THE DISTRIBUTION AND HABITS OF AMPHIBIA AND REPTILES IN LINCOLN BENTON AND LINN COUNTIES

by

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INTRODUCTION

This paper is a general survey of three typical counties of Western Oregon. The objective was to determine the exact range and distribution of the known forms and to uncover as many new forms as possible, for it is a well known fact that the Pacific Northwest, and especially the Cascade Mountains of Oregon, are very incompletely known so far as the herpetological fauna is concerned.

The work was carried on over a period of about twelve months, actually the time spent in the field was much less. There is no doubt that many new forms and range extensions remain to be discovered.

The field of life histories of amphibians and reptiles is still open to any worker looking for a relatively untouched field. An attempt was made to collect data on the habits of the forms within the scope of this work, and in addition material on this phase of the work was taken from observations made on numerous occasions in years prior to the time this work was started.

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TABLE OF CONTENTS

Introduction........................................................................................................ iii
Table of Contents................................................................................................ iv

I. Topographical and Climatic Features......................................................... 1

II. The Habitats of Amphibians and Reptiles............................................... 7
   Aquatic........................................................................................................... 9
   Streams........................................................................................................ 10
   Semi-aquatic................................................................................................. 13
   Forests.......................................................................................................... 13
   Open Country............................................................................................... 15
   Desert.......................................................................................................... 16
   Marginal..................................................................................................... 16

III. Faunal Differences in the Cascade and Coast Ranges................................ 18

IV. Key to the Amphibia and Reptilia.............................................................. 21

V. Class Amphibia............................................................................................ 27
   Order Caudata
   Suborder Mutabilia
      Family Salamandridae
         Genus Triturus.......................................................... 27
      Family Ambystomidae
         Genus Ambystoma.................................................... 31
         Genus Dicamptodon.................................................. 32
         Genus Ryacotriton.................................................... 37
      Family Plethodontidae
         Genus Plethodon...................................................... 39
         Genus Ensatina........................................................ 40
Genus Aneides.......................... 42
Genus Plethopsis.......................... 43

Order Salientia
Suborder Costata
Family Ascaphidae
Genus Ascaphus.......................... 45

Suborder Linguata
Family Bufonidae
Genus Bufo............................... 48
Family Hylidae
Genus Hyla............................... 49
Family Ranidae
Genus Rana............................... 51

VI. Class Reptilia.......................... 55
Subclass Diapsida
Order Squamata
Suborder Sauria
Family Iguanidae
Genus Sceloporus.......................... 55
Genus Phrynosoma.......................... 57
Family Anguidae
Genus Gerrhonotus.......................... 61
Family Scincidae
Genus Eumeces............................ 64

Suborder Serpentes
Family Boidae
Genus Charina............................. 66
Family Colubridae

Genus Diadophis........................................ 68
Genus Coluber........................................ 69
Genus Pituophis........................................ 71
Genus Contia........................................... 73
Genus Thamnophis..................................... 73

Family Crotalidae

Genus Crotalus........................................ 77

Subclass Synaptidae

Order Testudinata

Family Testudinidae

Genus Clemmys......................................... 82

Illustrations

Typical habitats of some of the common amphibia and reptilia............................... 86
Thamnophis sirtalis concinnus................................. 86
Triturus similans........................................ 87
Hyla regilla............................................ 87
Dicamptodon ensatus and Plethodon vehiculus............. 88
Ambystoma gracile....................................... 88
Scoleleporus c. occidentalis............................... 89
Pituophis catenifer catenifer............................. 89
Sand Mountain Crater.................................... 90
Foothill Habitat......................................... 91
Crotalus confluentus oreganus............................ 91
Bibliography.............................................. 92
THE DISTRIBUTION AND HABITS OF AMPHIBIA AND REPTILES IN LINCOLN BENTON AND LINN COUNTIES

TOPOGRAPHICAL AND CLIMATIC FEATURES

The three counties considered in this study offer a wide variety of topographical features from the sandy ocean beaches of Lincoln County to the high Alpine peaks in eastern Linn County with all intermediate stages that may be encountered between these two extremes.

The extreme western edge of Lincoln County consists of sandy beaches backed by steep cliffs and these merge into a zone which typifies a narrow strip of land paralleling the west coast of Oregon. The land in this zone varies from a few hundred yards to a half mile or more in width and consists of a clay and sandy top-soil, and in elevation it varies from sea level to several hundred feet or more. As a rule the elevation is fairly constant and ranges between fifty and two or three hundred feet in this zone. This zone may be designated as the Wind Zone or the Coast-Canadian Zone and is typified by stunted and wind-swept vegetation, particularly the Jack-pine or Lodgepole pine which is found only in this narrow strip in the western part of Oregon. Other typical vegetation is short grasses of various kinds and dense stands of Salal.

Inland this zone merges into the Coast Range Mountains. These mountains formed from a much eroded plateau rise to an elevation of 4097 feet at the highest point on Mary's Peak, and average from 1500 to 2500 feet. Though not high, the slopes are usually steep and deeply cut by steep V-shaped canyons. On the east slope the predominant vegetation is the Douglas fir with an undergrowth of
Vine maple and Salal. The open burns or clearings, after a few years, are taken over by Vine maple and particularly Bracken fern which may reach a height of 10 feet and an almost impenetrable density.

The west slope has a predominance of Sitka spruce, Western Red cedar, Western hemlock, with the usual Douglas fir, Vine maple, and Salal. In addition large areas of the west slope are taken over by alder.

The low foothills along the eastern edge of the Coast Mountains usually show a predominance of deciduous trees such as oak, maple, hazel, etc. Much of the forest cover is on the north slope of these foothills, and south slopes being covered by short grasses or shrubs.

For the most part the valley is quite flat and consists of rich clay and loam soils. Most of it is in river bottoms and creek bottoms which are densely covered with growths of oak, maple, ash, alder, some fir, and poplar, as well as numerous shrubs. That part of the valley which is in Benton County is in general more wooded than the part which lies in Linn County. The eastern half of the valley in Linn County near the Cascade foothills is particularly flat and given to large expanses of grasslands. During the summer this region has many characteristics peculiar to more typically arid or semi-desert country.

In this flat grassland region near the western edge of the Cascades are found the "Buttes", steep, rugged, solitary hills of volcanic origin, as are also the Cascade Mountains, and varying from three or four hundred feet to 1200 feet in height. These "Buttes" rise abruptly from the flat floor of the valley and
for the most part are found close to and in a irregular line parallel
to the main range of the Cascades. A few of these "Buttes" are well
out in the valley and not more than seven or eight miles from the
Willamette River. They consist entirely of volcanic basalt in most
cases and are covered only thinly with soil. As a result there are
numerous projecting rock ledges with deep cracks and fissures.
Particularly is this true on the south slopes where there is
little vegetative cover other than wild rose and grasses.

In the same category may be placed the low foothills, many
of which run in long ridges at right angles to the main Cascade
range and project well out onto the floor of the valley, for they
are of the same origin and possess to a large extent the same
features as the line of "Buttes" which form the advance guard for
them. These foothills and "Buttes", particularly in the zone ly-
ing just within the valley proper and the foothills proper, are
peculiar in that they also show characteristics peculiar to arid
regions in the form of plants and animals found within their
boundaries. The north slopes of these "Buttes" and foothills
are usually well timbered with Douglas fir and oak. However,
the south slopes and particularly the lower slopes usually bear
only short grass and often extensive and heavy growths of wild
rose which may cover hundreds of acres on these southern slopes.
Most of this land is fit only for pasturing sheep and cattle.

The cascade Mountains rise quite abruptly along the eastern side
of Linn County and reach a height of 5000 to 6000 feet with some of
the higher peaks within the county reaching an elevation of 8000 feet.

On the west slope up to three or four thousand feet the Cascades,
which are of volcanic origin, are quite similar to the Coast Mountains.
The slopes also are steep and rugged and traversed by numerous canyons and ridges and quite well covered with soil which supports heavy stands of timber, primarily of Douglas fir, spruce, etc.

In the more interior regions of the range, however, and at the higher levels the aspect of the mountains changes to a considerable extent. The soil is shallow and sandy and the slopes become more rocky and the vegetation becomes more sparse and somewhat stunted. Also along the eastern edge of Linn County are located extensive lava beds formed by the Belknap Crater and other craters. Many small craters are found in this region and the weathered, sand-like pumice forms extensive sand areas quite arid in environmental conditions.

Belknap Crater in southeastern Linn County marks the origin of extensive lava flows which form miles of jumbled and desolate lava beds. Many of the lakes in this region are of volcanic origin, formed by the damming up of streams and valleys. Many of these lakes are of great depth and the water is almost ice cold even during the hottest parts of the year.

Typical plants are Lodgepole pine as well as spruce, White pine, White-bark pine, tamarack, and willows. Along some of the mountain slopes, chaparral and manzanita are common and are indicators of the arid desert conditions that exist here.

Rainfall and Climate

Taking the counties as a whole the climate may be considered mild and the rainfall quite heavy during the rainy season. However, considerable variation exists between individual areas.
throughout the year. This can easily be understood when one considers that the elevation varies from sea level to an average of 5000 to 6000 feet and even higher in certain areas. Also that the coast is exposed to the effects of the ocean, whereas certain interior areas may receive little or none of the effects commonly associated with the sea coast.

The rainfall along the coast and on the west slope of the Coast Mountains may be 100 inches or more per season whereas on the east slope it will be somewhat less and in central Linn County it may be as low as 30 or 40 inches. Again it will be higher on the west slopes of the Cascades, approaching that of the Coast Range Mountains. The rainfall is also quite varied in latitudinal strips, a condition that can be expected considering the low passes in the Coast Range Mountains and the fact that rain clouds are low hanging clouds and are here always blown in from a westerly or southwesterly direction and must come over the Coast Range Mountains through these passes. This strip-zonation of rainfall is most noticeable in spring and fall before rains become general and particularly in the summer when occasional showers fall. Those areas in the path of wind currents coming through the Newport, Waldport, and Alsea passes are usually favored and the areas between these strips may be quite dry and sharply marked off from the wet strips.

The west slopes of the Coast Range Mountains and particularly the immediate coastal strip experiences a much more stable climatic condition throughout the year. This area may be considered the Fog Belt, for even during summer months heavy fogs are common and the
region is constantly cooled by ocean winds. During winter and often
during the summer the coast region is quite disagreeable due to the
constant cold, damp winds, fog, and rain.

Here one can experience conditions that make heavy clothing
desirable and necessary even in July, and yet after driving over
the first ridge into the interior valley one finds that the
temperature may be 90 degrees or more in the shade.

In the same way one can leave the valley under temperature
conditions ranging close to 100 degrees Fahrenheit in the shade
and find it comparatively cool in the high Cascades, though the
range of variation is not near the extreme that one finds between
the valley and the coast. On the higher peaks such as Mt. Washing-
ton one may find snow banks as late as August. The entire valley is,
throughout the summer, fanned by cool ocean breezes during the late
afternoon and evenings.

The summer season in the Cascades is quite short, beginning
usually in June and lasting till late September. During much of
the remaining time snow drifts cover the higher slopes of the
mountains to a considerable depth, often reaching extremes of
5 to 12 feet.
THE HABITATS OF AMPHIBIANS AND REPTILES

It is advisable for the beginner to acquire some knowledge of the habitats of the animal he intends to collect if he is to meet with any degree of success.

The best way of course is to accompany a person who knows the habitats and has had experience in collecting the forms to be collected. This, however, is not always convenient or possible. The next best way is to learn the habits of the animals to be collected by reading the literature published on the subject. In the case of amphibia and reptiles this does not always answer the question fully; particularly is this true in the case of amphibia where much of the material is scattered in various journals and publications and, at best, usually only names the place where the specimens were collected, such as, under a log, a board, rock, etc., without giving much information about the associations, habits and habitats of the species.

With this problem in mind it will not be amiss to discuss this subject in relation to the forms taken up in this paper insofar as this subject is known. Since this paper deals only with western forms, only western habitats will be discussed. However, since many of these forms are quite typical of the particular groups to which they belong this information may be applied to corresponding forms in other parts of the State and country, keeping in mind, of course, local variations and modifications.

The habitats of amphibia may be divided in a number of logical groups according to the physical features of the environment in which
a group of animals is commonly found. The word *group* in this case is not meant to refer to a group made up of forms belonging to the same specific taxonomic classifications, but to one made up of specimens representing various species, genera or even families.

The word *environment* is used loosely and in the sense that it refers to the general physical and geographical factors in which the animal is found. The term *association* is more specific in its meaning and refers to the more immediate and limiting physical features of the environment which can be directly associated with that animal or group of animals and in which it is found. It is in short a more specific unit of the *environment*. The term *habitat* refers simply to the environmental condition or conditions which are closely and directly associated with the animal. A habitat may be within an association or may be made up of two or more associations.

