

EFFECT OF THE WHITE MAN'S SETTLEMENT ON WILD ANIMALS  
IN THE MARY'S RIVER VALLEY

by

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# EFFECT OF THE WHITE MAN'S SETTLEMENT ON WILD ANIMALS IN THE MARY'S RIVER VALLEY

## Introduction

A large per cent of the recent publications in natural history and related subjects give evidence of a great depletion in our supply of native wild animals, due mainly to encroachments on territory and depredations on number by the white man. This fact is quite obvious to anyone who will turn for even a short time to natural conditions. In taking up the study of a particular area, it is hoped that the situation will be more or less typical. Inevitable allowances must be made for variations in local conditions, but the fundamental facts should be applicable to many localities.

As an example of the white man's intrusion into a wilderness area, the vicinity of Corvallis, Oregon has been chosen. The main advantage of this area in the present study was its nearness and consequent availability of material. Furthermore, there are still a few areas in the vicinity which approach the primitive conditions and help to serve as a check. The fact that the area is, to a large extent, prairie gives opportunity to test the soundness of at least one logical speculation. When the white man settles a prairie area, the habitat change is not so drastic as in the clearing of forest lands, the opening

up of desert areas, or the drainage of swamps. Does the animals life show similar trends? Lastly, one can see what forms are attracted or repelled by the presence of a city of the size of Corvallis.

Observations in this study are confined to the city of Corvallis, the fields surrounding it, and the last few miles of the Mary's River valley. (See Plate I). The dense river bottom growth of the Mary's tends to encourage animal forms which might otherwise stay in the adjacent hills. Any references to other parts of the Willamette Valley or state will be satisfactorily linked to the area delimited.

Corvallis is close to the west side of the Willamette Valley. To the east of the town is the Willamette River. From the south side of town, along which flows the Mary's River, the prairies of the valley stretch flat and level to distant hills. To the southwest of town, at about a half-mile distant, a low oak and fir-covered hill breaks the level and is the nearest example of the higher hills which rise on the west and northwest of the city at a distance of one or two miles. The higher fir-clad hills of the coast range are west about six miles. These send out an eastward spur which is only two or three miles north of the city. This spur stops short of the Willamette River, leaving a narrow strip of flat land between.

Rough map of the Corvallis area, showing main landmarks and general topography.

