water beetles, 2 large beetle larvae, a wasp, a caddice fly larva, and unrecognizable remains of other small arthropods. Stomachs of seven larvae from Rogue River, 11 miles from the coast, contained 11 water snails, 12 aquatic insect larvae, a spider and a bug. Two metamorphosed specimens from the same general locality had eaten 3 beetles, a moth, a fly, a land snail having a shell diameter of about 12 mm., and a caddice fly larva with its case.

On several occasions, larvae were found in stomachs of gray garter snakes. On May 26, 1935, a large garter snake *(Thamnophis sirtalis)* which was found at Lobster Creek, disgorged a small adult marbled salamander.

Rhyacotriton olympicus (Gaige)—OLYMPIC SALAMANDER

Heretofore this species has been recorded only from northwestern Washington. In May, 1935, I collected five in a deep, heavily shaded ravine, on the north side of Rogue River, 11 miles above its mouth. None was found in the creek itself. They were dug out from under rock slides, several inches beneath the surface in the saturated basal layer of pebbles and rocks, through which water was seeping slowly. This situation seemed transitional from the aquatic habitat to the damp earth habitat occupied by many species of salamanders.

All five specimens are young; the three smallest still have stumpy external gills. These gills are less than 1 mm. long, being much less conspicuous than in marbled salamanders of the same size. In life the dorsal coloration was brownish with pale gray flecks and white dots along the sides. The ventral coloration was bright lemon yellow (which faded in alcohol) with scattered black dots.

Of the following measurements, for each specimen, the first represents the head and body length to back of thigh in millimeters; the second represents tail length from back to thigh to tip: no. 18562, 40-23 (tail incomplete); no. 2615, H.S.F., 34-20; no. 18564, 29-20; no. 18561, 28-21; no. 18563, 24-18.

Batrachoseps attenuatus attenuatus (Eschscholtz)—SLENDER SALAMANDER.

The slender salamander has been recorded from Gold Beach (Slevin, 1930, p. 49); apparently this is the northernmost record. I found no specimens.

Plethodon dunni Bishop—Western Green-BACKED SALAMANDER

This species was collected at only one locality, a ravine on the north side of Rogue River, 11 miles above its mouth. Most of those found were dug out of rock slides. They were active and, when exposed, attempted to escape by running back under the rocks. Some individuals evidently disturbed by 638

my activity ran out from holes several inches ahead of the point where I was digging. Many escaped.

In life the color pattern of these salamanders closely resembled that of the long-toed salamander: a broad greenish-yellow longitudinal dorsal band, and a gray ventral surface spotted with white. The dorsal band was most brightly colored in the young; in some of the larger adults it was dull brownish yellow, not sharply set off.

The costal grooves, counting one each in the axilla and groin (see Bishop, 1934) and an incomplete one in front of the hind leg, were 15-15 in seventeen of twenty specimens, 16-16 in two, and 15-16 in one.

The largest specimen has a total length of 126 mm.

Plethodon elongatus Van Denburgh—DEL NORTE SALAMANDER

Two specimens of this salamander were collected along with the series of P. dunni discussed above. In both, the costal grooves are 16-16 between (and not including) axilla and groin. These specimens are of more slender appearance than P. dunni, and have relatively narrower heads which are less distinct from the neck region. On the ventral surface, reticulations of black pigment are denser than in dunni, with fewer and smaller white spots. In life the dorsal band was pinkish brown rather than yellow or green.

The larger specimen (no. 2605, H.S.F.) had a head and body length of 49 mm. and a tail length of 49 mm. (from back to thigh to tip). In the smaller specimen (no. 18550,) the same measurements were 23 mm. and 15 mm. Tails were complete in both.

Ensatina eschscholtzii Gray-OREGON SALAMANDER

Two specimens have been collected. One was taken at the head of Poormans Creek, 5 miles southwest of Jacksonville, at the bottom of a 20-foot mine shaft at 2700 feet, in Douglas fir forest. The other was taken in dense forest near the mouth of Silver Creek, about 18 miles inland. The species may be abundant in the coastal region, where little collecting was done.

Aneides ferreus Cope-CLOUDED SALAMANDER

Six clouded salamanders were found on May 22, 1935, in the coastal forest between Lobster and Silver creeks. Five were taken between the bark and wood within a few square feet, on a large Douglas fir log in space excavated by wood-eating insects. In this space, partly filled with damp particles of wood, the salamanders were hiding with spiders, centipedes, and slugs. Twice, when slabs of bark were broken off partly exposing a salamander, the latter quickly crawled farther up beneath the bark, temporarily escaping. The sixth specimen was found at mid-day beneath bark on a log exposed to direct sunlight.

Stomachs of five of the specimens contained: 2 large orange-colored mites, 1 beetle grub (length 12 mm.), a small beetle, a heavily armored kind of weevil, and some unrecognizable fibrous material.

One specimen contained 12 ova about 4 mm. in diameter.