Associations may be divided into a number of natural groups as follows:

1. Aquatic
   a. Springs, pools, ponds, and lakes
      1. Permanent
      2. Temporary
   b. Brooks, creeks, and rivers
      1. Fast mountain streams
      2. Slow, sluggish streams

2. Semi-aquatic
   a. Marshes
   b. Seepages
   c. Bogs
3. Forests
   a. Heavy homogeneous forests
   b. Heavy mixed forests
   c. Interrupted or broken forests

4. Open country
   a. Grasslands
      1. Upland meadows
      2. Lowland meadows
   b. Desert

5. Marginal
   a. Aquatic, semi-aquatic, marshland, forest and field margins.

Aquatic

Springs, pools, and ponds are frequented by many forms of amphibia and reptiles. Some of these ponds and lakes may be temporary and some permanent and this must be taken into consideration for certain forms may require permanent ponds or lakes for their existence. However, in the case of the various forms dealt with in this paper there are only few that require permanent aquatic habitats of this type.

Permanent ponds and lakes such as those of the upper Cascades and the larger sloughs and ponds of the valley, harbor such forms as the *Rana a. aurora*, *Rana p. pretiosa*, *Rana catesbeiana* and *Hyla regilla*, during the breeding season *Triturus similans*, *Dicamptodon* (in the higher mountain waters), *Rana p. luteiventris*, *Bufo*, *Thomophis*, and in the lowland ponds *Clemmys marmorata*. 
Streams

Streams may be quite sharply divided into rapidly-flowing mountain streams and the sluggish lowland streams. The difference in the forms found in and along their margins is usually not so much due to the rapidity of water flow as to the temperature of the water as well as the general environmental conditions in and around these two different types of aquatic habitats.

Fast flowing mountain streams usually fed by springs or by melting snow will maintain a quite constant low temperature, rarely rising over 60 degrees Fahrenheit. Furthermore, the temperature, due either to the elevation or the dense forest usually present, or both, is usually lower than in the lowland and soil conditions are more moist, particularly along streams.

Lowland streams during the summer months usually have a temperature above 60 degrees Fahrenheit, and will show a wide range of fluctuations between extremes throughout the year.

As to the speed of flow, little attention need to be paid to this if one remembers that most amphibians are comparatively weak swimmers and can be expected to be found only in the quiet waters. Such forms as the various frogs which may be encountered along the banks of fast flowing streams will be found to be very reluctant to enter the water and when forced to do so will usually promptly swim back to shore and grasp some solid object along the bank, or climb out entirely, rather than trust to their own ability in the swift current. It is in the quiet stretches and the pools that one may look for specimens in these mountain streams. Such
forms as *Triturus* and *Dicamptodon* may be looked for in the open water of these streams, while such frogs as the *Rana b. boylii*, *Rana a. aurora*, *Rana p. pretiosa*, and *Rana p. luteiventris* are usually found along the banks of the streams, ready to plunge into the water. Certain forms such as *Rhyacotriton*, *Ambystoma larvae, Ascaphus*, and larvae of *Ascaphus* as well as *Plethodon vehiculus* and *P. dunni* may be said to be found in mountain streams, but the last two are peculiar in that the streams they frequent are usually the very small brooks, often not more than a bare trickle of water over the rocks which form the bed of the stream. Here in this semi-aquatic habitat these forms are found under the rocks and debris in the streams. Larvae of *Ascaphus* will usually be found in the small pools clinging to the rocks on the bottom with their sucker disks. Most of these shallow water forms are only partly submerged (*Plethodon* is terrestrial) though when disturbed they do not hesitate to plunge into the deeper water for refuge. In connection with these shallow brooks may be mentioned the adult form of *Dicamptodon*, which may be looked for under the larger rocks where they take refuge in a partly submerged condition, during the dryer seasons of the year.

Slow streams are usually characterized by greater depth and higher temperature (above 60 degrees Fahrenheit in summer) as well as sluggish currents. These streams are also characteristically located in the lower valley regions or the foothills. Conditions are generally quite similar to that of ponds, and much the same forms may be expected in and along these streams. Characteristic forms
associated with these streams are the salamanders, *Triturus*, larval *Dicamptodon* (in the foothills), such frogs as *Rana a. aurora*, *Rana p. protiosa*, *Rana catesbeiana*, as well as *Hyla regilla* during the breeding season. Of the reptiles the *Clemmys Marmorata* is the only inhabitant of these streams though others may be closely associated with them.

It may be argued that since the larval form of *Dicamptodon* if found in some of the sluggish streams along the margins of the valley that they may also be found in some of the lowland ponds. Here it must be remembered that though such sluggish streams may seem to be quite warm many of them have a large number of "cold spots" along the bottom of the stream bed. These "cold spots" are formed by underground springs and the water in the immediate vicinity will be quite cold, in fact where a large number of such springs may be closely grouped the temperature even on a hot mid-summer afternoon will be so cold as to chill a swimmer to the point of acute discomfort. Under such conditions forms like *Dicamptodon* which require low temperatures could survive quite readily. In contrast most of our lowland ponds are formed by river overflows or underground seepages from larger streams such as the Willamette River, and once such ponds have filled up there is little addition of fresh water to them, consequently the temperature will usually be quite high during the summer. Furthermore, most ponds and lakes in the lowlands are cut off from the mountain streams and since lowland conditions are not suitable to the existence of the adult land forms of *Dicamptodon* these ponds would not become stocked with the larval forms of this salamander.
Semi-aquatic

Going from the aquatic to the semi-aquatic a certain amount of overlapping will be found between the classified habitats. This is to be expected for it is impossible to make a sharp and definite segregation of each type of association and habitat, much less to expect animals to strictly adhere to certain characteristic habitats to the exclusion of all others.

Marshes and bogs, though perhaps technically different from a physiological standpoint, may be considered practically identical as to the forms which may be expected to be found there. Primarily these forms are Hyla regilla, and Thamnophis.

Seepages resemble the marshes in that they present semi-aquatic habitats where such forms as Plethodon, Ambystoma, and Rhacotriton may be found.

Forests

Forests in general present several features that are common or characteristic of practically all forests, whether heavy homogeneous, mixed, or broken forests. These features may be classed as cover objects and consist of such things as logs, bark on the ground, leaves, rotten stumps, loose bark on trees, etc. All of these afford a place of refuge and protection to amphibians and reptiles, particularly the former. Furthermore, the moisture content of the ground in general, and beneath objects, will be much higher, particularly in dense forests, than in the grassland type of habitat. Further, the temperature will be lower and humidity relatively higher in a forest. These conditions all favor the
requirements of salamanders of various kinds.

Dense homogeneous forests in the counties surveyed are represented primarily by coniferous trees, mostly of the Douglas fir, and spruce type, though higher in the Cascades there are extensive pine forests (Pinus contorta). This latter type is, however, in this case not a profitable collecting ground for forms typically associated with coniferous forests.

Forms commonly to be expected in forests of this kind are Plethodon, Plethopsis, Ensatina, mature Dicamptodon, and Ambystoma. Of reptiles only one need be expected and that is Charina bottae.

Mixed forests usually consist of coniferous trees and deciduous trees such as maple and alder and in the foothills region often to a large extent considerable amount of oak. The same forms may be looked for here as in the preceding type of forest with the possibility of Ambystoma being more common.

Interrupted or broken forest may be either coniferous or mixed, quite commonly the latter, and are characterized by having the trees more widely dispersed or in small scattered groups. Such forests will be poorer in amphibian forms and richer in reptiles.

Ensatina is at times quite numerous in favorable localities and Plethodon is also found at times. Reptiles are more characteristic of this type of association. Common forms are Contia tenuis, Diadophis amabilis occidentalis (both are more or less characteristic of the foothill region), Sceloporus o. occidentalis, Eumeces skiltonianus, Gerrhonotus, Coluber, Pituophis (uncommon) Thamnophis, and Charina. In the oak belt of the foothills this is also the typical habitat of the Crotalus confluentus oreganus.
Open Country

In the area surveyed, upland meadows, properly speaking are found only in the higher Cascade Mountains of eastern Linn County. Most of these are at elevations of over 2000 feet. Often these meadows are old lake beds or are lakes during the wet season, and dry, grassy meadows in late summer. Though these meadows are usually too dry to be considered marshes, they nevertheless are often quite moist, the water being but a short distance below the surface of the ground, making possible rank growths of grasses. Here the chief forms are Bufo, Hyla, and Thamnophis.

Lowland meadows may be considered any of the grasslands in the valley regions where trees are absent. Often these grasslands have extensive growths of wild rose present, but these will be considered in the classification with grasslands due to the fact that the amphibia and reptiles that are found there are the same as those on other similar grasslands minus the wild rose.

This habitat is not particularly suited to amphibians but a number of reptiles are common in this environment. Commonest is *Pituophis o. catenifer* and *Coluber constrictor mormon*. Approaching the foothill region the *Diadophis amabilis occidentalis* and *Contia tenuis* is often found, usually where some object is present on the ground to provide a safe retreat. *Gerrhonotus* and *Sceloporus* are also common around rock and brush piles, rail fences, etc., in these grasslands. The last three named are confined to the foothill region both on the west and east side of the valley.
Desert

In only one particular part of the three counties surveyed is there a region in which the conditions may be considered that of the desert. This type of environment is to be found in what one may consider the Lower Hudsonian Zone at elevations over 5000 feet in the Cascade Mountains. The area or areas, for they are often interrupted by growths of timber, are located northwest of the Belknap Crater lava-flow and are part of a series of extinct volcanic peaks and ridges. In this region the upper slopes of these ridges and peaks are made up of fine volcanic rock and sand and are extremely dry throughout the summer season. Vegetation in the form of stunted pines and such shrubs as manzanita and chaparral are present only sparingly. In short, typical sandy desert areas, complete in their sparseness of vegetation and absence of water are to be found. So far as was possible to determine the only form of cold blooded vertebrate to be found was the horned lizard. Food seems abundant in the form of insects, but the summer season is very short. During winter these regions are of course covered with snow, often to a depth of five to twelve feet.

Marginal Areas

As a whole marginal areas afford some of the best collecting that one can find in a region. Such forms as frogs, toads, salamanders and many of the snakes are more frequently found along the margins of their associations.

Lake and stream margins are very favorable places for frogs and toads. Frogs usually spend most of the daylight hours on the
bank of the river, lake, or pond, or in the woods close to shore. Toads also are more common along lake, and stream margin, though these will be more evident during evening or night when they come out to feed. Such snakes as *Thamnophis* particularly favor the marginal areas adjoining a body of water. Salamanders usually favor the vicinity of streams, commonest being *Plethodon*, mature *Dicamptodon*, *Nyctotherus*, and *Ambystoma*, and land-traveling, mature *Triturus*.

Forest and grassland margins are one and the same and offer the best opportunities for collecting most of our snakes and lizards, foremost being *Gerrhonotus*, *Sceloporus*, *Eumeces*, *Diadophis*, *Contia*, and *Crotalus*. These margins are transitions between forests and grassland and usually offer a combination of habitats characteristic of both forests and grasslands.
FAUNAL DIFFERENCES IN THE CASCADE AND COAST RANGES

From the geographical features present in the area it might be expected that faunal differences would be evident between barrier-separated geographic areas. Such barrier-separated areas are present in the form of the west slope of the Cascade Mountains and the Coast Range Mountains separated by a wide valley which is totally different environmentally from both areas which are quite similar. A fairly large river adds an additional barrier between the two areas.

This expectation of a difference in the amphibian and reptilian fauna is further strengthened by the fact that in other groups of animals, the birds and mammals, well recognized differences in species and subspecies exist between these two areas.

As to amphibian and reptilian forms the difference seems to be somewhat of a minor nature. At the present time so far as is known, with the exception of a few forms, there is little difference between the two areas.

The exceptions to this faunal sameness are *Rana boylii boylii*, *Rana luteiventris*, *Bufo boreas boreas*, *Plethopsis wrightii*, *Thamnophis infernalis* and *Eumeces skiltonianus* which are found in the Cascade Mountains or foothills and not in the Coast Range Mountains and *Thamnophis ordonoides ordonoides* and *Gerrhonotus principis* being found in both areas but being more common in the Coastal area. In addition it might be mentioned that *Bufo boreas boreas*, and *Rana pretiosa luteiventris* and *Thamnophis sirtalis infernalis* though found within the Transition Zone are nevertheless found well near the upper limit of this zone and have obviously migrated into this region from their native eastern Oregon habitat which lies but a short distance away on
the east side of the summit of the mountain range. It is possible that the three forms mentioned would find conditions compatible in the Coast Range Mountains if they could get there. On the other hand an observer would find strong grounds for contenting that Coast Range conditions in this latitude are for some reason unfavorable to these forms for none of them are found on the lower slopes of the west side of the Cascades and this lower side is almost identical environmentally to that of the Coast Range. The same lack of inclination to spread northward in the Coast Range is shown by these same forms which are already established in the southern part of Coast Range Mountains.

In addition to the facts already mentioned it may be worth noting that whereas in the case of birds and mammals the existing difference between the two areas is almost exclusively subspecific whereas in the case of amphibia and reptiles the difference is largely one of species and genera. Furthermore, when we analyze this difference we find that those forms which are different are to a large extent forms which have obviously migrated from a closely adjoining and sharply differentiated region, namely, the eastern and arid side of the Cascade Mountains, sharply and very narrowly separated from the western side by the narrow summit of the mountain range.

It is possible that the two other forms, Plethopsis and *Rana boylii boylii*, may yet be found to be present in the Coast Range Mountains at this latitude, for their presence in the Cascade Range is of itself only of recent knowledge and the
Coast region is but little better known than the Cascade region.