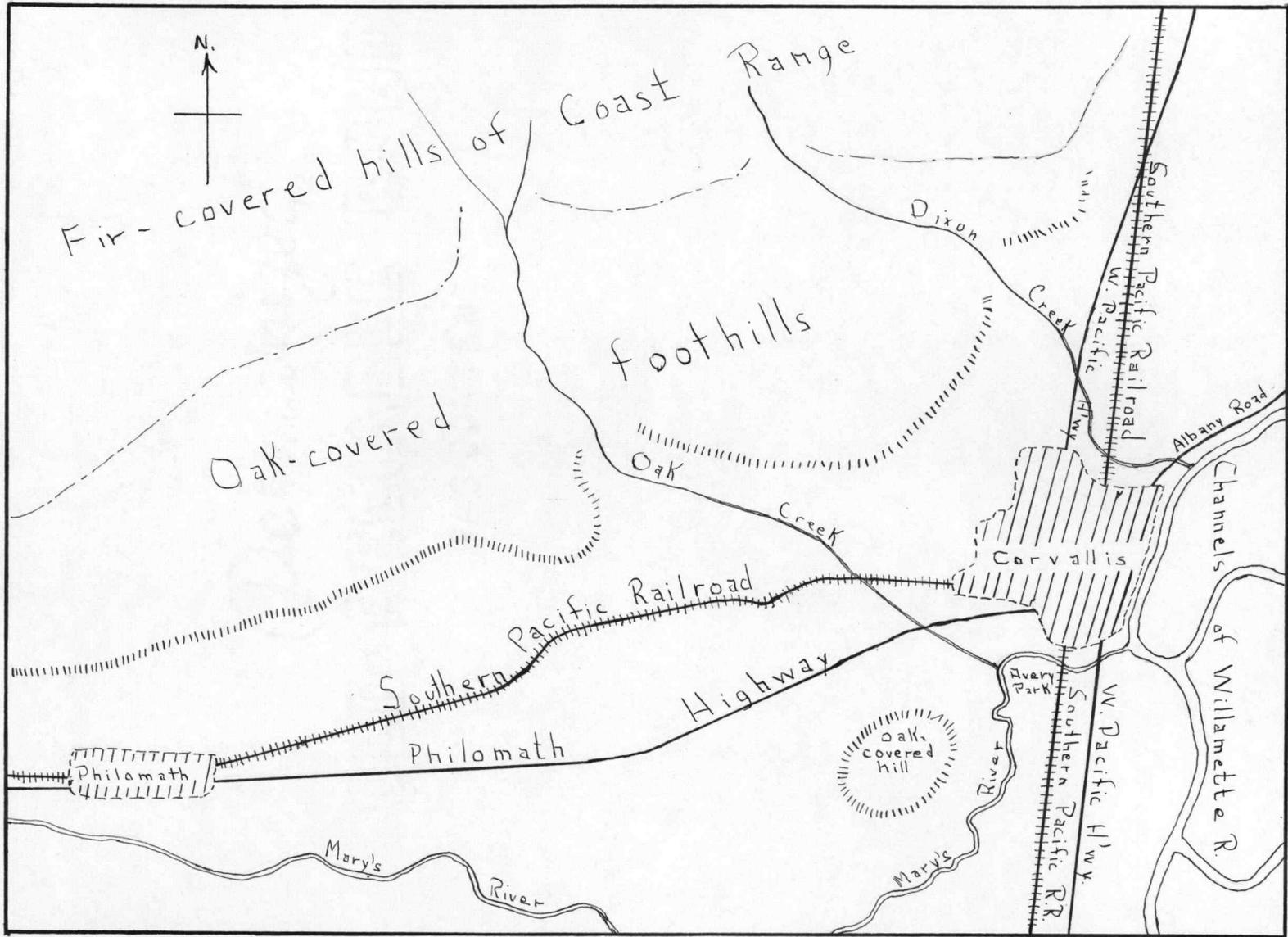
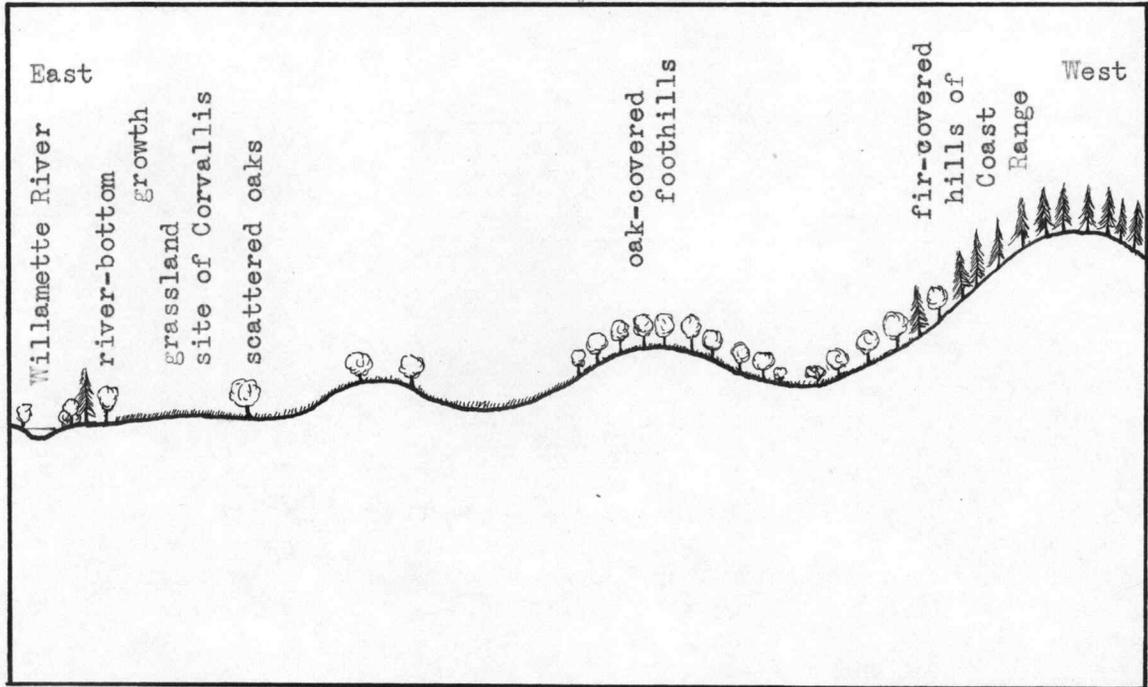
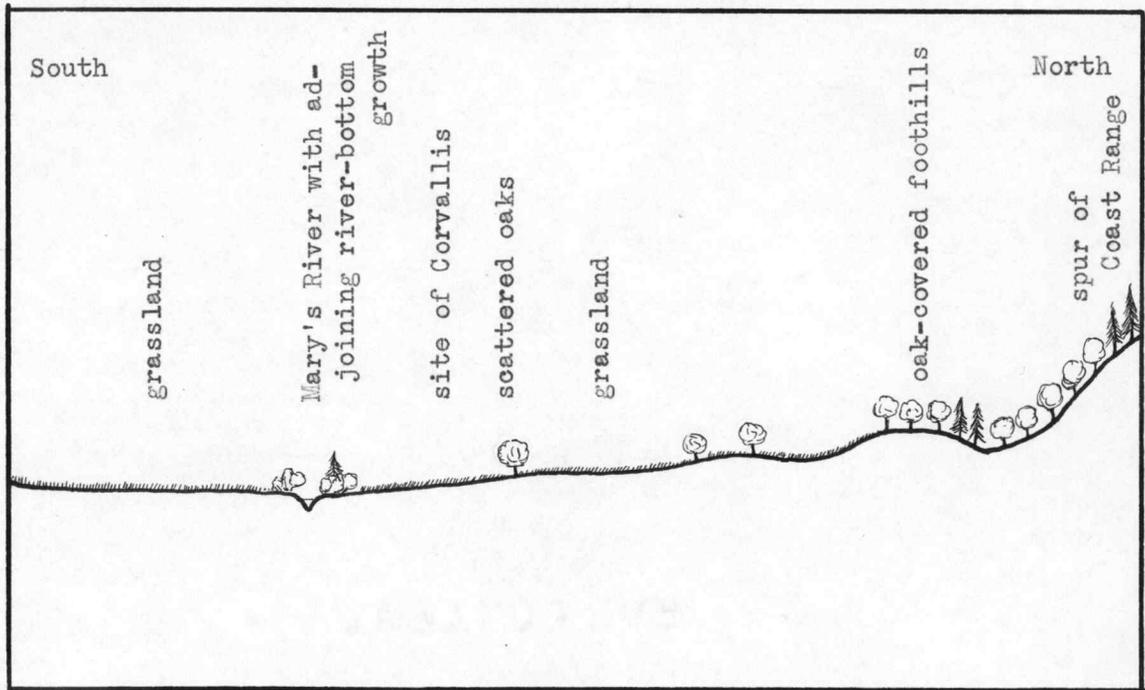


PLATE I

PLATE II



East-west diagrammatic cross-section through the Corvallis region, showing primitive vegetation.