Ascaphus truei Stejneger-BELL TOAD

On May 21, 1934, I collected two adult males (nos. 17161 and 17162,) 11 miles above the mouth of the Rogue River, in the ravine where greenbacked and Olympic salamanders were found. The ground was saturated with moisture and supported a luxuriant growth of ferns and moss. One toad was hopping over rocks where water was seeping down a bank, about fifteen feet from the creek. The other was crouching on a bare spot on a nearly vertical sandstone bank which was damp and nearly covered with moss. Yellowlegged and red-legged frogs and tree toads, and five species of salamanders were collected within a few feet of these places. The stomach of one contained fragments of a small brown beetle; the other a geometrid larva 16 mm. in length, and three small sowbug-like isopods of a kind extremely abundant among rocks along the creek.

In May, 1935, I visited the same ravine and found a Bell toad tadpole 56 mm. long clinging to a rock in the creek, and another adult male. Larvae of marbled salamanders and adult newts were abundant in this same creek.

The following paragraph gives details concerning the capture of the adult:

At one place a small stream entered the main stream, seeping almost entirely beneath a heavy layer of moss. Humps above the general level of the moss marked the positions of stones. I traced this seeping trickle up the bank away from the creek, clearing away stones and moss as I went, and pushing through a thick growth of bushes and tall ferns. Several salamanders (*Plethodon*) were taken as I progressed. When I had reached a point about 50 feet from the creek, I was standing with difficulty on loose sliding soil of the steeply inclined hillside facing a nearly vertical bank where the trickle of water first emerged. A toad hopped on the moisture-saturated moss at my feet. I caught it without difficulty and it proved to be a small male Bell toad. It seemed phlegmatic, and made no vigorous attempts to escape either before or after being captured—in contrast to the behavior of the two species of frogs, occurring there and, to a lesser extent, that of tree-toads.

Bufo boreas boreas (Baird and Girard)—Northwestern TOAD

This toad ranges throughout the area. At Crater Lake in August, 1930, one was seen several hundred yards out from land swimming between Wizard Island and the shore. A brisk breeze was blowing at the time. On May 26, 1935, one was seen in a cultivated field near the coast, at the mouth of Lobster Creek.

The species is affected favorably by irrigation in the valley. Individuals are often transported, sometimes for long distances, in the irrigation canals. These canals are unsuitable breeding places for some amphibians because of the uncertain supply of water and its turbidity and high temperature. The hardiness of the toad tadpoles and their rapid development usually enable them to complete their larval stage in the canals. In late summer, swarms of young toads are to be found in mud cracks along the edges of the irrigation ditches, or foraging in the evening near-by in the open.

Spawning usually takes place in April, on the floor of the valley, and on the average is several weeks later than that of the tree-toad in the same locality.

Hyla regilla Baird and Girard—PACIFIC TREE-TOAD

Locality records indicate that tree-toads occur in all parts of the area. On the valley floor in the vicinity of Medford, the species ordinarily begins to breed about mid-March and continues at least until mid-June. In 1935 treetoad choruses were heard first in the last week of February. Cold weather in the first week of March temporarily silenced them, but they were heard into July with decreasing volume.

Sluggish streams with mud bottoms which become dry in summer are favorite breeding places. In such situations, many enemies such as garter snakes, newts, and turtles, which might be found in larger creeks, are absent.

Rana aurora aurora (Baird and Girard)—WESTERN WOOD FROG

This species occurs only in the humid coastal region. From May 21 to 26, 1935, many were seen in the vicinity of Lobster Creek, but the species was much less abundant than the yellow-legged frog. Most of those seen were several or many yards from the water. They were especially active on warm evenings, foraging among tall ferns and other dense vegetation.

Stomachs of three wood frogs from near Lobster Creek contained 2 small isopods, 6 beetles (the largest 15 mm. in length), a caterpillar 30 mm. long, and a Douglas fir needle. One from 4 miles east of Gold Beach had eaten 4 small isopods and a silverfish (lepismid).

Rana boylii boylii (Baird)—CALIFORNIA YELLOW-LEGGED FROG

This is probably the most abundant amphibian within the area. It is confined to the immediate vicinity of permanent streams, at least those where water holes persist through the dry season. It is most common along streams having rocky beds, but occurs also in ones having mud bottoms. Most of the stations of occurrence are in low Transition Life Zone or in Upper Sonoran.

Yellow-legged frogs were found in abundance at Evans Creek on April 29, 1934. The majority were small and of nearly uniform size, probably young of the preceding year. Numerous egg masses attached to large pebbles, and newly hatched tadpoles were seen. The spawning places were in pools four or five inches deep where slow currents or eddies caused constant circulation of water around the egg masses.

Stomachs of two specimens from 5 miles east of Gold Beach contained 2 hornets (*Vespa maculata*); 2 carpenter ants, a crane fly, a small dipteran, and a small skipper water strider (*Gerris*). Seven stomachs from 11 miles east of Gold Beach, May 20 to 26, 1935, contained 7 small beetles, 3 mosquitoes, 2 flies, a small moth, a water snail (shell length 10 mm.) and a piece of molted skin.