In conclusion it may be said that the lower half of the west side of the Cascade Range, and Coast Range in this latitude is practically identical; that the Cascade region has three forms one (Plethopsis) a genus and the other two, (Rana boyliii boyliii and Rana pretiosa luteiventris) species which are not found in the Coast Range; that two entirely different species, (Bufo and Thamnophis sirtalis infernalis) are found in the upper slopes which are somewhat different from the Coast Range areas, and these forms are obviously migrants from an adjoining region.

In addition Gerrhonotus principis has been reported from the Cascade region in the area studied and has been collected on the east side of the Coast Range but is more common in the narrow Coast Canadian strip on the west side of the Coast Range Mountains, also it is more common so far as is known on the west side of the valley than on the east side.

Although the unique presence of Phrynosoma, an arid Upper Sonoran form found in the Lower Hudsonian Zone west of the summit of the Cascades might be considered a striking difference compared to the Coast Range territory, the area wherein this form is found is so obviously different from the Coast region and so completely similar and identical (with the exception of seasonal climates) to the normal habitat of this form in Eastern Oregon that it cannot be compared with west Coast Range country but rather would have to be compared with Eastern Oregon country, notwithstanding the unique zone classification and altitude.
KEY TO THE AMPHIBIA AND REPTILIA

ORDER CAUDATA

A1. No parasphenoid teeth; no nasolabial groove.
   bl. Palatine teeth in longitudinal rows; no costal grooves; skin comparatively rough.

   Family Salamandridae
   One species -- *Triturus similans* Twitty

b2. Palatine teeth in transverse rows or meeting posteriorly; costal grooves usually present; skin comparatively smooth.

   Family Ambystomidae
   cl. Dorsal surface with lighter colored stripe; costal grooves ll.
      ○ *Ambystoma macrodactylum* Baird
   c2. Dorsal surface without lighter colored stripe.
      dl. Costal grooves l2.
         □ *Dicamptodon ensatus* (Eschscholtz)
      d2. Costal grooves l4.
         □ *Ryacotriton olympicus* (Gaige)

A2. Parasphenoid teeth present; nasolabial groove present.

   Family Plethodontidae
   bl. Parotoid glands absent.
      cl. Tail with prominent basal constriction; costal grooves usually ll or not over l2.
         □ *Ensatina eschscholtzii* Gray
o2. Tail without basal constriction; teeth not confined to front of jaw.
d1. Costal grooves 14-15; toes 4-5.
   Plethodon vehiculus Cooper and
   Plethodon dunni Bishop

d2. Costal grooves 16-17; toes 4-4, webbed half their length.
   Plethopsis whirghi Bishop

c3. Tail as in o2 but teeth confined to front of jaw and projecting from closed mouth.
   Aneides ferreus Cope.

ORDER SALIENTIA

A1. Pupil of eye vertically elliptical; males with anal process; ribs present.
   Family Ascaphidae
   One species -- Ascaphus truei Stejneger

A2. Pupil of eye round or horizontal; male without anal process; no ribs.
   b1. Parotoid glands well developed; toes without terminal adhesive disks.
      Family Bufonidae
      Bufo boreas boreas (Baird and Girard)
   b2. Parotoid glands not developed.
      c1. Terminal adhesive disks on ends of toes; skin on belly rough or granular.
Family Hylidae

Hyla regilla Baird and Girard

c2. No adhesive disks on ends of toes and belly usually smooth.

dl. Dorsolateral ridges present.

Family Ranidae

c1. Tympanum smooth

f1. Thighs and inner legs red.

g1. Skin smooth and spots small and usually few in number.

Rana aurora aurora (Baird and Girard)

g2. Skin rough or tubercled; spots many and often with light centers.

Rana pretiosa pretiosa (Baird and Girard)

f2. Thighs lemon or yellow.

Rana pretiosa luteiventris Thompson

e2. Tympanum granular or covered with tubercles.

Rana boylii boylii (Baird)

d2. Dorsolateral ridges absent.

Rana catesbeiana Shaw

ORDER SQUAMATA

Suborder Sauria

Al. Tongue thick and not protractile; femoral pores present.

Family Iguanidae
b1. Body lizard-like and cylindrical; chin with blue patch and belly with two lateral patches of blue. *Sceloporus occidentalis occidentalis* (Baird and Girard)

b2. Body flattened and scales with sharp, well developed spines; spines form horn-like developments at posterior end of head. *Phrynosoma douglassii douglassii* (Bell)

A2. Tongue divided at tip and protracile; femoral pores absent.

b1. Scales on dorsal side keeled; color same on body and tail; vertical bars on side of body. **Family Anguidae**

c1. Bars continuous across back. *Gerrhonotus scincicauda scincicauda* (Skilton)

c2. Bars not continuous across back. *Gerrhonotus principis* (Baird and Girard)

b2. Scales all smooth; body and tail contrasting in color; tail usually bright blue; longitudinal stripes present on dorsal side of body. **Family Scincidae**

*Eumeces skiltonianus* (Baird and Girard)

**Suborder Serpentes**


b1. Subcaudals undivided; tail blunt and short; dorsal surface uni-colored; no transverse or longitudinal stripes.
Family Boidae

Charina bottae (Blainville)

b2. Subcaudals divided, tail long and tapering.

Family Colubridae

c1. Scales smooth.

d1. Color metallic bluish-gray or gunmetal; very agile and active.

Coluber constricor mormon (Baird and Girard)

d2. Color brown with two lighter dorsolateral stripes. Anterior half of each gastrostege black; urostege sometimes similarly colored.

Contia tenuis (Baird and Girard)

d3. Color metallic blue or bluish-green; ventral surface bright orange or red, this color extending in narrow collar or ring around neck.

Diadophis amabilis occidentalis Blanchard

c2. Scales keeled.

d1. No lateral stripes; dorsal surface with dark blotches against lighter background; general color yellowish-brown.

Pituophis catenifer catenifer (Blainville)

d2. Lateral stripes present.

   d1. Ventral side light; dorsal surface dark and with median stripe of grayish-white or yellowish. Lateral stripes usually.
black with single median yellowish-green stripe; sides usually with prominent red spots.

*Thamnophis sirtalis concinnus* (Hollowell)

2. Ventral side light; dorsal side usually grayish color median and lateral stripes grayish-white or yellowish-white; chin shields proportionately wide and short compared with *Thamnophis sirtalis* sub-species.

*Thamnophis ordinoides ordinoides* (Baird and Girard)

A2. Tail with horny rattle.

Family Crotalidae

*Crotalus confluens* oreganus (Holbrook)

ORDER TESTUDINATA

Family Testudinidae

A1. Marginal shields without red markings.

*Clemmys marmorata* (Baird and Girard)

*A2. Marginal shields with red markings.

*Chrysemys bellii bellii* (Gray)

*This species is not normally found in the area covered by this paper, but since its range borders the northern edge of the area, it is listed to eliminate any confusion.*
CLASS AMPHIBIA

**Triturus similans** Twitty

**Triturus**

**Distribution:** *Triturus* is the most common and widely distributed of our salamanders. It is to be found throughout the area surveyed, from the small coastal lakes of Lincoln County to the deep ice-cold lakes and streams of the Cascade summit. To list specific places where specimens were collected or are known to occur would necessitate the listing of practically every stream, pond and puddle in the area.

**Habits:** Salamanders of this genus are the most common salamanders to be found in this region. Throughout the year at least a few can always be found in the ponds, ditches and pools of streams. During the height of the breeding season, about April and May, many of the ponds and streams swarm with these salamanders and they may also be encountered wandering overland in search of suitable water in which to breed.

In *Triturus*, breeding may begin as early as December and continue until late June. However, these early and late cases are extremes and are exhibited usually only by scattered individuals. General breeding begins about mid-March and continues to the end of May, during the height of the regular breeding season individuals may be encountered on overland migration, sometimes as much as a half or three-quarters of a mile from water.

It is generally believed that *Triturus* leaves the water soon after the close of the breeding season and takes up a terrestrial.
existence until the next breeding season. There is considerable evidence that this is not always so in all parts of the country. In connection with its leaving the water the salamander is said to undergo a change in its skin texture, the skin becoming granular and rough. This makes it possible to resist desiccation more effectively. This change is rapid and can be observed a few hours after a specimen has been removed from water and left exposed to the air.

In the area surveyed Triturus was found to be present in permanent ponds to a greater or lesser extent throughout the year. Particularly is this true of the larger bodies of water. Observers (Taylor not published) have advanced the theory that Triturus spends the periods between breeding seasons in the larger bodies of water, that is, the large rivers and lakes, and at the approach of the breeding season migrate out into the smaller tributaries of these waters to breed and again migrate back into these large, deep bodies of water where they remain until the next spring.

This theory is based to a large extent on the fact that small tributary streams will regularly show almost countless numbers of Triturus during the breeding season without any indication of land migration, and that when they again disappear after breeding, and supposedly have left the water for a terrestrial existence, it is practically impossible to find a salamander in the vicinity of the former breeding waters. In contrast to the absence or scarcity of Triturus in smaller streams and ponds, the large rivers and lowland streams have a large number of Triturus in them. A hook baited with a worm and fished near the bottom on one of the larger lowland creeks
or the Willamette River will almost immediately bring results in the form of a specimen of *Triturus*. As late as August attempts at still fishing of this kind in Linn County were practically impossible at times due to the persistence and regularity with which salamanders took the bait.

It is possible that in unfavorable areas where there are no permanent or large bodies of water available the salamanders leave the water and take up a terrestrial existence. However, in this region, unless it is assumed that *Triturus* burrow under ground to a considerable depth, a doubtful possibility, it would seem that very few take up a terrestrial existence and those that do, do so only for a short time while in transit to the larger bodies of water. This assumption is based on the fact that there may be hundreds and thousands of salamanders in a small tributary stream and yet when they are gone after breeding, only a few can be found on land, and that only a short time after they disappear from the water. Later in the summer none will be found even in favorable, damp, sheltered places, much less in the generally dry fields and woods about the streams. In addition and in contrast to extremely unfavorable environmental conditions on land, there is a much greater supply of food available in the larger streams and lakes. And last, it has been observed that even such strictly terrestrial species as *Plethodon*, *Dicamptodon*, and even *Ensatina* will concentrate along the edges of streams and even enter the small shallow brooks during the dry summer months, and that when they are absent entirely from their former haunts, they can be found along, and in these streams. If such highly terrestrial forms will seek out such semi-aquatic
habitats, then certainly such highly aquatic forms as *Triturus* would be expected to take up their existence in a completely aquatic habitat during the most adverse time of the year.

A peculiar behaviorism has been observed among *Triturus* which seems to have no logical explanation. During late summer and early fall large masses or groups of *Triturus* have been observed to congregate at a common point in the water. In all cases this has always been in quite deep, sluggish streams or larger ponds. The numbers observed have been from a dozen to fifty or sixty and even up to several hundred. July 16, 1938, such a mass group was observed in Beaver Creek between Waldport and Newport about a mile above the mouth of the creek. The water was perfectly clear and about three or four feet deep where about sixty *Triturus* were "swarming" in a quite compact mass in the middle of the stream about a foot above the bottom of the stream bed. All seemed to be crowding about a common point, yet there was nothing visible which might attract them. They gradually dispersed about fifteen minutes after they were first observed. On the same day a group of twelve salamanders was observed in a small coastal lake between Waldport and Newport. This group seemed to be traveling in the same manner as a school of fish, that is, they were swimming leisurely in the same direction along the margin of the pond through the thick mat of water lilies. A student reported witnessing a mass of several hundred *Triturus* behaving in a manner similar to that of the group seen in Beaver Creek. The incident took place in the Pistol River in Curry County and as near as the student could recall there
was nothing visible in the water which might serve to attract the salamanders and that all of them were milling or swarming around in a compact mass in fairly deep water. This incident is supposed to have been witnessed in late summer, at a time too late to be attributable to mating behavior on the part of the animals.

*Triturus* are highly carnivorous and will apparently feed on anything small enough for them to overcome and swallow. They are easily captured on hooks baited with live worms and have been fed on live grasshopper, worms, meat, etc.

The eggs are deposited in the water in small gelatinous clumps and the young remain in the water in a larval stage with prominent external gills for a long period of time before they change into the adult form. Freshly hatched young superficially look at first glance like young larva of *Hyla* with which they are often associated, but on closer examination it will seem that the salamander larvae are not as plump bodied and possess prominent and clearly visible external gills which they retain throughout their larval life.

*Ambystoma macrodactylum*

Long-toed Salamander

**Distribution:** Only one specimen was taken near Corvallis in 1935.

This salamander like *Ambystoma gracile* leads a subterranean existence to a large extent and possibly this is one reason that it has not been found more frequently. Like *gracile* it lays its eggs in the water and the young are aquatic until they attain maturity.
Dicamptodon ensatus (Eschscholtz)

Marbled Salamander

Distribution: Next to Triturus, Dicamptodon is probably one of the most widely distributed and most common salamanders in Linn, Benton, and Lincoln Counties. The larval form is common in the streams of the Cascade and Coast Range Mountains. It is also common in some of the sluggish lowland creeks such as Muddy Creek in Benton County. The adults are much less common, in fact, very few records are available for the northern half of Western Oregon. Two adults were taken July 19, 1938, from a small tributary of Fall Creek in Lincoln County. An extremely large adult specimen measuring ten inches in length in the Department of Zoology collection is labeled Colorado Lake, 1923. Colorado Lake is a small lake on the east side of the Willamette River near Corvallis and is typical of the small lakes formed by underground seepages from the river. Dicamptodon has never to my knowledge been taken this far out in the valley and since there is a question mark after the location on the specimen label there is a question as to the reliability of this information.