North-south diagrammatic cross-section through the Corvallis region, showing primitive vegetation.

(See Plate II).

A brief description of the area's appearance at present will make the following account more understandable. Corvallis is a city of about 9,500 population. The State College campus occupies a considerable portion on the west side of the city. The streets of the city are lined with trees which are mainly Sycamore, with many Walnuts, Elms, Maples, and a few Chestnuts. The campus has many varieties of evergreens growing upon it, and also many American Elms. Back yards of the city contain several species of fruit trees.

The level fields to the south of the city are now largely cultivated. The main crop raised is winter wheat, but hay is grown in many localities. A narrow fringe on the banks of the Willamette is grown up to trees, which are mainly Alder, Willow, and Maple, with a good sprinkling of Douglas Fir and Lowland Fir. This strip probably doesn't average more than 150 to 200 feet wide. The bottom lands of the Mary's River are densely grown with Alder, Willow, and many shrubs, the growth being almost impenetrable in places. This type of vegetation forms strips on each side, which probably don't average more than 100 feet in width, and in many places are reduced to ten or fifteen feet. Directly across the Mary's from the city of Corvallis is a four or five acre tract of Douglas

Fir trees, known as Avery Park. Being a park, it is supplied with fireplaces, tables, etc., and is more or less cleared of underbrush.

The land to the west is broken by small streams, the courses of which are marked by the usual stream bottom growth of small trees and shrubs. There are several orchards intermingled with the grain fields and pastures. This type of cover soon gives way to the forested hills, which are used mainly as pasture for sheep. To the north, on the near side of the base of the hills, small farms are the rule. In addition to these farms are large areas of small timber and shrubby growths.

Throughout the area, scattered areas of brushy pasture occur, the main shrubs being a species of wild Rose and Poison Oak, which appear where grazing has been heavy. Another encroacher is the Scotch broom, which has taken over considerable areas northwest of town.

In gathering material for such a study, one is immediately confronted with the problem of determining the original condition. Most of the very early travellers through the Valley left no journals or similar information. Even where journals are available, they may be quite vague as to localities visited. It is only by reading many accounts, and by fitting them together, that one can gain to some extent the desired information.

In presenting the material, it is most logical to first state the original natural conditions, following this with the arrival of the white man and his various effects upon those natural conditions. In dealing with the wild animals, it will probably be necessary to limit observations to comparatively few forms, because of a lack of informative material. It is hoped that conclusions can be applied to related species or to species found in the same habitat.

## Chapter I

### Conditions Prior to the Arrival of the White Man

#### Floral Conditions:

In any biome or ecological set-up, the various types of plant life are usually the most conspicuous living forms. The whole arrangement of animal life is largely dependent upon the plants for actual body subsistence and for protection from natural enemies and from the elements. Although many of the carnivores appear to derive their food almost entirely from the lesser animals, these, in turn, may feed entirely on vegetation or on smaller herbaceous animals. Following this trend of thought, it is easy to see that the whole burden of food supply evolves directly or indirectly upon the plants.

It is perfectly obvious to one who has traveled that plant types and conditions show great variations over the country. It is less obvious, but well known to close observers, and quite important to ecologists, that these different plant types support animal life which is quite characteristic of that plant community. In working out the present problem, it is best to first set forth an account of primitive plant conditions in this region. With this stated, it will be easier to draw correlations with any animals life which may have been present. In

other words, if one knows what the original habitat was, he will be at an advantage in stating the faunal inhabitants. Furthermore, since plant life is the most conspicuous manifestation of living material, it follows that early journals and accounts are more inclined to give notes of floral types. This is true in the present study to the extent that the picture of early floral conditions in this area is fairly definite.

Numerous extracts from early journals are quoted in order to give a clearer picture of early conditions. Insofar as possible, the accounts concerning early plant cover are arranged in chronological order. From these accounts, it will be possible to draw conclusions and present them.

One of the earliest travelers through the Valley was Farnham, who visited here in 1839. From his journals comes the following description. He probably deals with an area farther to the north, but this gives an idea of the appearance of the whole Willamette Valley.

Its general appearance as seen from the heights is that of a rolling open plain, intersected in every direction by ridges of low mountains, and long lines of evergreen timber; and dotted here and there with a grove of white oaks. (1)

The "intersecting low mountains" which he mentions are more typical of country in the Salem vicinity, but since

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(1) R. G. Thwaites. Early western travels. Vol. XXIV.  
(2) p. 50.

he makes no mention of vicinity, it could well be nearer Corvallis, since the "open plain" aspect is more conspicuous here. By the "long lines of evergreen timber", he probably refers to the growths adjacent to the larger streams. Probably most important in this account is the mention of "white oak groves". One of the main problems of visualizing early conditions was whether or not trees were present on the main valley floor.