One of the natural enemies of this species is the gray garter snake. Wher-

ever this snake was found, the frogs were present in abundance and they form a large part of the snake's food as shown by stomach examinations. I have often watched individual gray garter snakes hunting under water, crawling and swimming among rocks, and darting after tadpoles which attempted to escape.

In September, 1929, at Trail Creek my father found garter snakes unusually abundant, and nearly all those seen had eaten at least one yellowlegged frog. The frogs were then concentrated about drying pools or the trickles of water connecting them, and the young were metamorphosing. The actual capture of a frog by a snake was witnessed; the struggling prey was rescued by the observer as the snake was beginning to swallow it. The frog died almost immediately, possibly poisoned by its own dermal secretions introduced into the blood stream through the deep lacerations made by the snake's teeth.

Rana pretiosa pretiosa Baird and Girard-WESTERN SPOTTED FROG

The spotted frog has been found at only two localities, both in the extreme northeastern part of the area, in the Cascade Mountains. A specimen (no. 17606) was collected August 26, 1934, at Munson Valley, 6700 feet, near Government Camp, Crater Lake National Park, and Slevin (1930, p. 136) has recorded this species from Crater Lake. I collected two specimens (nos. 17185 and 17186) at Whiskey Creek, 4510 feet, on the headwaters of Rogue River. In this locality the creek is cold, deep, and well-shaded, with mossy banks. Canadian Life Zone is indicated there by the presence of lodgepole pine, white pine, and Sitka spruce. Stomach of the two specimens contained three large beetles, a spider, and unrecognizable insect remains.

Sceloporus graciosus gracilis (Baird and Girard)-MOUNTAIN SWIFT

Within the area the mountain swift is limited to Transition Life Zone. It seems to be restricted further to localities where dry, open ground is available. This habitat is present on hillsides so precipitously steep that nearly all debris is washed away, and the ground is swept bare. The lizards may be locally abundant in such places. Golden oak is usually the dominant plant in this habitat.

I have found this swift at Union Creek at Natural Bridge; 6 miles south of Grants Pass; Squaw Creek above Squaw Lake; on the lower Rogue River at Rainie Falls, Bunker Creek and Corral Creek.

In all of these localities but the first, the fence lizard was also present, but not in great numbers. The competition of this larger species may be a limiting factor in the distribution of the smaller one. Both in the wild and with caged individuals, I have noted that the mountain swifts are wary of the larger fence lizards. Males of the former species made threatening displays in the presence of the latter, but retreated when these approached too near. Fence lizards seemed to ignore the presence of the smaller swifts.

Two female mountain swifts collected at Rainie Falls, on May 12, 1934, each contained five developing ova. These and other breeding females seen

on the same date had conspicuous salmon colored markings along the sides and neck.

Sceloporus occidentalis occidentalis (Baird and Girard)— WESTERN FENCE LIZARD

This species occurs everywhere below Canadian Life Zone in the area, and it is by far the most common species of reptile. Dry open woods in the foothills seem to offer optimum habitat conditions, but the species occurs even in dense forests of tan oak and Douglas fir near the coast.

In 1934 newly hatched young were first seen on July 16, at the Illinois River 3 miles west of Holland. In other years young were not usually seen until the last week of July or the early part of August.

[A record of *Phrynosoma douglasii* from Grants Pass, Josephine County, Oregon (Van Denburgh 1922, p. 375) is probably erroneous. No further evidence of occurrence of any horned toad there could be obtained. In an earlier paper, Van Denburgh (1897, p. 91) gives the locality as "Grants".]

Gerrhonotus coeruleus principis (Baird and Girard)— Northern Alligator Lizard

This alligator lizard is common near the coast, especially along banks of creeks, and in grassy clearings at the edge of the forest. A single specimen from Crater Lake seems to belong to this race, which occurs in the Cascade Mountains farther north. On the coast at Silver Creek and Lobster Creek many were seen during May, 1934 and 1935, but none was seen east of Silver Creek in this region. Apparently this lizard is closely restricted to the humid coastal belt except as it occurs in high mountains in the northeastern part of the area.

Gerrhonotus coeruleus shastensis Fitch—SHASTA ALLIGATOR LIZARD

This race has been found in the southeastern part of the area in the Siskiyou Mountains at Blue Ledge Mine, Squaw Creek, Wagner Gap and Mount Wagner (about 5 miles southwest of Ashland), Griffen Creek, Anderson Creek, U.S. Highway 99 at Siskiyou summit (about 3 miles southeast of Siskiyou Peak), and 10 miles east of Ashland.

Specimens from these localities are not typical of the race *shastensis*; they show intergradation with *principis*. They may be distinguished from typical *principis*, as it occurs near the coast, by absence of light mid-dorsal band; presence of irregularly arranged black marks and of white-tipped scales on the back; lighter ground color of head usually contrasting with ground color of body; heavier keeling of scales; longer tail consisting of more than 100 scale whorls; large azygous prefrontal touching postnasals laterally; sides of fronto-parietal more markedly concave.