Habits: Dicamptodon is the largest known terrestrial salamander, and much misinformation has been disseminated by uninformed persons about this form. Newspapers in particular are in the habit of periodically breaking out with sensational stories about the new "Giant Salamander" that some fisherman has hooked while fishing some mountain stream. In addition these persons will embellish the stories by speculations as to its possible size, with quite dogmatic
assertions that it may reach a length of two feet or even more. Naturally there is no truth in such
statements and they are the wild speculations of highly imaginative minds.

_Dicamptodon_ was described as early as 1852 from "Oregon" by Baird and Girard (Occasional
Papers of the California Academy of Science, p. 37 vol. 14, September 15, 1928, Slevin) and has since
been recorded from various parts of the Pacific region as far north as British Columbia and in the
south from California.

_Dicamptodon_ lays its eggs in the water in fairly large gelatinous masses and the young after first
hatching are not unlike tadpoles in appearance, but have the typically feathery gills externally. The form
later takes on characteristics typically those of a true salamander. The external gills are retained and the
larval form remains in the aquatic habitat for an indefinite period of time. Just how long is required until
it matures and transforms into an adult is not known. Quite likely there is no set number of years for
maturation, for larval forms of varying lengths have been taken from the same stream. Some almost
twelve inches in length still retained complete and fully functional gills and others not over four
inches in length had the gills reduced to mere elongated tubercles and had already begun to show faint
indications of the mottled color pattern of the adult form as well as the more typical adult body contours.
Furthermore the larvae of _Dicamptodon_ have been taken in northwestern Oregon with functionally
matured sex organs, some females having the ovaries filled with mature ova at the time of their capture. These examples indicate
that it is not necessary for this salamander to attain adult form to breed, and that at least here in the Northwest it breeds in the larval stage, a habit not unknown to other members of Ambystomidae in other parts of the country. It is not known whether this habit of breeding in the larval form is general in this region or not, but it is possible, and perhaps that is the reason so few adult specimens are found.

Slevin (1928 - p. 38) states that mature Dicamptodon should be looked for under large pieces of old bark which have become embedded quite deeply in the soil. He refers here to the heavy coniferous timbered regions of California.

Two specimens collected July 19, 1938, were taken in a small tributary stream of Fall Creek in the Coast Range Mountains. This creek was very small, being not more than a mere trickle over the rocks, of the narrow but rather deep stream bed, at this time of the year.

Small pools up to two and four feet in diameter were common along level spots. The stream was being worked systematically upstream by turning over every rock, piece of bark and wood in the stream. Salamander number one was found on turning over a large angular rock of some twenty inches in diameter. The base of this rock was buried several inches in the soil but on being rolled to one side a considerable free space was revealed underneath it. In the center of this space was a half inch deep puddle of water about ten inches in width, and out of this small puddle which was connected with a small pool about four feet in diameter and five to six inches deep, darted a salamander and into the larger pool. So rapid
were its movements that the only impression it left was that it was considerably larger than the larval *Dicamptodon* which were here numerous, and that it was of a yellowish-brown coloration which was distinctly in contrast to the dull grayish-black of the larval *Dicamptodon*. After carefully blocking off the outlet of the pool to prevent a possible escape, the specimen was found submerged on the farthest side of the pool with only its nose showing above the surface of the water. Attempts to capture it showed that it swam with speed and agility, but that it tired rapidly and once having become fatigued it seemed unable to remain submerged for long and it then tried to climb out of the water and escape among the rocks. The specimen proved to be a fully matured *Dicamptodon* about seven and a half inches in length. A second specimen a trifle smaller and with a more closely set and finer pattern of mottling was taken fifteen or twenty feet farther up the stream under similar circumstances. Both specimens were partly submerged in water while hiding under the rocks. The time of the year was during the hottest season and the forests were extremely dry at this time. Possibly at this time of the year these land forms move into these small, shallow, heavily shaded creeks where the moisture and temperature is more favorable. Careful collecting in such localities during this season of the year may reveal a greater number of mature *Dicamptodon* than have heretofore been found.

Most favorable spots for collecting are the small mountain creeks of the Cascad and Coast Range Mountains where the larval forms can be located resting in the clear shallow pools. A dip net of ordinary type is not very suitable as the meshes are apt to
be so fine that it cannot be swung through the water rapidly enough to sweep up the larval *Dicamptodon* which are very quick and agile swimmers. A net made of coarse window netting is much more suitable. It such tiny streams as described in the account of the adult *Dicamptodon* the pools are so small and shallow that the specimens can be caught by hand.

Most of the specimens in these small streams are small, usually not over five inches in length and the largest ones, those up to twelve inches in length, will be taken from large creeks and rivers in deep, quiet pools. In most of these large mountain creeks and rivers during the summer months the water is crystal clear and the bottom of pools five to eight feet in depth can often be examined very clearly and the salamanders located resting on the bottom. Where the bottom is light the specimens can be easily detected, however, the specimens usually blend well with the background and it takes a bit of practice to detect the quarry. Once one learns what to look for this is not so difficult.

For these deep-water specimens a dip net is impractical for besides being in water often five or six feet deep they may also be ten to fifteen feet from the bank. The best and simplest means of taking such individuals is with a hook and line. An ordinary hook baited with a live worm, dropped in front of a resting *Dicamptodon* will be snapped up almost instantly and no skill is required once the specimen is located. Such rivers as the Alsea in the Coast Range and the Santiam in the Cascades are well stocked with *Dicamptodon* and specimens up to ten inches and some occasionally up
to twelve inches are not uncommon. Specimens of *Dicamptodon* have also been taken by accident in Muddy Creek of Benton County while still fishing. The specimens cannot of course be located and the ones taken are by mere chance.

Judging by their readiness to take bait of all kind, even artificial flies bobbed tantalizingly in front of them, it appears that larval *Dicamptodon* probably feeds on anything it is able to capture and overcome, probably largely the same food is taken as that by bottom feeding trout in the same stream.

*Rhyacotriton olympicus* (Gaige)

Olympic Salamander

Distribution: This small salamander is found in the Cascade Mountains as well as in the Coast Range Mountains of Lincoln and Benton Counties. It was taken on Mary's Peak in Benton County, Fall Creek in Lincoln County, and on the Middle Fork of the Santiam River in Linn County. It was also collected on the Luckiamute River just across the county line in Polk County.

The Santiam River and the Fall Creek records are the extreme east and west records in this area, and at these points the salamander was common. Undoubtedly it is also present in many other localities in the mountains where collecting was not done.

Habits: *Rhyacotriton* is commonly found in the small mountain streams, either in very small shallow streams or near the edge where it is usually only partly submerged when hiding under the rocks or debris in the stream. In only one case, to my knowledge, was *Rhyacotriton* taken from a large stream and here they were not
actually in the stream but in a spring seepage on the bank.

All specimens collected showed traces of gills, but in all cases these were mere vestiges and were usually represented by a few small finger-like tubercles in the gill-slits. Specimens placed in deep water were obviously distressed and attempted to get out of the water and when left too long died.

This species required a low temperature and was the least hardy of the salamanders kept in captivity. A half dozen specimens placed in a gallon glass jar with some moss and about a quarter inch of water in the bottom have been kept alive for eight months in a refrigerator.

For collecting practically no equipment is necessary other than a container in which to place the specimens as they are picked up. As was previously stated _Rhyacotriton_ inhabits the smallest streams or the shallows of the larger ones and one need only turn over the rocks and debris in these habitats to locate the specimens. Exposed specimens are quite lively and will progress quite rapidly in an attempt to reach the main current and permit themselves to be carried down stream, at the same time swimming vigorously with the current. Unless the specimen is grasped quickly it will often be lost in the roiled water and amid the floating debris.

_Rhyacotriton_ is a terrestrial form which deposits its eggs in the cold mountain streams and the larvae live a strictly aquatic life until they lose their gills and take up a terrestrial existence. Just how long the aquatic larval stage of this species lasts is not known. None of the specimens collected were entirely minus their gills and all were taken from a very wet semi-aquatic habitat.
It is possible that like some other members of *Ambystomidae* this species breeds before it completely changes into the adult form.

**Plethodon vehiculus** Cooper

and

**Plethodon dunni** Bishop

Distribution: *Plethodon vehiculus* and *Plethodon dunni* will here be discussed jointly, for their habits and habitats so far as they are known today are practically identical. In addition there is some doubt in the mind of some authorities as to the validity of *Plethodon dunni* as a species as differentiated from *Plethodon vehiculus*.

In almost every case *Plethodon dunni* has been collected from the same identical localities where *Plethodon vehiculus* was taken, often the two species were found under the same shelter. For example, at the Fernwood Forest Camp on the South Santiam River in the Cascade Mountains a mixed collection of both species was taken from a crumbling lime stone ledge which was quite moist from a spring seepage. The area from which these specimens were collected was not over a half dozen feet square.

Specimens have been taken on Bull Run Creek, Fall Creek, and its tributaries in Lincoln County; it has been taken on the Luckiamute River just across the county line in Polk County; in Linn County it has been taken on the Middle Fork of the Santiam River about three miles above Foster on the Quartzville Road, and near the Fernwood Forest Camp on the South Santiam River in the Cascade Mountains. These *Plethodon* salamanders were common at all
the localities where collecting was done and in point of numbers rank about fourth among the salamanders of the region covered.

Both Plethodon dunni and Plethodon vehiculus are frequently found inhabiting the same habitat with Rhyacotriton, that is, the very small shallow mountain streams and shallows of the larger streams. Particularly are they to be found in such semi-aquatic surroundings during the advanced summer months when the forests are apt to be quite dry. Earlier in the season they are commonly found under logs, partially decayed logs and stumps.

Both salamanders are strictly terrestrial and do not lay their eggs in water but deposit them in damp spots under logs and other objects. The young are fairly well advanced when hatched and do not possess gills.

**Ensatina eschscholtzii** Gray

Oregon Salamander

Distribution: Ensatina is common in the region surveyed and was found near Corvallis in Benton County, near Peoria on the east side of the Willamette River in Linn County, in the Cascade Mountains on the Middle Fork of the Santiam River just above its junction with the South Santiam River and also on a small tributary stream of the South Santiam River at an elevation of about 2000 feet also in Linn County.

**Ensatina** is the only one of our salamanders which has been taken in the Willamette Valley proper, that is, not in the foothill regions. The specimen near Peoria was taken in a tract of coniferous timber from the base of an old decayed stump.
Habits: Ensatina is strictly a terrestrial salamander and inhabits damp places under old logs, rotten stumps, rocks, bark, and leaves in coniferous or mixed forested areas. An especially favorable situation for this species is around the base of decaying stumps, under the slabs of bark which have fallen off the stump, and under old logs in the decaying wood debris. During the earlier and damper season of the year the thick layer of maple and alder leaves in mixed woodlands is a favorite retreat for this salamander.

It lays its eggs in moist places and the young hatch in an advanced stage of development and do not have an aquatic larval stage. A female taken in February contained twelve fully developed eggs. No deposited eggs have yet been found in this region to indicate just when egg laying takes place in this region.

Storer (1925, p. 111 and 112) records the finding of Ensatina in attendance on deposited eggs during April, June, and July. Possibly the breeding period extends over a protracted period of time throughout the warmer months of the year. This is merely a possibility and is not definitely known to be the case.

Ensatina in some ways seems to be quite hardy in captivity, yet does not seem to last long. Those placed in an aquarium with soil in the bottom and kept in a cool place were kept for almost two months until they were left exposed to some unexpected warm spring weather over a week end.

This salamander is one of the few which can voluntarily cast off its tail. The constriction at the base of the tail seems to be a physiological specialization for this purpose. Specimens which succumb in captivity often will be found separated from their tail,
though the actual performance has not been witnessed. It has been noted that specimens in discomfort will often go into a fit, twisting and lashing their tail about from side to side. It is probably that this sort of behavior takes place when the animal dies from adverse conditions in its cage and that the tail is cast off during one of these convulsive spasms.

Those examined showed that almost every type of small insect to be found in the leaf mold and about the habitat of this salamander is taken as food. Those taken in February showed remains of small sowbugs, thrips, and numerous small flies and gnats which were present in the leaf mold on the ground at this time.

_Ancides ferreus_ Cope

Clouded Salamander

_Distribution:_ Apparently this salamander is not nearly as common as any of the others in the area surveyed. Only one specimen has been collected in this region, namely, above the Fernwood Forest Camp in a crumbling limestone ledge, where it was found in association with numerous _Plethodon vehiculus_ and _Plethodon dunni_. It is possible that this salamander is more common than evidence shows, for its habits are not very well known.