At one point in his journals, Franchere speaks of "a dwelling and trading house constructed on a great prairie about 150 miles up the Willamette ---." (2) This indicates a location quite close to Corvallis. The underlining is mine.

Other early travelers in the valley of the Willamette were the Englishmen, Warre and Vavasour. They give this brief but eloquent sentence.

Wide extended, undulating prairies, scattered over with magnificent oak trees, and watered by numerous tributary streams. (3)

At about this time, which was sometime between the years 1835 and 1840, one Hall Jackson Kelly viewed the Valley, and from him comes a flowery descriptive paragraph. Following a sentence, praising the natural beauty and the fertility of the soil, he says,

(2) Ibid. Vol. VI. p. 281.

(3) Joseph Schafer. Warre and Vavasour's Military Reconnaissance in Oregon. P. 11.

The whole valley of this river abounds in white oak and other valuable timber. Fringes of trees grow along the margins of the streams, and back of these are rich bottom lands or prairie ground of inexhaustible fertility, and adorned with all the wealth of vegetation. From these prairies, which are sometimes a few rods, and sometimes several miles wide, often rise round isolated hills, heavily wooded and presenting a lovely contrast to the sea of grass and flowers from which they spring. (4)

This description could easily pertain to the Corvallis vicinity. It is evident that many of these early explorers were impressed by the agricultural possibilities of the region.

A few years later, or about 1845, Palmer journeyed through the valley, and leaves his somewhat more detailed descriptions to rely upon. The following is his description of the country between the Luckiamute River and the Mary's.

Thrifty groves of fir and oak are to be seen in every direction; the earth is carpeted with a covering of luxurious grass, and fertilized by streams of clear, running rivulets---. The mountain sides are covered very heavily with fir timber. (5)

From Johnson and Winter comes this sentence:

On the upper Willamette, the country is more open and level, and is diversified with groves of Oak, Pine, and Fir, and broad and fertile plains covered with luxuriant crops of grass. (6)

(4) F. W. Powell. Hall Jackson Kelley--prophet of Oregon. pp. 284-5.

(5) R. G. Thwaites. Early western travels. Vol. XXX p. 176.

(6) Johnson and Winter. Route across the Rocky Mountain with a description of Oregon and California. p. 165.

From this quotation, one is inclined to believe that Palmer may have had reference to the more rolling terrain north of Corvallis. When he speaks of "groves" of Firs and Pines, he implies a greater abundance of these than one can envision from present conditions. However, it is true that there are still a few isolated groups of these trees (Firs), which must have been present at the arrival of the white man. Furthermore, it is quite likely that such groves were more common then. An example of such a Fir grove is Avery Park.

Returning to the general appearance of the Valley, a slightly different picture is given in Lieutenant Neil M. Howison's report on Oregon in 1846. Howison says of the Valley:

---; continuous ranges of prairie land, free from the encumbrances of trees or other heavy obstacles to the plow, stretch along, ready for the hand of the cultivator; in their virgin state, these are overgrown with fern, the height of which, say from 3 to 10 feet, indicates the strength of the soil. No felling of trees or grubbing is necessary here. (7)

The item of variation here is the mention of ferns as the virgin ground covering. This contradicts all other accounts, which state the covering to be grass. At least one logical explanation can be given for this deviation. It was the custom of the Indians, in the early days, to burn off large sections of prairie in order to facilitate

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(7) Report of Lieutenant Neil M. Howison on Oregon, 1846.  
p. 49.

their hunting. More will be said of this later, but suffice it to say here that the fern is typically the first plant in floral successions following fire, in this vicinity. It is quite probably that Howison had reference to an area which had recently been burned. Further attention should be called to Howison's obvious implication that the Valley was almost devoid of tree growth. In view of the fact that he was describing the aspect of the whole Valley, his statements can be disregarded in dealing with this local area.

One of the best descriptions of ground cover in the Valley as a whole is given in David D. Fagan's "History of Benton County, Oregon". Fagan says:

For mile upon mile and acre after acre, tall wild grasses grew in wonderful profusion--one great, glorious green of wild waving verdure--high over the backs of horse and ox and shoulder high with the brawny immigrant. (8)

He further mentions the growth of trees along the Willamette River.

In "Two Years in Oregon" by Wallis Nash, an imaginary conversation, which took place in Corvallis, about 1875, is given. The man being questioned is an old-timer, and he confirms Fagan's report by saying,

"The valley was all over bunch grass waist high, etc."

(9)

(8) David D. Fagan. History of Benton County, Oregon. p.328  
 (9) Wallis Nash. Two years in Oregon. p. 187.

When asked what the Valley was like in 1847, the old gentleman replied,

All open prairie. A man could drive seventy miles without stopping from Salem to Eugene. All this oak brush has grown up since. (10)

Of significance is his statement that all the oak brush has grown up since white man's settlement. It is quite possible that the Indians kept this down with their numerous fires.

Turning from these rather general accounts, there are a few which make specific mention of Corvallis or nearby landmarks, and hence are of more value in the present study. In 1934, John Work made a journey from Vancouver to the Umpqua River and back. His journal contains a few rather specific references to the Corvallis vicinity. In one section, he records,

Large tracts of open ground extend to the E. The road now lay along an extensive plain, some parts of it swampy, to Laurie River where we camped not far from its discharge into a channel of the Willamette. Here is an extensive plain on both sides of the river, and the mountains to the W. are nearly without wood.  
(11)

By the "Laurie River", Work has reference to the Mary's. According to evidence, the name was his own, and his method of determining the name does not appear in the literature. Opinion differs as to the origin of the

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(10) Ibid.