Gerrhonotus multi-carinatus scincicauda (Skilton)— Oregon Alligator Lizard

This species is abundant throughout the Upper Sonoran and low Transition life zones in the area. Its range slightly overlaps those of *G.c. principis* and of *G.c. shastensis*. My westernmost record of its occurrence is between Silver and Lobster creeks within the humid coastal belt.

The natural history of this form in the Rogue River Valley has been discussed elsewhere (Fitch, 1935).

Eumeces skiltonianus (Baird and Girard)-WESTERN SKINK

Skinks seem to occur everywhere below Canadian Life Zone in the Rogue River drainage. The westernmost record of occurrence is 1 mile west of Lobster Creek about 10 miles from the coast. In rocky open places in the forest the skink sometimes occurs in concentrated colonies. Individuals have been found often under flat rocks on grassy hillsides.

The population of skinks may fluctuate greatly over periods of years. In a pasture of about four acres at Belmont Orchard 6 miles south of Medford on a sidehill strewn with flat rocks, these lizards were formerly so abundant that at least one could be found beneath every large stone. In 1935 they were rare or absent on this hillside. Similar reductions in numbers have been noted at different times in other localities.

One kept for three years in a terrarium remained active all winter at room temperature. It ate cutworms, maggots, earthworms, flies and cockroaches.

Charina bottae (Blainville)—RUBBER SNAKE

Rubber snakes have been recorded definitely from only two localities within the area, Wagner Gap, and 10 miles east of Ashland, both in high Transition Life Zone in Douglas fir and yellow pine forest. At Wagner Gap one was found beneath loose bark of a dead yellow pine two feet above the ground. Another was found in a similar situation only a few inches above the ground. A third was under loose bark on a fallen log. Three specimens collected 10 miles east of Ashland were all found beneath boards on a sawdust pile. This was at the site of an old sawmill which had fallen into decay. The shelter afforded by rotting logs, boards, and debris made the spot favorable for reptiles, skinks, alligator lizards, and fence lizards being unusually common.

One rubber snake when captured disgorged the remains of young meadow mice (probably *Microtus montanus*). At different times, several of these snakes were kept alive in a cage filled to a depth of several inches with old sawdust. They seldom showed themselves at the surface except at dusk. On several occasions they were offered young linnets which they usually ate. The method of attacking and swallowing the prey varied little. The snake crawled around the bird and nosed it for a few seconds, then seize it by the side of the head and quickly threw one or two coils about its body. It would then tighten its coils for a few seconds, and at the same time would pull and twist on the head of its prey, which was quickly killed.

One captive rubber snake gave birth prematurely to three young. Each was enclosed in an amniotic membrane along with a relatively large mass of yolk. The young made feeble movements; a few hours later they were killed by sunlight falling upon them. Their premature birth was probably a result of the abnormally high temperature at which the mother was kept.

At Fish Lake a man described as the "timber snake," a snake evidently of this species, which occurred locally.

Diadophis amabilis occidentalis Blanchard—WESTERN RING-NECKED SNAKE

All snakes of this species that were seen were in low Transition or Upper Sonoran life zones usually near water. At Belmont Orchard, 6 miles south of Medford one was taken as it was crossing a road, another was found in a dry irrigation ditch, a third was crawling under the edge of a bush of buckbrush (*Ceanothus cuneatus*). Near Dark Hollow, 7 miles south of Medford one was found coiled under a flat rock. Three snakes from lower Rogue River at Paradise Bar, 1 mile east of Lobster Creek, and 1 mile west of Lobster Creek, respectively, were found crossing trails at mid-day. A large female (no. 17246,) found near Burns Creek on May 15, 1934, contained four ova averaging 20 mm. in length.

Ring-necked snakes in a terrarium ate western skinks on several occasions.

Coluber constrictor mormon (Baird and Girard)— WESTERN YELLOW-BELLIED RACER

This racer is most abundant in the Upper Sonoran Life Zone but it is also common in Transition Life Zone except in thick coniferous forests. It is common in open woods of Garry oak and poison oak, on grassy slopes, in chaparral, and in grain or hay fields.

On one occasion when my attention was attracted by the squeaking of a mouse in tall grass, I followed up the sound and discovered a yellow-bellied racer attempting to swallow an adult meadow mouse (*Microtus californicus*).

Two racers cornered at the edges of streams swam across shallow pools in escaping. Often when one is cornered in a bush it will attempt to escape by climbing. I have found individuals hiding under loose bark of trees as high as eight feet above the ground.

Captive yellow-bellied racers ate fence lizards and showed agility in catching them on the run.