_Habits:_ The limestone ledge where the specimen was collected was well shaded by sapling alder and contained a spring seepage near its base which kept not only the pile of shale and crumbling limestone at its base quite damp, but the wall of the ledge as well for quite a distance above the level of the ground. The ledge was made up of vertical sheets of limestone which could be pulled loose.
in thin slabs and it was between these layers that the specimen was found in company with some Plethodon salamanders. The specimen was several feet from the ground level behind a loose sheet of stone and it is of interest to note that Slevin (1928 page 71) records two specimens found in the rotten wood of a tree, some twenty feet above the ground. In connection with this it may be mentioned that the specimen collected in Linn County showed considerable skill and agility in climbing about on and over objects above the ground.

Aneides ferreus is terrestrial and the young do not have an aquatic larval stage.

**Plethopsis wrightii** Bishop

Wright Salamander

Distribution: To date this species has been found only in Linn County of the three counties surveyed. It was found on the Middle Fork of the Santiam River above five miles above the junction of that stream and the South Santiam River. A half dozen specimens were taken from an area of not over 100 square feet.

Plethopsis is one of the most recently discovered salamanders, having been discovered in 1936 by Stanley G. Jewett and described the same year by Dr. Bishop. Very little is known of its habits and life history outside of a few facts regarding its habitat.

Habits: This species which to the amateur may appear as a medium sized Plethodon salamander similar to Plethodon dunni or Plethodon vehiculus is terrestrial in habit, and presumably has a life history and breeding habit similar to other terrestrial
salamanders.

In contrast to most other terrestrial salamanders which are usually found on the ground under objects such as logs, bark, stones, etc., which are lying about on the forest floor, *Plethopsis* seems to quite consistently prefer a shelter somewhat removed from the ground and usually in old partly decayed logs. Almost all of the present known specimens were collected from such habitats. The Linn County specimens were taken from sections of a large tree which had been cut and left near a forest road. These three logs, some of which were a yard in diameter, were partly decayed and could be quite easily ripped apart by pulling and prying loose flat slabs of the partly decayed wood. The salamanders were found in the lateral crevices of the wood and undisturbed specimens were usually in a partially coiled position, a position not usually observed in resting salamanders where there is sufficient room for them to straighten out. Stanley G. Jewett Jr., who collected the first known specimens and who was with Dr. Bishop when the specimens on which he based his description were collected, says that this habit of frequenting logs and resting in a partially coiled position was common in most the specimens he had seen and that these habits in themselves are identifying characters of the species. One or two specimens were found in the soil and decaying wood mold beneath old logs. These were small specimens not over half an inch in length. It would be interesting to know whether the eggs are deposited on the ground or in logs where the adults are usually found.

The specimens kept in captivity and under identical conditions
with _Plethodon_, _Ensatina_ and _Rhyacotriton_, showed themselves to be hardier than any of the others and survived all other of the listed salamanders. Of this group _Rhyacotriton_ and _Ensatina_ were the least hardy, with _Rhyacotriton_ succumbing first of all.

For collecting, a stout pry-bar is quite a handy tool with which to break up the partly decayed logs in which these salamanders are found. Those who have used them stated that the so-called "potato hook", a stout handle of some three and a half to four feet long with several stout iron hooks which will not bend under heavy service on the end, is the best all around tool for this kind of work as one can use it for turning over pieces of bark, logs, etc. as well as for ripping apart log logs. I have used a single "bale hook" with success in tearing up and turning over logs which otherwise would have been hard to handle with bare hands.

**Ascaphus truei** Stejneger

American Ribbed Toad

Distribution: **Ascaphus** is to be found in the cold mountain streams of the Coast Range and Cascade Mountains. In Linn County it has been collected on Red Creek in the Santiam National Forest at an elevation of 3000 feet (Slevin 1928 p. 82), and from a tributary stream of Fall Creek in Lincoln County. Stanley G. Jewett Jr. (unpublished manuscript) collected the larvae of this species in a small creek on Mary's Peak in Benton County.

Habits: **Ascaphus** required such low temperature that it is found only in the cold mountain streams. Collectors have found this toad some distance from water immediately after heavy rains.
which thoroughly saturated the dense forests in which the streams are invariably found. During dry periods it always returns to the streams.

Distribution records for this species are quite widely separated and not very numerous. A possible reason for the scarcity and the widely separated records may be due to a habit displayed by specimens collected on small tributary stream of Fall Creek. This small stream already described in connection with the mature *Dicamptodon* specimen is on the west side of Grass Mountain in Lincoln County, and is heavily shaded by Douglas fir, Vine maple, and other plants. The *Ascaphus* were found accidentally while collecting salamanders and were not suspected of being present in this habitat. The bottom of this stream consists of coarse gravel, rock, and boulders up to twenty and thirty inches in diameter and some of the salamanders would attempt to escape by squirming down among the gravel and rocks in the bottom, and it was while digging down after these specimens that the *Ascaphus* specimens were found. At a point where a considerable area had been dug up for about six or seven inches below the original surface, two *Ascaphus* suddenly popped out from under my hands. Their color pattern so closely matched the grayish rocks that they were practically invisible until they moved. The find resulted in a systematic turnover of the gravelled stream bottom to depth where it was no longer possible to dig with bare hands and the next twenty feet of stream yielded two more specimens and it was definitely observed that they were among the gravel and below the surface of the stream bed and did not happen to blunder
into the excavating operations under my hands from the nearby bank. Also these last two specimens when given an opportunity to do so promptly disappeared from sight among the rocks and gravel. Hasty digging at the point where the specimens disappeared resulted in the recapture of one at a depth of some eight inches, or at a point where the gravel and soil was too hard and compact to go any farther. The other one was never recovered. By squirming and twisting and pushing with their feet and legs these toads literally sink into the gravel where it would seem that the spaces between the loose gravel are far too small for an animal the size of a full grown *Hyla* specimen.

A careful search in the pools revealed two *Asaphus* tadpoles clinging to the rocks on the bottom with their large sucker disks.

The adult appear to be clumsy and weak swimmers and not very strong jumpers on land. When exposed they showed little inclination to hop away, but would often sit for several minutes within a foot of where work was going on, apparently relying on their protective coloration to save them.

The adult and larvae were placed in gallon jars with about an inch of water in the bottom and goodly quantity of clean moss into which they could burrow. The jars were kept immersed in a stream near camp and in this way the specimens were kept through several of the hottest days of the summer of 1938. In transit the jars were placed in aquaria half filled with water from the mountain streams. Placed in a refrigerator the adult specimens have survived for eight months as have also various species of the salamanders
which were thus kept, and which otherwise it would have been impossible to keep alive. The larval *Ascaphus* survived only a day after being placed in the refrigerator, probably due to poorly aerated water in the container and perhaps also due to the chlorine which is present in the city water.

**Bufo boreas boreas** (Baird and Girard)  
Northwest Toad

**Distribution:** *Bufo* is found only along the eastern side of Linn County in the Cascade Mountains. This form is not known to occur in the Willamette Valley farther south than Oregon City and here in Linn County its presence on the west side of the summit of the Cascade Mountains is obviously a range extension from the Eastern Oregon region where it is quite common. The toads were found west of the summit as far down the western side as 2500 feet.

Specimens were observed on an unnamed creek on the South Santiam Highway. It may be that this creek is the headwater of the South Santiam River, and it is part of the Santiam River system and one wonders why these toads, if found on the headwaters of this system, are not found on the lower reaches of the Santiam River. Specimens were collected at Clear Lake and Big Lake and Pagens Lakes, all in Linn County.

**Habits:** Little was learned of its habits during the short period that it was under observation. The individuals never come out until dusk and at this time and throughout the night they could be heard hopping about around camp and splashing in the water along the lake shore. Occasionally one would give voice
in harsh deep toned, grunting croaks. At Big Lake two specimens, one a large female and the other a male, about half the size of the female were collected. The female was located by her harsh deep toned croaks which was the common note heard. The male after capture showed a rather peculiar voice which was new at least to me. When crowded by the bigger female in the aquarium he would give voice to a series of short rapid notes and at the same time his entire body would quiver sharply once for each note uttered. The sound was quite high pitched but mellow and had a peculiar liquid, and at the same time, bell-like quality to it. This bell-like effect was much greater when the sound was given singly rather than in a rapid series. The quality of the sound can be nearest likened to the notes of a zylaphone, and though not loud, could be clearly heard twenty or thirty feet away.

Young tadpoles just transformed into the terrestrial form were present about the edge of Fish Lake by the thousands during the last week in July, and tadpoles not yet showing signs of legs were swarming in equally great numbers in the shallow waters of this lake.

The two specimens referred to above showed signs of breeding actively in January and the females ovaries, examined a short time after, showed advanced development of ova.

_Hyla regilla_ Baird and Girard

Pacific Tree-toad

Distribution: _Hyla_ is wide spread and is even more common than _Triturus_ in distribution and numbers. It has been observed
and collected from the summit of the Cascades of Linn County to the Coast of Lincoln County. During breeding season every stream, pond, puddle and ditch emits its chorus of croaks.

Habits: Here around Corvallis the first faint and rather hesitant chirps of *Hyla* can be heard as early as December, but these are usually from individuals somewhere on land. The first week in February is usually when they enter the water in force and their croaks can be heard in the typical "frog chorus".

Breeding is usually well under way by the end of February and the first tadpoles are out by mid-March. Development is rapid and by July and August most of the tadpoles have transformed into adult form and left the water. By June most of the adults have left the water and take up terrestrial existence, often in the grass about the lakes or streams which they have just left, often, however, in trees and bushes. *Hyla* is often found a long ways from water, as for example a specimen which was collected near the summit of Peterson Butte in Linn County. The nearest water was at least a half mile away and the country between was very dry. The specimen was in a mixed stand of oak and fir on the north slope. After being carried in a paper bag for half a day it was found on reaching home that the specimen had almost dried up and looked to be but skin and bones. It was still alive and on being placed under a water faucet on the lawn it literally soaked up water like a sponge.

Throughout the summer these tree toads may be heard uttering a low toneless croak that sounds somewhat like two limbs rubbing against each other and has nothing of the tone and ring to it,
so commonly heard earlier in the spring. The female is said to be silent at all times.

*Rana aurora aurora* (Baird and Girard)

**Wood Frog**

Distribution: Specimens were collected from the spring in Bellfountain Park and along Muddy Creek in southern Benton County, and from a partly dry creek near Brownsville in Linn County.

Habits: Nothing much is known about this frog. Those from Bellfountain were taken at the edge of an ice-cold spring in the park. The frogs acted very stupidly and would sit without moving, almost permitting one to touch them before moving. Those from Muddy Creek were taken among the ferns and grass in the deciduous woods along the banks of the creek. The specimens from Brownsville also exhibited the extreme stupidity and permitted close approach. They were found sitting on the edge of a shaded bank near a pool in the creek bed and were taken with a light net made of window netting having a rather wide hoop. This is much more satisfactory, since the large hoop and coarse netting permits a much quicker sweep and gives a greater chance of capturing a moving frog.

*Rana pretiosa pretiosa* (Baird and Girard)

Distribution: Specimens were collected near Peoria and on the upper South Santiam River in Linn County.

Habits: This frog was very common on the upper South Santiam River in the Cascade Mountains, at an elevation of about 2500 feet.
The specimens showed under colors, that is, the reddish thighs, intermediate between that of *Rana pretiosa luteiventris* and the regular valley form of *Rana pretiosa pretiosa*. This points to intergrades between this species and *Rana pretiosa luteiventris*. All specimens showed extreme shyness, particularly those of the valley ponds and streams. Frogs taken on Muddy Creek were so shy that stalking and shooting had to be restored to in order to collect a few specimens. All individuals were found either in the water or never farther than the edge of the pool within easy jumping distance of the water. It seems to be more aquatic than *Rana aurora aurora* which was often found some distance from water in the vegetation about the pond or stream.

*Rana pretiosa luteiventris* Thompson

Distribution: A high Cascade form, (for this region) found only along the summit and upper slopes of the Cascade Mountains of Linn County. One specimen was taken near an unnamed stream about eight miles north of Bellknap Springs, two from Ice Cap Springs, and nine from Clear Lake, all in Linn County.

Habits: The specimens from Clear Lake were all immature, partly grown specimens. The two from Ice Cap Springs and other one appeared to be fully grown or nearly so, being about the size of mature *Rana pretiosa pretiosa*. These frogs do not seem to trust themselves in the swift waters of the larger streams and the individual taken on the unnamed stream was extremely reluctant to enter the water and when forced to do so promptly swam back to the
bank and either climbed out of the water or grasped a twig or a blade of grass and hung on. The same was noted in the case of *Rana pretiosa pretiosa* on the Upper Santiam, where, when individuals were near quiet pools they did not hesitate to dive in and swim to the bottom to hide, but where the water was swift they acted just like *Rana pretiosa luteiventris*. Those at Ice Cap Springs showed no hesitation in taking to the water.

A wide mouth net (18 to 20 inch hoop) made of coarse window netting was found best for collecting frogs.

Specimens in captivity did quite well on grasshoppers which were numerous and easy to get in the summer time.

*Rana boylii boylii* (Baird)
California Yellow-legged Frog

Distribution: So far it has been collected at only one place in Linn County, on the Middle Fork of the Santiam River.