(11) Leslie M. Scott. John Work's journey from Fort Vancouver to Umpqua River, and return, in 1834. P. 249.

name "Mary's", which came into use around 1845. (12)  
 Continuing in Work's Journal, this small extract comes from his account of the return journey.

July 2. Fine. Continued our course  $6\frac{1}{2}$  hours across the plain to River Laurie where we camped.  
 (13)

Obviously, there is great lack of detail in these quotations, but equally obvious is the fact that Work was impressed by the "plains" aspect of the vicinity at that time.

During the early 1850's, Reverend Ezra Fisher travelled in the Valley to quite an extent, leaving his brief, but somewhat more descriptive remarks about the country around Corvallis, then called Marysville. In Reverend Fisher's correspondence of 1852, he says,

From Marysville, I followed up the valley of the most western fork of the Willamette, 70 miles through a level prairie country studded with small groves of ash and soft maple, while the hills were crowned with oak groves, but on the Willamette bottoms the balm of Gilead, white fir, and soft maple constitute the principal growth of timber. (14)

This deals with the River south of Corvallis, but indicates sufficiently that prairie stretched from the edge of the city, and that the Willamette had tree-lined banks. In referring to "a level prairie country studded with small groves of ash and soft maple", Fisher perhaps

(12) Lewis A. McArthur. Oregon geographic names. p. 409.

(13) Leslie M. Scott. John Work's journey. p. 264.

(14) Correspondence of the Reverend Ezra Fisher. p. 464.

also includes the Garry Oak, since the trees he mentioned are more characteristic of river bottoms.

From 1853 is the diary of Maria Parsons Belshaw who came to Corvallis in that year. For October 8 is this entry:

The country has about the same appearance as yesterday. Some timber some prairie--much of the land overflows in winter and spring. Camped two miles from Marysville on Cold Creek. (15)

This woman approached from the north and, consequently, did not see as much prairie as lies to the south.

Of much the same nature is a short entry taken from the Abbott Railroad Survey of 1855, as set down by R. W. Sawyer, who also approached from the north.

Oct. 25. Over a very level plain bounded by high hills to Corvallis,---. Whole country very level with much oak cedar fir and spruce timber in spots---. (16)

Sometime between 1847 and 1858, Reverend George H. Atkinson made these entries in his diary.

We crossed Mary's River and rode over a wide prairie to Mr.---. (17)

I returned from Mr. R's, crossed a large prairie 14 mi's to the mouth of the Mary's---. (18)

(15) Joseph W. Ellison. Diary of Maria Parsons Belshaw, 1853. p. 332.

(16) R. W. Sawyer. Abbot railway surveys, 1855, II. p. 125.

(17) Ruth Rockwood. Diary of Reverend George H. Atkinson 1847-1858. p. 352.

(18) Ibid. p. 353.

In concluding these quotations, a few lines from "Two Years in Oregon" are given. The author is looking east from "Old Baldy" (the bald hill west of Corvallis) toward the Cascades.

Their lowest range is about 30 miles off, and the rich flat valley between is hidden by the thick line of timber, generally fir, that fringes the farther side of the Willamette. (19)

It is now evident that, if one can keep all these accounts in mind, he will have a reasonably accurate picture of the appearance of the Corvallis vicinity, prior to the arrival of the white man. This picture will be clearer if an imaginary account of the area in early days is given.

As undisturbed by fire, the valley was of the savanna type--predominately prairie with small groves of trees scattered about. In those areas not immediately next to river or marsh the most abundant tree was the Garry White Oak (Quercus garryana). These occurred in small groves, or as solitary trees. As a matter of fact, there are Oak trees remaining in this area, which are at least 250 years old, and apparently in excellent condition. In the clearing of the land, many of these were undoubtedly cut down, and the start of others has been discouraged.

Along the streams, the vegetation was practically identical with today's. It was possibly more luxuriant

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(19) Wallis Nash. Two years in Oregon. p. 26.

and far-reaching, but he who has attempted to penetrate these growths today will not deny the abundance of vegetation. No doubt, in many low areas, the trees and shrubs have been cleared away. On the other hand, with protection from the Indian, countless areas have grown up to small trees and other plants.

Where trees did not grow, bunch grass flourished. The many eye-witness accounts of this "sea of verdure" cannot be denied. As one ascended into the nearby hills, the soil became poorer, and the grass thinned out. No doubt, its existence was further discouraged by a greater growth of trees--Oaks on the lower hills giving way to the coniferous timber of the higher ranges.

If one can erase Corvallis from the scene; if one can see the area, stripped of buildings, roads, and all of man's accoutrements; if one can replace this with trees along the rivers, tall grass in the drier portions, oak trees scattered here and there and becoming groves on the hills, he will realize the primitive scene.

The scene was not devoid of human life, for Indians lived in the area, gaining shelter and sustenance from it. Furthermore, this is only the setting. In these prairies and forests, among the branches of trees, along the rivers--lived an abundance of animal life. The next section takes up this aspect of early life.