Coluber taeniatus taeniatus (Hallowell)-STRIPED RACER

The striped racer apparently is confined to dry hot and rocky chaparralcovered foothills. It is rare and I have seen only six individuals. One caught in a creek bottom near the mouth of Little Applegate River was climbing through a willow thicket and was elusive in avoiding capture. Another was found in the road a few miles up the same river. At Big Applegate River near the mouth of Beaver Creek, one was seen crawling rapidly near the edge of the road with its head elevated several inches above the ground. Apparently it had not been alarmed by the observer and seemed unaware of his presence. At Van Dyke Cliffs 5 miles east of Talent one was found basking on a ledge of rock at the edge of the cliffs, and another time one was found near the same spot coiled under a rock. One (no. 18634,) was found crushed on the highway two miles southeast of Gold Hill.

Except the last mentioned one, all were captured alive and kept in a large outdoor cage where they thrived. They ate fence lizards regularly, but did not attack other small animals offered, such as mice, young birds, and alligator lizards. When a fence lizard was thrown near one of the snakes, the latter would dart after it with rapid undulations, and would usually catch the lizard as it scampered and dodged. If the lizard temporarily escaped and hid, the snake would rear high off the ground and advance cautiously, turning this way and that, with sudden jerky motions, prepared to dart in any direction at a movement of the escaping prey. Lizards usually became limp and passive when they were caught by the racers, and then were rapidly swallowed, either head first or backwards, without offering resistance.

Caged striped racers showed indifference to the mid-day sunshine and often they were observed basking, even on summer days, when all other reptiles in the cage, including such desert species as collared lizards and leopard lizards, were in the shade or had sought shelter in burrows.

Pituophis catenifer catenifer (Blainville)—PACIFIC GOPHER SNAKE

Gopher snakes occur throughout the area below Canadian Life Zone. Specimens have been taken in dense Douglas fir forest (near Squaw Lake), and in pasture land on the coast near Gold Beach, but the species is most common in the cultivated areas of the valley, and in brushland in the foothills.

Near Dark Hollow, 7 miles south of Medford on July 27, 1932, as I was walking down a road which was walled in on either side by dense chaparral thickets of *Ceanothus cuneatus*, I heard the distressed bleating of a rabbit coming weakly and spasmodically from some point near-by in the brush. I turned aside to investigate, and when I had crawled a short distance beneath the bushes, I saw a small jack rabbit *(Lepus californicus)*, rolling about and kicking on the ground a few yards ahead of me. Then I saw that it was being attacked by a small gopher snake coiled around it. As the snake attempted to shift its hold, the rabbit regained its feet and ran unsteadily in my direction dragging the snake for several feet before it dropped off. I caught the rabbit when it nearly brushed against me in passing. The snake, possibly alarmed by my movements, climbed up into the chaparral where it was caught 3 feet above the ground. This snake had a total length of 27 inches and the rabbit weighed 195 grams.

Gopher snakes kept in captivity usually accepted small birds and mice as

food when these were offered either alive or freshly killed. Several times fence lizards in the cage were caught and eaten by the snakes.

On one occasion a very small gopher snake had just been placed in the cage a few minutes after being captured. A young meadow mouse taken from its nest, covered with fur but eyes not yet open, was placed in the path of the snake as the latter crawled restlessly about the edge of the cage. The snake stopped suddenly when it discovered the mouse, and struck at it, emitting a sharp hiss as it did so. It then drew back to a defensive pose, and held the forward portion of its body in a S-shaped loop, ready to strike again. In this position it circled around the mouse and struck at it repeatedly, hissing at each inspiration and expiration, and working itself up to a high pitch of excitement. The mouse's movements were feeble, and the snake grew bolder. It struck the mouse with audible impacts, and after each blow bit it before drawing back. Finally it caught the mouse by the head, then retaining this hold, constricted it and quickly killed it. When it was beginning to swallow this mouse, an adult meadow mouse which had been released in the cage approached. The snake hurriedly freed itself from its prey, and struck wildly at the adult. The latter retreated, but the snake retained its defensive pose, meanwhile hissing violently. Eventually it returned to the mouse it had killed and swallowed it.

This snake's behavior seemed to indicate instinctive fear of attack from a parent mouse on whose offspring it was preying. It is probable that a snake of this size if caught unaware in the act of swallowing prey, could be killed easily by an adult meadow mouse.

Several times gopher snakes mated in captivity. A female captured during the breeding season was continually followed by several males in the cage. In preparing to mate the male grasped the body of the female in his jaws. Possibly males recognize the female by scent. A male seeing another gopher snake crawling a few feet away, would pursue it, but after catching up and nosing the other, would quickly lose interest if the second snake happened to be another male.

Lampropeltis getulus boylii (Baird and Girard)-BOYLE KING SNAKE

This king snake has been found only in dry hot areas of the valley floor. Three were found near the mouth of Little Butte Creek, in 1924, 1928, and 1929. On April 19, 1934, a king snake (no. 17270,) was found crossing the Crater Lake Highway 1 mile south of Trail. It bit me several times when it was captured. In April 1935 one was collected at the mouth of Birdseye Creek.

In all those seen, the dark bands were black in color, never brownish as they often are in specimens from California.