Habits: Just above the junction of the Middle Fork and the South Santiam the young frogs were very numerous in small pools formed on the rocks by a spring seepage. These specimens were about the size of mature *Hyla*. Two specimens about twice this size were collected on Moose Creek, a tributary of the Middle Fork of the Santiam.

*Rana catesbeiana* Shaw

Bullfrog

Distribution: Common in Colorado Lake in Linn County and in the Calapooya Slough near Shedd, also in Linn County. The deep bass
croak of this frog have been heard near Albany in the Willamette River. It is undoubtedly common in the vicinity of Colorado Lake and on the River.

Habits: This species was introduced into Colorado Lake ten or twelve years ago and has spread rapidly. It is very common here and in other nearby river-bottom lakes and ponds. Several years ago (1937) several hundred tadpoles were taken to the Calapooya Slough near Shedd and frogs are now common on this slough. A specimen taken by Stanley G. Jewett Jr. contained a ringneck snake in its stomach.
CLASS REPTILIA

Sceloporus occidentalis occidentalis (Baird & Girard)
Pacific Blue-bellied Lizard

Distribution: Sceloporus is the commonest lizard in the area surveyed. It is confined chiefly to a narrow strip of foothill country on the east and west side of the valley.

No records are available of specimens in the valley in Linn or Benton Counties. Nor were any collected anywhere in Linn or Benton Counties other than in the rocky foothill region or only a very short distance from these areas. Sceloporus has been collected at Corvallis in Benton County and on Peterson and Saddle Buttes and east and south of Brownsville in Linn County. Specimens have also been observed near Bellfountain in Benton County.

Habits: Sceloporus frequents rocky, partly wooded country in the foothill region, and is commonly found around fallen trees, stumps and rock piles. In the Cascade foothills on many of the marginal buttes, there are often lengths of old stone walls built of the numerous basaltic boulders of this region. These walls seem to always run in an east and west direction and in a straight line, starting at a point without any logical evidence for starting it there, and ending sometimes 200 to 400 feet farther on in the same way. The walls are well laid and three to four feet high and some of the boulders are far too large and heavy to have been handled by one man. Also they are usually too far removed from open fields, usually well up the side, or on the very ridge of a butte, to consider the possibility that they were removed from fields for
agricultural reasons. One such wall is situated on the very crest of Peterson Butte between the two high points. Natives usually term them "Indian Forts" and supposedly they have been built up by Indians. They are always located in the stands of oak which are common on these marginal foothills, and as was intimated have no logical explanation so far as could be ascertained.

Whatever reason for these rock walls, they and their vicinity, are excellent collecting ground for blue-bellied lizards, not to mention alligator lizards, skinks, rattlesnakes, and racers.

Rail fences, in the day when they were a common feature of the landscape, were a favorite habitat of Sceloporus, but these structures have to a large extent disappeared. Nothing seems to be known about its breeding habits other than that they are oviparous.

On March 9, 1938, a field companion collected a mature female and seven immature specimens from under one rock. The young were about two inches long; indicating that they were undoubtedly born during the previous summer season. Ordinarily the young of lizards do not remain with the parent, and perhaps in this case, the specimens were from a late hatch which went into winter hibernation before the brood scattered and was then captured during the first warm days of the next spring before having an opportunity to scatter into surrounding territory.

For those collectors whose hand is quicker than the eye, no additional equipment other than a number of paper bags of convenient size is necessary, however, the agility and dodging speed of
Soeloporus makes collecting with bare hands a profitless business for most people. For most collectors a three or four foot switch with a foot of black thread on the end of the stick and a slip noose on the end of the thread is satisfactory collecting equipment. With this simple device any but the very shyest specimens can usually be noosed without injury to the lizard.

Soeloporus is a very hardy species. It is usually the earliest to appear in spring and the last to disappear in the fall.

They withstand captivity well and tame readily and may be fed on various insects such as cockroaches, termites etc. In the wild state they feed on various small insects.

Phrynosoma douglassii douglassii (Bell) 
Horned Lizard

Distribution: This extremely interesting and homely lizard has so far been found in only one area west of the Cascade Summit in the area within the scope of this work. It was found in 1938 on Sand Mountain, near the summit of the Cascades, in eastern Linn County. This mountain is northwest of the main lava flow of the Belknap Crater and is one of a series of small extinct craters in this region.

Habits: This horned lizard was found at an elevation of 5600 feet in the Cascade Mountains within what would be considered at least Lower Hudsonian Zone, a distinctly unusual situation for this form which is usually found in the arid Upper Sonoran Zone and in distinctly arid or desert regions.
Though perhaps out of place from the standpoint of life zones, the habitat in which this species was found is typically arid or desert, and similar to that where it is usually found in other parts of the country.

Sand Mountain, where the specimens were collected, is aptly named, for it is virtually a mountain of sand, or at least the upper one-fourth is. This mountain, as are most of the other similar small mountains in this vicinity, is an extinct crater and the upper one-fourth is very sparsely populated with manzanita, chaparral, and stunted white-bark pine. For the most part the upper slopes and the small crater, which is about 200 yards wide and several hundred feet deep, is made up of rather coarse volcanic sand and pumice-like rock.

It was impossible to inspect the other mountains in the vicinity due to lack of time, but to all appearance they were the same as Sand Mountain and quite likely also have horned lizards on them. *Phrynosoma* can be considered quite common on Sand Mountain. Thirteen were collected in about 400 yards around one side of the crater.

There were three sizes of specimens, one size measuring not over 3/4 of an inch in length which probably represented the young of that season; an intermediate size measuring 1 1/4 to 1/2 inches in length, and a third size, the largest of which was 2 3/4 inches long and the smallest of which was 2 1/4 inches long. These last were taken to be the adult size, for no larger ones were seen. The lookout who has been on the station for two seasons also stated that
he had never seen larger ones than the ones collected.

The individuals are colored and patterned so like the sand and rocks on which they are found that it is impossible to detect one until it moves. Not one was seen until it moved and even after one was located as it scurried for the shelter of a manzanita shrub it would be lost against the protective background if it stopped for a moment in its flight. This was particularly the case if one took his eyes off the lizard even for an instant. Never was a specimen found more than a dozen feet from a bush to which it would invariably scurry when approached. Apparently they do not venture very far from the shelter of these bushes. With such definite restriction of its home range, the vicinity where one could be expected to be found could quite surely be predetermined, but though special effort was made to locate one before it moved, so well did they blend with the ground that these efforts proved futile in every case.

The sparrow hawk (*Falco sparverius sparverius*) was common here and one was always hovering about the rim of the crater and it is possible that this bird preys on these lizards and perhaps is one reason that they stay close to the shelter of the shrubs, though even the sharp eye of the sparrow hawk would have difficulty in distinguishing a horned lizard from its background before it moves.

Horned lizards are generally considered rather slow, clumsy animals, but this is distinctly not true of the specimens from Sand Mountain. They are not as quick at dodging or making those quick lightning-like dashes around a log or boulder, so
characteristic of *Sceloporus*, but in a straight away dash across the loose sand and gravel I believe it would be a close race between *Sceloporus* and *Phrynosoma*. A specimen some fifteen or twenty feet from a manzanita shrub, and starting as they usually did when I was some twenty feet from them, would be overtaken only by very lively sprinting, and then usually just barely in time to prevent its escape into the shrub. Due to their lack of incentive to dodge they were quite easily caught. They seemed to be so intent on reaching the bush that they would keep right on toward it even though cut off. Or as was often the case they stopped and would try to escape notice and could then be picked up without the least trouble. In a few cases where some managed to reach one of the flat spreading manzanita or chaparral bushes, they dodged about under the low spreading limbs and twigs with considerable agility. The smallest ones were always found either in or along the margin of these bushes, and so closely resembled the withered and shed leaves of the manzanita that more than half were lost even after having been startled into revealing their presence by moving.

Ants were numerous on the mountain, and the droppings which consist of the chitinous remains of numerous insects and are about 1/4 inch in diameter and slightly longer, showed that ants were the principal source of food, though, the hard shell-like wing coverings of some black beetles were quite common. The orange and black remains of the yellow jacket wasp was also common in these droppings and showed that they were not infrequently taken as food. This wasp was quite common on Sand Mountain at the time the collecting was done.
This little lizard is exceedingly gentle and will often take insects from the hand a few minutes after being captured. Most of these for some reason refused to eat when brought down into the valley and though a few survived for several months, would not take food and finally succumbed.

Whether this lizard reaches a greater size here is not known. All indications are that it does not. This may be due to the exceedingly short summer season which prevails here. Adverse weather sets in usually about the middle or last of September and favorable weather does not being until June so that at the very best there are only four, and possibly only three months of the year during which this form is out and feeding. During most of the rest of the year this area experiences cold temperatures, and for a greater part of this time, is under snow which may reach extremes of ten to twelve feet and remain until early June.

Paradoxically White-bark pine is a Hudsonian Zone indicator and quite properly belongs in this part of the Cascade Mountains at this elevation, yet chaparral and manzanita are indicators of the other extreme, the arid Upper Sonoran Zone, and this also is quite proper for this particular area at least during the summer as far as temperature, humidity, and rainfall is concerned, it is typically arid Upper Sonoran.

Gerrhonotus scincicauda scincicauda (Skilton)

Western Aligator Lizard

Distribution: Gerrhonotus is perhaps second in number among
the lizards of Linn, Benton, and Lincoln Counties, and first in distribution. *G. s. scinciscuda* is generally found east of the Coast Range Mountains in the strip of foothills on either side of the Willamette Valley. It, like *Sceloporus*, seems to be confined strictly to this habitat and is entirely absent from the valley floor and has not been collected there.

Habits: *Gerrhonotus* generally is to be found in the same region as *Sceloporus*, but will usually be found only on the ground under logs, boulders, in rock piles, and under boards etc.

Compared to *Sceloporus*, this species of lizard is rather sluggish, but exceedingly pugnacious. When cornered it will face the intruder with gaping jaws and hiss quite audibly. Careless handling will result in the unpleasant experience of getting one's finger, or some tender part of the hand, into the bull-dog grip of jaws which are far from weak. Once it sets its jaws on its captor, it retains its grip with such tenacity that it must be pryed loose forcibly to free oneself. A sixteen inch specimen which attached itself to the rather tough skin of the palm of my hand gripped with such force as to numb the flesh in its grip for some time after it was released and left purple imprints of its jaws which were clearly visible for several hours afterward. Its short teeth were, however, not able to pierce the skin. *Gerrhonotus* is oviparous, and Fitch (1935 p. 14) observed mating pairs from May 14 to June 12, and records one captive specimen which laid 13 eggs the first week of August. This author further states that he has usually seen the first young in September and believes that at
least one month is required for incubation of the eggs.

The food is believed to be primarily insects of various kinds. Captive specimens are quite hardy, but remain wild and the large specimens have retained their viciousness for months without showing any change in their temperament.

No equipment other than a cloth sack or paper bag is needed for collecting them. The collector need only exercise a bit of skill in pinning the head of this lizard to the ground with his hand and then picking it up by the neck so that it cannot bite.

_Gerrhonotus principis_ (Baird & Girard)

_Coast Alligator Lizard_

Distribution: This species is found practically from the coastal beaches of Lincoln County to the foothills of the Cascades; though in numbers it seems to be confined primarily to the area of the Coast Mountains. It has been taken not uncommonly west of Corvallis in Benton County and has been recorded from the Cascade foothills of Linn County.

Habits: This species of _Gerrhonotus_ is found in habitats similar to those of _scincioauda_. However, in general this species is smaller than _scincioauda_ and not nearly no vicious.

Specimens kept in captivity fed readily on cockroaches. Van Denburgh states that this species often climbs about in trees, but this has not been observed in the specimens from this region.

Females containing developing ova were taken by Fitch (1935, p. 24) on July 21 and 22, 1932.
Eumeces skiltonianus (Baird & Girard)

Western Blue-tailed Skink

Distribution: Eumeces like Sceloporus and Gerrhonotus is confined to the foothills in Linn and Benton Counties. It has been collected near Foster, on the Santiam River, and east and south of Brownsville, both in Linn County. It has been reported from, but so far not collected in Benton County.

Habits: This lizard is commonly found under rocks, logs, boards and other objects on the ground. It has also been found hiding in the leaf mold around the base of wild rose bushes. Occasionally it has been observed during the dry season far out in open pastures where there were no shelters of the type mentioned above, but refuge was taken in the numerous cracks present in the dry ground at this time of the year.

This species lays eggs, and Van Denburgh (1922 p. 584) cites a record of egg laying on June 15. Other than this meager information nothing is known of its breeding habits.

Presumably its chief food is insects. Captive specimens are quite hardy and will thrive on cockroaches, termites, and ants.

The brilliant blue-tail, the ease with which it breaks off when a specimen is roughly handled, and the violent contortions and wriggles this cast off member undergoes for a minute or two after being shed, suggests that it is a protective rather than decorative device. A personal experience bears this out quite graphically.