### Faunal Conditions

In drawing up an image of the early animal life, it would be best to give very accurate ideas on the primitive abundance of the various species. Unfortunately, the difficulties encountered in trying to do so are insurmountable. For instance, if some observer says that a certain bird "occurs in great numbers in the fall of the year", there is no accurate conception of his exact meaning. In view of this, it is only practical to give some ideas of relative abundance, compared with conditions today. It is apparent after reading all the early journals that it is quite useless to deal with any animals lower in classification than birds and mammals.

A rather general account of early animal life in western Oregon is given in H. H. Bancroft's "History of Oregon".

There is an abundance of waterfowl, conspicuous among which are brant, geese of several species, cranes, mallard, canvasback, and summer duck, blue-winged and green-winged teal, snipe, golden and killdee plover, and other wading birds some of which are not palatable. Of game birds found in the woods there are also plenty; grouse, quails, pheasants, and wood-doves inhabit the thickets of young firs, and the groves of oak and fir that skirt the older and darker forest. Singing birds which make their homes in trees are rare. (20)

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(20) Hubert Howe Bancroft. History of Oregon. Vol. XXIX.  
p. 5.

Bancroft's statement deals with a period between 1834 and 1848. In this first quotation arises a problem that continues throughout all early descriptions of animal life--the problem of nomenclature. Doubtless, Bancroft refers to the Wood Duck (Aix sponsa) when he speaks of the "summer duck". His abundance of the "golden plover" is doubtful since this bird (Pluvialis dominica dominica) is an uncommon migrant on the Oregon coast, but he may have had the bird confused with another of the many shore-birds. His use of the word "pheasants" is misleading. There were no true pheasants in Oregon at that time. Possibly, he refers to the Sooty Grouse (Dendragapus f. fuliginosus) or to the Ruffed Grouse (Bonasa umbellus). "Wood-doves" is Bancroft's name for the Band-tailed Pigeon (Columba fasciata). This account covers all of western Oregon, including the coast.

Another general account comes from the journal of Charles Wilkes, who explored portions of western Oregon from 1838 to 1842:

In the spring and fall the rivers are literally covered with geese, ducks, and so forth. (21)

Farnham, traveling in 1839, gives practically the same statement. (22)

(21) Charles Wilkes. Report on the territory of Oregon. p. 287.

(22) R. G. Thwaites. Early western travels. Vol. XXIX. p. 93.

Due to the fact that the Valley has an abundance of water in the winter months, and because the temperature never drops very low during that season, it has always been quite attractive to water birds. There are many accounts from those who were impressed by the wintering flocks of waterfowl.

David Douglas, the young botanist, traveled extensively in western Oregon (including the Willamette Valley) in the years from 1823 to 1827. Although a botanist, his natural interests took in animals as well, and there are several brief references to avifauna in his journals. In regard to the waterfowl, he recorded:

The common Canadian Wild Goose, the Grey or Calling Goose, and the small white goose, are very plentiful in all lakes, low plains, and on the sandbanks of the Columbia. (23)

By "Grey or Calling Goose", Douglas referred to the White-fronted Goose (Anser albifrons), and his "small white Goose" is the Lesser Snow Goose (Chen h. hyperborea).

In an account by a resident of Salem, the author says the following of the years around 1844.

To me it seems unbelievable by a person coming here now, to state the quantity of waterfowl, cranes, curlews, and snipe which wintered on the grasses and the roots of the damp lands of the valleys and the sloughs, ponds, and streams sixty-four years ago. (24)

(23) Journal kept by David Douglas. p. 154.

(24) John Minto. From youth to age as an American. p. 152.

This was written in the early 1900's when waterfowl were still considered fairly abundant, so the comparison is obviously indicative of plentiful waterfowl in early days.

Lieutenant Neil M. Howison's report on Oregon contains this reference to the waterfowl of the Valley in 1846:

Wildfowl, from the swan to the blue-wing, are very abundant during the winter. The wild geese move over the country in clouds, and do great injury to the wheat fields upon which they determine to alight.  
(25)

So much for the waterfowl. It is evident that they were extremely abundant here in migration and as winter residents. Waterfowl are always among the most conspicuous of the birds in an area, and, therefore, probably received much more attention in these early journals than did the other birds. However, there are available several useful references to other birds. The waterfowl have been discussed first because of their importance in early accounts.

Turning to the birds of prey, there are a few records, which tend to be records of presence rather than accounts of numbers. Douglas's journal has short entries regarding various of the Hawks, Eagles, and Owls. In referring to

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(25) Report of Lieutenant Neil M. Howison on Oregon, 1846.  
p. 49.

the Bald Eagle (Haliaeetus leucocephalus), he says:

The Silver-headed Eagle is abundant all over the country where there are rivers containing fish. (26)

Douglas also refers to the "Calumet Eagle" as being found "2 south of Columbia according to Indians" (27), but the present nomenclature of this species is not available. This is the extent of very early observations on this order of birds. From "Two Years in Oregon", which covers the period immediately after white man's settlement, comes this sentence:

Eagles and hawks we have in abundance, and of all sizes. (28)

Before leaving the Falconiformes, it is well to know that the California Condor (Gymnogyps californianus) was present in this area in fair numbers during early days. (29)

The following entry from Douglas is the only early reference to the owls:

Large Horned Owl; Seems not to be very abundant. I have not seen more than twelve or fourteen. (30)

Obviously, this is the Horned Owl (Bubo virginianus), and the statement implies a good number in spite of Douglas's doubt as to their abundance. The nocturnal

(26) Journal kept by David Douglas. p. 152.

(27) Ibid. p. 155.

(28) Wallis Nash. Two years in Oregon. p. 97.