Lampropeltis zonata (Lockington)—CORAL KING SNAKE

The coral king snake is restricted to dryer parts of the area where Garry oak, golden oak, madrone, or chaparral are dominant. It is more widely distributed and abundant than the Boyle king snake in the same region as I have personally collected or received twenty specimens of the present species and only six of the former species. The twenty specimens represent the following localities: Lake Creek 7 miles south of Brownsboro (no. 17272,); 3 miles east of Phoenix; Belmont Orchard 6 miles south of Medford; Dark Hollow 7 miles south of Medford; Coleman Creek 3 miles southwest of Phoenix; Jacksonville; Big and Little Applegate rivers; East Fork of Illinois River, 1900 feet; and, on the lower Rogue River, Rainie Falls, Solitude Bar, and Horseshoe Bend. Gordon (1935) records it from five additional localities, Wolf Creek, Selma, Grants Pass, Gold Hill, and Sams Valley.

One found dead on the road at the junction of Big and Little Applegate rivers had the tail of a fence lizard and fragments of a green beetle in its stomach. One recently captured disgorged small leathery eggshells which were probably those of either the fence lizard or the western skink.

During the summer of 1934 four adults were kept together in a small cage. They were fed fence lizards which they ate regularly. Evidently the sense of smell plays an important part in finding prey. One would appear to sense the presence of food when it crossed the fresh trail of a lizard. It would become alert and apt to strike at any moving object; often it would seize another snake momentarily. When the lizard was found, it was usually caught by the head. The snake would then throw several coils about it and constrict it. In the meantime a second snake would often find some portion of the lizard exposed between the coils of the first, and would also seize it. Often as many as three snakes attacked the same lizard, enveloping it in a mass of coils from which individual snakes extricated themselves with difficulty after giving up their attempts to appropriate the victim. Skinks were also eaten whenever they were placed in the cage. A half-grown alligator lizard, which was offered, was not eaten but evidently it was attacked as its tail was found to be broken on the following day. An adult rattlesnake, a yellow-bellied racer, and a garter snake, which were placed in the cage at different times were not attacked.

During the latter part of May, shortly after the time of capture, these snakes showed signs of sexual activity. The two smaller individuals, which were males, frequently followed the two females or rested near them. Probably mating did not take place.

Contia tenuis (Baird and Girard)-SHARP-TAILED SNAKE

I have seen only two sharp-tailed snakes from the area. One of these was collected by Professor F. C. Reimer at the Southern Oregon Experiment Station at Bear Creek near Talent. This snake was found coiled under a board near the creek.

Another, which I kept for several months in a terrarium, was collected at the Rogue River near Table Rock. It was secretive and seldom showed itself during the daytime, but it became active and crawled about the cage after dark. It often climbed to the highest point that it could reach and extended its body upward.

Thamnophis ordinoides-WESTERN GARTER SNAKE

Three subspecies of *ordinoides* exist within the general region under consideration, and all three may actually occur in the same locality. Thus near Agness, on May 18, 1934, I collected one of each, all within a radius of 100 yards. There is no sign of intergradation in this region between any two of these forms. Interbreeding is seemingly prevented by factors not yet fully understood. Subspecific ranking of the three forms seems to me justified, after considerable study of the whole group, by the presence elsewhere of intermediate populations; all are ultimately connected as a geographically continuous intergrading series.

Within the Rogue River drainage, all individual ordinoides I have examined may be readily identified with one or another of the three subspecies. T. o. ordinoides has only seven pairs of supralabials, 17 or 19 scale rows on the body, a small narrow head, and, usually, some red in the coloration. T. o. elegans has eight pairs of supralabials, 21 scale rows, a distinct bright yellow dorsal stripe, and a broad heavy head. The third form, differs markedly in its characters from both these subspecies, and it does not agree with any form hitherto described. This previously unnamed race is here designated as:

Thamnophis ordinoides hydrophila subspec. nov.— Oregon Gray Garter Snake

Diagnosis.—A member of the *couchii-hammondii* series within the species, having tendency toward reduction of maximum number of scale rows on body from 21 to 19; ground color, gray, dorsal stripe present, and lateral stripe faint or absent.

Description.—Size large, total length as much as 800 mm.; head relatively narrow with pointed muzzle; dorsal stripe faint, less than a single scale row in width for most of its length, tan or pale dirty yellow; lateral stripe faint, or not distinct from color of ventral surface; a checkerboard pattern of two alternating rows of black squares on a gray ground color between dorsal and lateral stripe on each side; supralabials pale gray, almost white on their lower portions, gray or light olive above, narrowly margined with black posteriorly; iris wider than diameter of pupil, uniformly brown or gray in color; chin and throat white except for occasional narrow edges of black between infralabials; ventral surface posteriorly suffused with more or less pink or purple of variable tint; maximum number of scale rows on body 21; the fifth row on each side (when 21 are present) usually reduced and not continuous from head posteriorly to middle of body; supralabials normally 8, 8; infralabials, 10, 10; contact of rostral with both internasals less than contact of rostral with nasal on either side; seventh supralabials relatively small; gastrosteges 154-171, urosteges 74-94.