A small specimen of about four inches in length was seen scurrying through the grass in an open pasture and was promptly
imprisoned under my hand. The grass was fairly thick here and a good handful of stems and leaves was smashed down under the hand with the lizard. A cautious look showed a bit of blue tail wiggling energetically amid the crushed grass stems and leaves, and rather than take a chance on having the specimen get out of hand and disappear into one of the numerous cracks in the dry ground, I picked it up along with the handful of grass and dumped the entire mass into a large paper sack. On taking the grass out I found that I had a bright blue, and still lively, skink tail, but no skink. As I was puzzling over this seemingly slight of hand disappearance, for I was positive I had had it in my hand with the material I had placed in the bag, my tailless skink popped out of a small crack in the soil, near where I had pinned it to the ground, and scurried into larger and deeper one a few inches farther away. Apparently I had pinned only its tail, and the uneven surface of the ground had given the skink sufficient freedom to wriggle free, unseen amid the fairly thick grass, and into a crack in the ground near my hand, and I, without a close look had placed the conspicuous tail in the bag, thinking I had a lizard, which in the meanwhile made good its escape minus a tail but none the worse for that. In this case the prominence of color and motion of the tail and the lack of experience of the part of the captor certainly served to benefit the captive. In the case of a reptile, bird, or perhaps mammal, the case might very easily be exactly the same. Mammals which hunt in the grass for mice and frogs, lizards and insects, and that includes cats, dogs, coyotes, skunks, coons, will almost invariably pounce on their prey with their paws,
pressing the grass and leaves down with their victim, and then cautiously nose it out. Under the above circumstances such an animal would be very readily fooled, and while its attention was centered on the twisting, wriggling tail, the not entirely hale but quite hearty owner of the tail could make his escape. The same might be true of birds and snakes. A skink grasped by the tail will certainly break loose and leave that member in the grasp of his assailant. A snake or other animal might be quite satisfied with what it had in its grip rather than risk losing it by chasing after the body.

Charina bottae (Blainville)

Rubber Boa

Distribution: Charina bottae has been collected in Benton County in the hills west of Corvallis and on Woods Creek west of Philomath. It has been seen on Green Peak in southern Benton County in the Coast Range Mountains and also on High Deck Mountain in the Cascade Mountains of Linn County. So far there are no records of this snake from the Coast Range Mountains of Lincoln County, but undoubtedly the snake is present there also, for the hills there are continuous with those of Benton County and the habitat conditions are identical. The farthest out in the Willamette Valley that it has been recorded is Corvallis.

Habits: This snake is extremely gentle and may be handled with impunity right from the start. In movements it is rather sluggish and when picked up has a habit of coiling around the captor's hand or arm and remaining so, if permitted, for hours. It also
occasionally coils up into a tight round ball.

This snake spends a good deal of its time under ground and is not often seen by the inexperienced collector. Most specimens are found under old logs, boards or other objects. A name commonly applied to this snake is the "two-headed" snake, in keeping with the resemblance which the blunt tail has to the head. Van Denburgh (1922 p. 642, Vol. 10) states that it often holds its tail in such a way that it resembles the head, with the true head hidden in the coils of its body. The same author mentions a large specimen taken in June which contained large eggs.

Judging from these records eggs are probably laid some time in June or July, though just when they hatch is not definitely known, probably August or September.

Its food probably consists to a large extent of insects, and worms, mice, lizards, and possibly, tree toads. Van Denburgh (1922 p. 642) mentions one specimen containing six young mice and cites two records of this snake taking the western blue-bellied lizard (*Sceloporus occidentalis occidentalis*). One snake was caught in the act of swallowing one of these lizards and another one contained two specimens.

This snake is one of the cleanest if not the cleanest of all the snakes and also the gentlest, and when it can be induced to eat, makes a pleasant and interesting pet.

*Charina bottae* inhabits chiefly the coniferous wooded areas of the foothill and mountain regions.
**Diadophis amabilis occidentalis** Blanchard

**Western Ring-neck Snake**

**Distribution:** In Benton County it has been taken in the vicinity of Corvallis, chiefly in the hills west of the town. In this locality it is neither common nor is it rare, generally two or three are brought in every spring. One specimen was collected on Peterson Butte in Linn County.

**Habits:** Very little is known about this snake. Van Denburgh (1922 p. 651) states that it is most often found under logs and boards in moist places and even in the salt marshes. His statements so far as the boards and logs are concerned apply to the Willamette Valley form, but otherwise, in part at least, the local form differs in that most of them are taken on open grasslands of the foothills which are anything but wet or even damp during the spring and summer. The Peterson Butte specimen was taken on the Butte in the open grass and this Butte is a veritable desert in the summer and is one of the few places in the Willamette Valley where that desert indicator, the burrowing owl, is found. On the other hand, one specimen was brought in last spring (1938) which was taken near a series of stagnant pools about a mile out of the city limits of Corvallis. This might be termed marshy country. Also Mr. Stanley G. Jewett Jr. records (Graf et al 1939) a large bullfrog from Oswego Lake which contained the remains of a ring-neck snake.

In regard to food it is said to feed on *Hyla regilla* (Van Denburgh 1922 p. 657). Quite likely the local ones will
feed on these toads quite as readily when the opportunity presents itself.

In captivity at least, this species seems to be quite cannibalistic. Two specimens, one of which was but slightly shorter than the other, were placed in a dry aquarium. For several days everything was in order, but one morning the smaller of the two snakes was missing. Since it has often happened before that snakes had escaped from these small aquaria because of the cover being poorly placed, it was believed to have escaped, but the next day while photographing the remaining snake, it suddenly disgorged the partly digested remains of its former cell mate. Under similar conditions two small sharptailed snakes disappeared. In this case one of the snakes was found disgorged in the cage the next day. Why it should have been regurgitated a full day after is not known for the snake was not disturbed during this time.

**Coluber constrictor mormon** (Baird and Girard)

*Western Yellow-bellied Racer*

Distribution: Distribution of this snake is widespread throughout the foothill and lowland country of both Benton and Linn Counties. So far it has not been collected in Lincoln County.

Habits: The racer is definitely not a snake of the heavy timber, though it is often found in the broken woodland and particularly in the marginal areas. It is perhaps more of an open grassland or meadow type of snake and will often be encountered far from any shelter in the open fields and pastures. The young of this snake will more often be encountered about wooded
or brushy areas, and particularly under or close to old logs, brush piles, and other similar shelters. The adult specimens usually encountered in the field and pastures take refuge in the numerous field mouse burrows.

No definite information as to its food habits is at hand, but judging from the habits of other members of this genus, which are better known, and from the habitat it frequents, it may be in all likelihood be assumed that it feeds largely on mice, lizards, and perhaps insects.

In the valley proper, in the grain fields and hay fields where it is commonly encountered it undoubtedly takes its toll of field mice which are usually over abundant here. In this respect it should be considered one of the farmers most valuable friends. The blue-bellied lizard is exceedingly common in the foothill region of Linn and Benton Counties and the racer is also common on the same grounds, so that perhaps this lizard and the white-footed mice and insects in this part of the country are its chief food.

Van Denburgh (1922 p. 663) says that it frequently climbs trees and bushes and that it is very gentle.

The first I have not observed, and the second is distinctly not the rule of the local form. Every specimen I have collected, or seen collected by field companions, was exceedingly vicious and would strike time and again in an attempt to bite the hand of the collector. Its teeth will inflict a somewhat unpleasant but not dangerous wound.

The racer is by far our swiftest, most agile, and graceful of our snakes, but it distinctly is not gentle.
**Pituophis catenifer catenifer** (Blainville)

**Western Bull Snake**

**Distribution:** This snake is fairly common throughout the Willamette Valley in Linn and Benton Counties. It has been collected on Peterson Butte and near Plainview in Linn County. It has been seen on numerous occasions near Peoria and Brownsville in Linn County. In Benton County it has been collected near Corvallis and has been observed near Bellfountain in the foothill country. It has not been recorded from Lincoln County.

**Habits:** *Pituophis* is typically a snake of the grassland areas and is found only occasionally in the timbered areas, though quite often it will frequent brush lands. It is oviparous and Van Denburgh (1922 p. 712) mentions one which he kept in captivity and which layed 19 eggs on July 15. The eggs, he says, are covered with a loose soft, sticky parchment-like white membrane which dried, cementing the eggs to each other where they came in contact with each other.

The bull snake feeds largely on small rodents such as mice, ground squirrels and gophers and from the farmers standpoint should be considered absolutely beneficial. In Linn County I have known several farmers who made a practice of keeping the larger specimens of this species, which they collected, in a sack for a week or more until, as they put it, it was "good and hungry", and then turning it loose in a pocket gopher burrow. Their claim being that it would kill the owner of the burrow with certainty. Whether this is so or not, benefit will be derived from the release of the snake
on the farmer's land even though the particular rodent on which it was turned loose is not killed.

This snake shows considerable variability in temperament. Some individuals are absolutely docile from the start and others will strike viciously and hiss weeks after they have been captured.

When cornered, or when its retreat is cut off, it puts on a magnificent but harmless bluff. It will coil and when approached too closely or threatened with a stick or other objects will fill its lungs with air to the utmost capacity and then suddenly expells it in a long hiss, quite startling to the amateur. Often this hiss will be accompanied with a vicious lunge of its head. If the annoyance continues, the hissing may become steady and the tip of the tail will be vibrated rapidly. Should the snake be in dry grass or leaves, this latter display to the uninitiated, is quite startling, for under such conditions this rapidly vibrating tail in contact with dry leaves or grass stems may sound surprisingly like the warning rattle of the rattlesnake.

The bull snake also has the peculiar habit of "freezing" at the approach of a human being. In grass and leaves or on a stick-strewn path, in a logged-off area, this ruse is most effective and a number of times I have not noticed such an individual stretched out in a cow path until I started to step over it. In one case my dog had preceded me by a few feet and had trotted right over a large four foot snake and I only noticed it when I was passing over it. It moved neither then nor when I stepped back over it again and for several minutes took pictures of it. I even moved its head a bit to get it into a better position and removed grass
stems and chips from the trail. This all failed to cause it to move and only after I started to stroke it lightly on the back did it glide off into the brush. I have experienced this same thing on a number of other occasions under similar circumstances.

Its habit of hissing and vibrating its tail unfortunately often result in its death at the hands of excitable and ignorant people. It also often is found basking on country roads, usually stretched out full length in the road, and this, with its habit of "freezing" often results in an untimely end under the wheels of cars.

**Contia tenuis** (Baird & Girard)

*Sharp-tailed Snake*

**Distribution:** A few are collected near Corvallis every season. These have all been taken in the hills west of the town.

**Habits:** Nothing is available on the habits of this species in the literature on reptiles. The specimens are usually collected under boards, rocks or other objects and probably this form spends much of its time underground or under objects on the ground. It probably feeds to a large extent on worms, and insects of various kinds.

**Thamnophis sirtalis infernalis** (Blainville)

*Pacific Garter Snake*

**Distribution:** For the area within the scope of this work its distribution is confined to Linn County only. It is found
around the lakes and upland marshes of the Cascades summit in eastern Linn County. Specimens were observed near Fish Lake and Big Lake.

Habits: Very little is known of its habits. It seems to prefer marshy areas and often is found near water. Those of the Cascade region were observed around the margins of the lakes and one was seen in the water in Big Lake.

Ditmars (1936 p. 155) states that specimens of this species which he observed, progressed by means of a sort of "sidewinder" mode of locomotion, that is, by means of lateral loops, and in an oblique direction to that to which its body was pointed. This mode of locomotion has not been observed in the local form. On the same page Ditmars states that several specimens gave birth to young on the twentieth and twenty-third of August and the fifth of September respectively. He further states that comparatively, this species does not produce large litters and that the smallest litter numbered seven and the largest fifteen in number. This information is just about all that is available on the breeding habits of this species.

Young garter snakes not over eight inches in length were noticed around Fish Lake during the latter part of July. These young snakes were undoubtedly from that season and at least indicate that young are born by the middle of July or earlier in this region.

Ditmars also credits this snake with a preference for small tadpoles rather than frogs. In that case *infernalis* should be amply provided for around the lakes of the Cascade Range, for these
fairly swarm with toads of all sizes and ages during the summer.

*Sirtalis* is said to be highly aquatic, often feeding on fish which it captures by fair chase. A specimen taken at the edge of a small dam in southern Oregon showed a remarkable case of the accident which can befall a snake which goes fishing. This individual, a large specimen about 36 inches in length had caught a four inch bullhead and had proceeded to swallow it head first, but the sharp spines on either side of the fish's head had pierced the skin of the cheeks of the snake, and in addition the spines of the dorsal fin had also helped hold the fish in place so that the snake could neither swallow the fish nor let go of it. The withered and dried up appearance of the exposed portion of the fish bore evidence of the length of time the snake had carried its unpleasant burden. After photographing it, a simple operation with a small pair of scissors freed the snake from the captive which had captured the captor.

*Thamnophis sirtalis concinnus* (Hollowell)

Northwestern Garter Snake

Distribution: Van Denburgh (1922 p. 799) gives the following records for the area within the scope of this work: "Lincoln County, on the road between Pioneer and Siletz Rivers, Alsea River near Alsea; Linn County near Albany." It may be further added that this snake is the commonest of all snakes in Linn and Benton Counties and has been collected near Brownsville and Peoria in Linn County, and near Corvallis, Bellfountain, and Monroe in Benton County, and
many other places too numerous to mention.