(29) Gabrielson and Jewett. Birds of Oregon. p. 180.

(30) Journal kept by David Douglas. p. 154.

nature of owls makes it difficult to see even one or two.

A statement by Douglas of the occurrence of the Mountain Quail (Oreortyx picta) on the Willamette River is the only specific early record of gallinaceous bird life. (31)

A single reference to the Band-tailed Pigeon is made in Townsend's Narrative:

The large band-tail pigeon (Colomba fasciata) is very abundant near the river, found in flocks of from 50 to 60, and perching upon the dead trees along the margins of the streams.--- In the course of the morning and without leaving our canoe, I killed enuf to supply our people with provision for two days. (32)

Concluding these all too scanty records is another entry from Douglas regarding the Coast Jay (Cyanocitta stelleri carbonacea), in which he mentions the bird as occurring in flocks of 30 or 40, and visiting the dung-hills of the Indian villages. (33)

It is unfortunately evident at this point that early records throw very little light upon the actual numbers or abundance or early bird life. Of early ornithologists, several visited Oregon, but their activities were confined more to eastern Oregon and to territories adjacent to the Columbia River. Lewis and Clark, Townsend, Nuttall, Audubon and others left their records in this state. In later years, Bendire, Henshaw, Mearns, etc. made

(31) Ibid. p. 153.

(32) R. G. Thwaites. Early western travels. Vol. XXI. p. 320.

(33) Journal kept by David Douglas. p. 153.

ornithological investigations. To the detriment of the present study, their work was done in other areas of the state. However, in reconstructing an early condition of bird-life, it is possible to use the records of these men, because a large number of the species to which they referred were distributed as they are today.

As stated before, the waterfowl element attracted the most attention in early days. Undoubtedly, their numbers were enormous. Had one been able to travel through the Valley in a winter near 1800, he can hardly imagine the scene. In the sloughs, ponds, and quiet portions of the rivers, vast flocks of ducks fed noisily. Overhead, they patterned the sky with widespread flocks. Species were numerous. Geese were probably much less numerous, but none the less abundant. Snow Geese and White-fronted Geese occurred with larger numbers of the various varieties of the Canada Goose (Branta canadensis).

In spring, most of these great hordes departed for their breeding grounds, but there remained a fair percentage of ducks which bred in local sloughs and marshes. With them were other water birds as herons, coots, rails, plovers, etc.

Turning to the so-called land birds, the birds of prey were well represented. From the lordly majesty of the California Condor to the darting Sharp-shinned Hawk

(Accipiter velox), these hunters coursed over the land, seeking their respective prey. In later sections of this paper, when present numbers are brought out, it will be possible to be more specific as to early abundance. One can compare then, and give an idea of these primitive numbers in the light of present day conditions.

The grouse and the Mountain Quail were probably abundant in the forest or at the forest's edge. In the trees above them, the Band-tailed Pigeon occurred in good-sized flocks. Of the remaining orders which now occur here, suffice it to say here that, inasmuch as conditions were favorable, they were present then. To this statement must be made some exceptions for introduced birds and others, influenced by the white man. These are among the objects of this study, and will be returned to in later pages.

There remains in this division of the discussion the early abundance of the mammals. Fortunately, there are more abundant references to certain of these, because they furnished many an early traveler with food and livelihood. In fact, the first travelers into the Northwest were attracted by the prospect of an abundance of fur-bearing animals. So intensively were these sought after, that they were very appreciably diminished, even before the beginning of settlement:

First of the natural products which attracted people to the Northwest Coast was furs.--- Later, other men came overland to establish posts which would serve as gathering points for those engaged in trapping the fur-bearing animals that were found in great abundance along every stream of the Oregon Country. After about 50 years, the beaver, the sea otter, and other such fur-bearing animals were almost exterminated, and the regions resource of furs was nearly exhausted. (34)

Traveling in the Valley as early as 1839, Farnham noted a decrease in the fur-bearers as he testifies in the following passage:

Abundance of game exists such as elk, deer, antelope, bears, wolves, foxes, musk-rats, martens, bears, and siffleurs---.

The fur-bearing animals are decreasing in numbers yearly, particularly south of the parallel of 48°; indeed it is very doubtful whether they are sufficiently numerous to repay the expense of trapping them.--- They have decreased, owing to being hunted without regard to season. (35)

In addition to observing a decrease, Farnham was remarkably long-sighted in attributing this to trapping at all seasons of the year.

Proceeding on to the analysis of general abundance and somewhat enlightened by the above quotations, one finds several accounts of the vicinity, referring to a period in the early 1800's. Sometime in these early years, a post was established on the Willamette by the Hudson Bay Company in order to supply the Columbia River post with meat. The

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(34) Clark, Down, and Blue. A history of Oregon. p. 13.