Type.—Adult male, no. 18127, Mus. Vert. Zool., collected by H. S. Fitch at Trail Creek 6 miles from its mouth, Jackson County, Oregon; July 27, 1934.

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Remarks.—Closely allied to *Thamnophis ordinoides couchii*. Differs from *couchii*, as shown by a comparison with a series of ten specimens from the upper Pit River (type locality), as follows: gastrosteges fewer (no overlapping if only specimens of the same sex are compared); infralabials fewer *(couchii* normally has eleven pairs); fewer scale rows across the body (fifth row continuous back to mid-body in *couchii* with occasionally an additional row, making maximum total of 23); ground color paler, grayer, less brown-toned than in *couchii*; no black markings on chin; no conspicuous black blotches on gastrosteges; lateral stripe usually faint, not well set off from ventral coloration.

This subspecies may be distinguished by its light uniformly colored iris from *elegans* and *ordinoides*, both of which have dark, heavily pigmented irises; by its dull indistinct dorsal stripe which contrasts with the bright yellow dorsal stripe of *elegans* and the brick red or chestnut (rarely yellow) stripe of *ordinoides*; by the gray ground color and checkerboard pattern contrasting with the jet black ground color of *elegans* and the usually brownish ground color of *ordinoides*; by the narrower contact of the internasal plates with the rostral exceeded by the contact of the nasal with the rostral on either side. In having 8 pairs of supralabials *hydrophila* differs from *ordinoides* and agrees with *elegans*; it is intermediate but well set off from both as regards number of scale rows and gastrosteges.

This snake is widely distributed and abundant within the area, but it is locally confined to the vicinity of permanent streams having rocky beds. I have collected altogether more than 120 specimens, mostly on boulders at the edge of the water, or in midstream, or crawling and swimming among rocks under water, in search of food. Stomach examinations indicate that nearly all the food is captured in the water. Fish (small trout and *Cottus)* and yellow-legged frogs (both tadpoles and adults) seem to constitute the bulk of the food. One specimen had eaten a larva of the marbled salamander which was 7 inches long. A juvenile had eaten a small newt larva.

There are 76 specimens in the Museum of Vertebrate Zoology collection from the Rogue River basin, and 4 from "Rogue River" in the University of Michigan Museum of Zoology (no. 71513) represent this race.

Thamnophis ordinoides ordinoides (Baird and Girard)— PUGET SOUND GARTER SNAKE

This garter snake is common in the humid coastal belt, but it becomes rare farther inland. It is characteristic of the moist Transition Life Zone where Douglas fir, alder, California laurel, hazel and broadleaf maple are dominant plants. Specimens have been collected at the following localities: Elk Creek; Squaw Creek 2 miles above Upper Squaw Lake; Evans Creek, 13 miles above mouth; 10 miles east of Ashland; and, on the lower Rogue River, Mule Creek, Kelsey Creek, Clay Hill Creek, Agness, Silver Creek, Lobster Creek, and Gold Beach.

Most of the specimens taken were found on damp ground, often many hundred yards from water. At no time was an undisturbed individual found *in* the water, and stomach examinations showed that only terrestrial animals

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were eaten. A total of 19 slugs, 5 plethodont salamanders *(Plethodon* and *Aneides)*, and one earthworm were taken from the stomachs of 80 individuals captured in the region around Lobster Creek; many were empty.

In the majority, the dorsal stripe is red, and brick red blotches are present on the abdomen; but the amount of red in the coloration is highly variable. Among more than eighty specimens from the coastal region, none has a yellow dorsal stripe; but among eight that I have seen from the eastern part of the area, two had yellow dorsal stripes and no red in the coloration. It seems probable that the amount of red, and the color of the dorsal stripe, vary geographically as well as individually.

Thamnophis ordinoides elegans (Baird and Girard)— MOUNTAIN GARTER SNAKE

This subspecies is rare within the area. It usually occurs in the low Transition or Upper Sonoran Life Zone along with Garry or golden oak, madrone, yellow pine, and manzanita. Specimens have been taken at the following localities: Hyatt Dam, 11 miles southeast of Ashland; Emigrant Creek; ridge north of Squaw Lake; Big Applegate River; Little Applegate River; Antelope Creek; Trail Creek; Belmont Orchard, 6 miles south of Medford; Griffen Creek, 8 miles south of Medford; Evans Creek; Rogue River, at Jackson Falls (3 miles northeast of Upper Table Rock); Burns Creek; Solitude Bar; 2 miles west of Agness.

Some adults were found at distances from water, sometimes more than a mile from any permanent stream. Apparently this snake forages in dry woods. Young and half-grown individuals have been found in streams along with gray garter snakes, which latter usually were much the more abundant.

One collected at Applegate River had eaten a small toad. Another taken at Griffen Creek had an adult male fence lizard in its stomach. A captive individual ate a half-grown alligator lizard, and two young yellow-bellied racers.