Habits: This species is perhaps more frequently found farther afield away from waters or marshes than many of the other garter snakes. It is commonly found in open fields and wooded areas, particularly brushy logged-off lands; and near Monroe in Benton County it was fairly common on the dry open foothills where it took refuge in the rosebushes and thick clumps of scrub oak.

In the hay fields I have often found it under hay shocks and not uncommonly in the act of feeding on a field mouse, these mice usually being common under the hay shocks. It is also said to feed on grasshoppers and other insects, and in captivity it feeds readily on tree toads and frogs. It is quite common, and sometimes very numerous around low marshy or swampy ground where there are breeding pools of tree toads and frogs, no doubt being attracted by the easy source of food.

Like other members of this race it is ovoviparous and though there is little information on its breeding habits they are undoubtedly similar to those of other members of the genus.

**Thamnophis ordinoides ordinoides** (Baird & Girard)

Puget Garter Snake

Distribution: Van Denburgh (1928 p. 815) lists records of this snake in Lincoln County from Toledo, Siletz, and Alsea; and from Benton County near Little Elk and Yaquina River, between Chitwood and Siletz River, between Pioneer and Siletz River and near Philomath. It has been observed on Muddy Creek near Peoria.
Habits: Little or no data is available on the habits of this snake. The few collected by myself were found near a dry marsh in Lincoln County. No snakes which have been positively identified in the hand have been taken in Linn or Benton County by myself. What was believed to be an ordinoides was observed on two different occasions near Peoria in Linn County. Both specimens were in the water and one displayed an agility and speed in underwater swimming that would astonish the ordinary observer who has never seen a garter snake swim other than in a leisurely and rather clumsy way on the top of the water. This individual was observed darting about in a small shallow woodland pond. The speed with which it flashed in and out and over the sunken logs and branches under water was baffling to the eye and not even a trout could have put on a flashier display of grace and speed. Since it was not in pursuit of any visible prey, one is at loss to explain this display of speed and agility. It was certainly not a case of fright. Possibly this rapid darting about catches the victim unawares, much as the same method of some of our hawks serves the same purpose.

_Crotalus confluentus oreganus_ (Holbrook)

Pacific Rattlesnake

Distribution: Found only in Benton and Linn Counties within the scope of this work. In Linn County it is found in the Butte region and around the outer edge of the foothills on the eastern edge of the valley. The snake has been collected near Brownsville and on Rocky Butte northeast of Coburg. It has been reported collected by others on Saddle Butte, Peterson's Butte, Ward's...
Butte, and Spencer's Butte, as well as other buttes of unknown name in this region. It has been fairly definitely ascertained that this snake is not only found throughout this foothill and butte region, but that in certain localities it is exceedingly common. In Benton County it has been reliably reported by local residents south of Monroe, 1938. It was reported on Baldy Hill, and it was also supposed to have been seen on Cemetary Hill near Corvallis in 1926. These last records are indefinite.

Habits: As states above the Pacific rattlesnake is not only common but exceedingly numerous in some localities. The Rocky Buttes and foothills are ideally suited for this reptile as the numerous rock outcrop and rock piles furnish ideal retreats for it.

These marginal foothills and buttes are interesting from a habitat standpoint. Most of them are quite arid on the south side. The north side usually has heavy stands of Douglas fir, and the south side usually only grasses and wild rose. Some of these hills are wooded on the south slopes and in most cases these woods will be predominately oak, with maple, madrone and other deciduous trees scattered among them.

In climatic conditions, at least during the summer period, these Cascade foothills are probably the most arid region in the Willamette Valley and it is quite interesting that in a generally humid region such as the Willamette region such a form as the rattlesnake which is more commonly associated with desert regions should be found here, and even more interesting that a form such as the burrowing owl which is most definitely associated with the rattlesnake in arid regions, is also found here and nowhere else.
in the valley.

So-called dens of rattlesnakes have been reported where as many as 150 snakes were killed in a short time, usually in early spring when they first appear after hibernation.

Interviews with local residents showed that this snake is far more common in this region than many people believe. Many of the residents farther out in the valley do not even know of the existence of rattlesnakes in the Willamette Valley, and even many of the farmers in the foothills believe that they are very scarce or absent around their immediate premises when actually they may have some under their barn or out-buildings. One farmer stated that he had killed several near his barn and that one was brought to bay one evening by his cat. My own experience is that these snakes are extremely shy, never move far from their retreat when they come out in day time, and generally do not come out until late evening or morning; possibly they are to some extent nocturnal as is indicated by the one cornered by the cat. This took place after darkness had set in. Generally they will come out of their dens under rocks and coil up at the edge, usually not more than a foot or more away, and at the slightest warning of approach will glide away into the rocks or den. All of the snakes collected by myself were always content to beat a hasty retreat or remain quiet to let the intruder go by. This and the extremely protective color pattern which blends into the gray of rocks and the gray-green of lichens and dry grass makes it extremely hard to locate, not one has ever given a warning rattle even when one stepped within a few feet of them. At such time they would usually be discovered when they start to
move into their retreat.

As an example of the passive nature of this snake, at least those of this region, it might be well to relate my first experience in collecting this reptile and also this may be a good example of what the beginner should not do.

The first specimen was sighted as it disappeared under a flat rock, while my field companion and I were still fifteen or twenty yards away and we immediately rushed over to see whether we could capture it. The rock was quite large and had fairly large open space under it. I promptly got down on my hands and knees to peer under the rock -- from a safe distance -- only as my head came within about eight inches of the ground, a portion of the lichens and pebble-strewn ground by the side of another large rock near which my head was inclined, acquired mobility and slowly uncoiled and slid off under the rock. Needless to say I lost interest in snake number one, for the time being. This second snake, even though it was within easy striking distance of my face, had only one objective in mind, namely, to retreat into its den as quickly and unobtrusively as possible. Both snakes were collected and neither sounded its rattle until it was handled and neither could be induced to strike. A third one was taken a few minutes later and it behaved like the first two, except that it struck once after being handled with more than usual roughness. It was poked out from under a rock with a stick and tossed out into the open and it promptly headed for cover, and when cut off, it would turn in another direction. Only after being rolled over and poked with a stick numerous times to stop it did it strike, and then only once.
Others collected subsequently have acted exactly alike in this respect, though some on being captured showed more liveliness and resistance, than the others.

With the exception of *Phrynosoma* this reptile is the hardest of all to detect in its natural habitat and the collector should be careful where he places his hands when climbing about the rocks for it would be possible to place a hand on a reptile lying on a ledge not clearly visible to the climber. I doubt if any of these snakes would strike a person unless actually stepped on or unless a hand was placed on one unsuspectingly. It must also be remembered that snakes vary in temperament and also during warm weather a snake is livelier, though not necessarily more vicious, than in cold weather and that though in general these snakes may all be quite passive to humans, there might be one individual which will be an exception to this rule. Like fire arms, rattlesnakes are dangerous to the handler only when carelessly handled, accidents not excepted.

I have records of only one person being bitten by a rattlesnake and that was some thirty years ago. As related by a local resident, this was not a fatal bite. Most of the snakes will be not over thirty-two to thirty-five inches in length, though I have the word of one farmer that measured a dead one (not skinned), which measured forty-two inches in length. A pair of heavy leather boots would be ample protection against the bite of this snake.

These snakes feed on smaller rodents, probably *Microtus* and *Peromyscus* and *Citellus douglasii* which are here plentiful. In this respect this snake should be considered highly beneficial to the farmers, and in view of the fact that they do not seem to endanger
live stock or people, should be protected, though this is something the average individual, ignorant of the ways of snakes, cannot be convinced of, even in respect to non-poisonous varieties like *Pituophis* and others.

One of the snakes collected gave premature birth to three young on August 28, and another one gave birth to eleven young the first week in November. These last all died after a short time.

Hibernation apparently starts in October, or after the first cold day sets in. None were observed, and local residents stated that they usually were not observed towards the latter part of September. Appearance in the spring is apparently in the last week in March and the first weeks of April, depending on the weather conditions.

A captive specimen was offered a *Hyla*, but after carefully looking it over and apparently smelling of the *Hyla*, for it poked its nose within a half inch of the victim, it withdrew and paid no attention to it other than to buzz when the tree toad hopped too close to it, that is within three or four inches of it.

**Clemmys Marmorata** (Baird & Girard)

Pacific Mud-Turtle

Distribution: This turtle is common in all the sloughs of the Willamette River, and the sluggish streams and ponds of the lowlands. *Clemmys marmorata* has been collected on Muddy Creek in Benton County and also on Muddy Creek in Linn County and has been seen on the Calapooya and the Willamette River in Linn County, and also on Mary's River and numerous ponds in Benton County. So far
as is known it is not found in Lincoln County.

Habits: This turtle is almost wholly aquatic in habits and leaves the water only during the spring to lay eggs. Practically all of the lowland, sluggish streams and ponds will have a few mud-turtles in them.

Overland migration, when they leave the water to lay their eggs, occur during late May and early June. Some five or six years ago a turtle, which had completed its egg laying was discovered near the nest the first week in June. Since no accurate records were kept at that time, much valuable data was lost. The nest was in a clover field about one hundred yards from the creek and consisted of a hole, wider at the bottom than the top, and about four inches deep and three inches wide at the widest point. The turtle had just finished laying and had covered the opening of the hole so that it was level with the surface of the ground and had tamped it down with its feet. The soil just over the egg-pit, and around its edge was quite moist, as if it had had water poured over it. Possibly it had been urinated on by the turtle. The remarkable thing about the nest was that it had been scooped out of soil which in this field was baked to almost brick-like hardness. It would be interesting to know whether the moistening of the soil took place before or after the hole had been dug.

There is no sand in this part of the country and I have often found these pits in various stages of completion, but without eggs, during the first week in June, as well as several later in the summer which had hatched successfully or had been exposed by some predator, probably a skunk. Every one of these has been on hard
dry soil either in pastures or along the side of a drainage ditch. The ground during June in these situations is brick-hard and apparently is preferred, for in a number of cases cultivated fields were available only a few feet away, and in these the soil was well worked and quite loose.

Just what the incubation period is is not known but if the eggs are laid in early June and hatch before the end of July -- I have found a nest with empty eggshells which apparently hatched successfully in July -- then it is probable that this time is from six to eight weeks. A single whole egg was picked up along a dry drainage ditch in July, and as no indication of a nest was evident it was assumed it had been dropped recently by a wandering turtle. This raises the question of whether the turtles lay only in spring or also in later months of the season. Van Denburgh (1922 p. 977-78) records the finding of a turtle during July which had just layed a single egg and contained two more in its body. Possibly most eggs are laid in early June and perhaps an occasional one later on. The same author (1922 p. 977) kept one specimen alive which laid three eggs in June and another one in August.

The eggs have a hard limy shell and measure about one and one-half by seven-eights of an inch in length.

Several stomachs of these turtles contained nothing but crayfish and one contained the remains of a small perch or bass.

A friend, whom I consider a reliable observer, reported witnessing the taking of a newly hatched duckling as it was trailing after its mother on the Calapooya River. This same person said
that out of about seventy stomachs which he examined, only three or four contained recognizable remains of young ducks. A duck shot during late summer and left on the water while the hunter went to get a boat several hundred yards away, was attacked by a large turtle of this species, and had eaten a fair sized hole out of the breast before the hunter returned some ten minutes later. The turtle was seen feeding on the duck and positively identified.

I have often, as a boy, caught this turtle on a hook while fishing in Muddy Creek in Benton County. When hauled in they would exude an extremely unpleasant and musky odor. At no time did the hook become imbedded in the flesh of the mouth, but was simply grasped so tightly in the hard horny beak that it had to be prised open with a knife blade. Often these turtles may be seen crawling along the bottom, in the shallow water, near shore in the sluggish creeks, apparently foraging for food. Possibly this is how they hunt for crayfish, for these are usually found along the margins in these creeks.

The mud-turtle, when prosecuted, will become very shy, and quickly drop from the log on which it is sunning itself long before a person is within shooting range. Where it is left alone, it becomes quite tame and may be quite closely approached.
Typical habitat of _Hyla, Rana p. pretiosa, Triturus, and Thamnophis_.

_Thamnophis sirtalis concinus_, the commonest snake in the Willamette Valley.
Triturus similans the commonest and most numerous salamander in the Willamette Valley.

Hyla regilla, or tree toad, commonly heard in the spring in the typical "frog chorus"
Dicamptodon ensatus, the largest land salamander, compared with an average Plethodon vehiculus.

Ambystoma gracile, showing prominent paratoid glands and glandular area on dorsal surface of tail.
Sceloporus o. occidentalis, the most numerous and commonest lizard in the foothills of Linn and Benton County.

Pituophis c. catenifer, the largest and one of the most beneficial snakes of western Oregon.
Sand Mountain Crater, elevation 5600 feet. *Phrynosoma d. douglassii* was common on the rim of this mountain.

*Phrynosoma d. douglassii* found on Sand Mountain in the high Cascades of Linn County.
Typical foothill habitat where Crotalus, Coluber, Diadophis, Thamnophis, Scoloporus, and Eumeces were collected.

Crotalus c. oreganus, the Pacific rattlesnake, next to Thamnophis, the commonest snakes of the Cascade foothill country in Linn County.
Bibliography