Although the northernmost published record of this form is Box Springs, eastern Lassen County, California (Grinnell, Dixon, and Linsdale, 1930, p. 152), it is now known to range for north of that locality. In recent years many specimens have been collected in Shasta and Siskiyou counties, California, and a typical specimen (no. 18788,) was taken by me on the Middle Fork of the Willamette River in Lane County, west-central Oregon.

Van Denburgh (1922, p. 823) described two specimens from Siskiyou, Jackson County, Oregon, as intergrades between this form and *atratus*. My examination of these specimens indicates that they are intergrades between *biscutatus* and *hydrophila*, and that they probably came not from Siskiyou itself, which is on the north side of the Klamath-Rogue divide, but from the south or Klamath side a few miles away. A specimen which I collected in that region on Cottonwood Creek, a tributary of the Klamath River, agrees both in color pattern and scalation with the two mentioned specimerus. *Elegans*, as it occurs in the Rogue River basin, is typical and does not show intergradation with any other race.

Thamnophis sirtalis concinnus (Hallowell)—PACIFIC GARTER SNAKE

This garter snake occurs from the crest of the Cascades to the coast wherever there is a permanent water supply, and thus it is the most widely distributed reptile within the area. It is apparently more adaptable than any of the subspecies of *T. ordinoides* and therefore competes with each of these more than they compete with each other. I have observed it hunting its food under water, and foraging both on wet meadowland and on dry ground. Its preferred habitat is on low, wet ground along the edges of marshy meadows and in creek bottoms bordered by thickets of willow and other undergrowth.

Crotalus confluentus oreganus (Holbrook)—PACIFIC RATTLESNAKE

Rattlesnakes occur in areas where chaparral, oak and yellow pine predominate. The range extends westward along Rogue River at least to Bunker Creek, where I collected one on May 12, 1934. Persons living in Agness stated that rattlesnakes were common a few miles farther down the river. In 1935, residents at the mouth of Lobster Creek, 13 miles inland from Gold Beach, informed me that a rattlesnake had been killed there several years before. At Gold Beach I was told that rattlesnakes were not of regular occurrence there, but that several individuals found at different times evidently had been brought down the river on floating driftwood.

The species does not seem to occur in cultivated areas on the floor of the Rogue River valley. Probably it has become exterminated there. It is still fairly abundant locally in brushland and in rugged areas in the foothills. An individual killed at Big Applegate River had eaten a wood rat (*Neotoma fuscipes*). When one taken at Rainie Falls was forced to disgorge, it was found to have eaten a meadow mouse.

Clemmys marmorata (Baird and Girard)—WESTERN MUD TURTLE

The mud turtle occurs in most of the permanent streams below the Canadian Life Zone; it is most common along the larger slow-moving creeks which afford deep pools. It occurs along Rogue River for most of its course though not abundantly. On May 20, 1934, several were seen in the river at the mouth of Silver Creek, 15 miles inland.

On April 19, 1934, a large mud turtle was seen crossing the Crater Lake Highway near Trail. It was moving away from the river, and had already progressed about 100 feet up a steep bank. On June 7, 1934, one which I had been keeping since April laid an egg in its cage.

Summary

Nine kinds of salamanders, six frogs and toads, six lizards, thirteen snakes, and one turtle have been recorded from the basin of the Rogue River. New locality records made here extend the known ranges of *Triturus similans*, *Rhyacotriton olympicus*, *Plethodon dunni Plethodon elongatus*, *Gerrhonotus*

multi-carinatus scincicauda, Coluber taeniatus taeniatus, and Thamnophis ordinoides elegans.

Three subspecies of *Thamnophis ordinoides* occur within the area, and one of these, T. o. hydrophila, is a new race closely related to T. o. couchii of California.

Batrachoseps attenuatus, Plethodon elongatus, Gerrhonotus coeruleus shastensis and Lampropeltis zonata apparently reach their northern limits in this area; Rhyacotriton olympicus and Plethodon dunni, have not been recorded farther south.

REFERENCES.

- BISHOP, S. C. 1934—Description of a new salamander from Oregon, with notes on related species. Proc. Biol. Soc. Wash. 47:169-172, 1 pl.
- FITCH, H. S. 1935—Natural history of the alligator lizards. Trans. Acad. Sci. St. Louis **29**:1-38, 4 pls.

GORDON, K. 1935-Boyle's and coral king snakes in Oregon. Copeia 1935:46.

- GRINNELL, J., DIXON, J. AND J. M. LINSDALE. 1930—Vertebrate natural history of a section of northern California through the Lassen Peak region. Univ. Calif.. Publ. Zool. 35, v+594 pp., 181 figs. in text.
- SLEVIN, J. R. 1928—The amphibians of Western North America. Occas. Papers Calif. Acad. Sci. 16:1-152.

TWITTY, V. C. 1935-Two new species of Triturus in California. Copeia 1935:73-80.

VAN DENBURGH, J. 1897—The reptiles of the Pacific Coast and Great Basin. Occas. Papers Calif. Acad. Sci. 5:1-236.

Museum of Vertebrate Zoology, University of California, Berkeley, California.