(35) R. G. Thwaites. Early Western travels. Vol. XXIX. p. 93.

location of this establishment is not definitely known, but evidence points toward its being very close to the present location of Corvallis. Bancroft, in his "History of the Northwest Coast", has the following to say:

---furnished fur-hunters throughout the whole Columbia region well nigh all they had in the shape of delicacies. ---- Hunters were constantly kept there to bring in deer and elk, and men to dry the meat for the use of the factory. (36)

Further proof of the abundance of wildlife around the Willamette post is given in Perrine's "Early Days on the Willamette". A few quotations give a glowing picture of early animal life. On page 304, he says:

By the end of the year 1812, provisions were beginning to get low at Astoria and as the valley of the Willamette was a veritable hunter's paradise, a party headed by William Wallace and J. C. Halsey started for there on Nov. 23, 1812. (37)

---thought best to send some of the men to pass the rest of the winter with Wallace and Halsey on the Willamette, where game was plentiful. (38)

Reed and Seton returned to Astoria on the 20th of March, bringing with them a quantity of dried venison, and they described in glowing terms the wonders of the Willamette Valley, and told of the abundance there of beaver, elk, and deer. (39)

Of the results of this meat-getting expedition, he has this to say:

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- (36) Hubert Howe Bancroft. History of the Northwest Coast. Vol. II. p. 244.  
 (37) Fred S. Perrine. Early days on the Willamette. p. 304  
 (38) Ibid. p. 305.  
 (39) Ibid. p. 305.

On May 25, 1813, Wallace and Halsey and their party returned from the Willamette, bringing with them the first results of the Astoria venture, seventeen packs of furs and thirty-two bales of dried venison. (40)

Unfortunately, one is not at all sure that this post is the same one as Bancroft speaks of. It is quite possible that it was located much further north than Corvallis. However, it seems logical that an abundance of game would be more or less scattered and not confined to one or two favored regions.

From the Journals of David Douglas come a few brief remarks on the mammals. One who reads Douglas's Journal will notice how often he mentions killing a deer or two for food. The impression is given that deer were almost universally abundant in western Oregon. Of the White-tailed Deer (Odocoileus virginianus), now so scarce in Oregon, Douglas says,

--- called by the hunters le Chevreuil or Jumping Deer is found in most parts of the Columbia; it is of a light gray and white on the belly and inside of the legs with a very long tail, a foot to 15 inches---. Great numbers are killed on the Multnomah or Willamette River, one of its southern branches. (41)

Following this, he says,

The other, the Black-tailed Deer is not so abundant as the former, ---. (42)

Of the elk, Douglas records:

(40) Ibid. p. 306.

(41) Journal kept by David Douglas. p. 155.

(42) Ibid. p. 155.

The variety of species of quadrupeds are not I think so great as in many other parts of America. The Elk (which the hunters say agrees with the Biche of the other side) is plentiful in all the woody parts of the country ---. (43)

Douglas also makes mention of a "singular species of Fox" found on the Willamette. From his description in which he includes a description of the tree-climbing ability of the animal, it is evident that he had reference to the Gray Fox (Urocyon cinereoargenteus).

A brief but more specific reference to local conditions comes from the accounts of John Work. The entry for July 3 is as follows:

Fine. Sent in the morning to an Indian Village below to see if they had any beaver. 10 of them visited the camp and traded their beaver. (44)

Since Work was camped on the Mary's River, this entry is valuable in indicating the presence of beaver in the Corvallis vicinity.

A less rosy picture of abundance is given by Lieutenant Howison, who traveled in the Valley in 1846. This was the year of devastating fires in the Coast and Cascade ranges, and it is quite possible that Howison witnessed the result of these fires. He says:

I was surprised to find so great a scarcity of game in this country. I lugged a heavy gun more than a hundred and fifty miles through the Willamette Valley, and in all that ride saw but three deer. Wolves are numerous, and pray upon other animals so that the

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(43) Ibid. p. 155.

(44) Leslie M. Scott. John Work's journey. p. 264.

plains are entirely in their possession. The little venison I saw in Oregon was poor and insipid; a fat buck is a great rarity. Elk are still numerous, but very wild, living in the depths of the forest, or near those openings which the white man has not yet approached. --- Black Bear are very common and destructive to the farmers' pigs. (45)

In "Ten Years in Oregon", the author has this paragraph, which, though undated, probably refers to a fairly early period in the history of the Valley:

As no hunters had visited the valley for sometime, they found fresh signs of the beaver, and otter, numerous flocks of wild fowl, and herds of deer were scampering, all hours of the day, over the beautiful plains. (46)

In drawing conclusions from these eye-witness accounts, it is evident that one can do considerable speculating on the numerous forms which are not mentioned. There is no intention of doing so. It is hoped that future sections of this paper can bring out the effects of the white man on these animals, but it is quite evident that to attempt to state original numbers would be foolhardy.

If the logical assumption is made that a state of balanced nature existed in early days, it is also logical to assume that most of the animals present here today were there then. They were all held within reasonable numbers by their natural enemies, competition for food, etc. To these, of course, can be made the notable exceptions of

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(45) Report of Lieutenant Neil M. Howison on Oregon, 1846. p. 49.

(46) A. J. Allen. Ten years in Oregon. p. 126.

introduced mammals like the Brown Rat, the House Mouse, and the domestic Cat. There may be other exceptions, to which problem this paper will turn in later pages.

Of the mammals that were noticed in early days, the deer and the elk are conspicuous. The Roosevelt Elk (Cervus canadensis occidentalis) occurred throughout the Valley and could often have been seen in the Corvallis vicinity. The White-tailed Deer was a deer of the brushy lowlands and the low foothills. Probably it was never abundant because of predators, but it was a common sight along the rivers in the early days. The Black-tailed Deer (Odocoileus hemionus columbianus) was found most often in the deeper woods, and was not so commonly seen in the lowlands around Corvallis.

Among the carnivores, the Cougar (Felis concolor) was probably a regular visitor from the Coast Mountains, but preferred the denser cover of those areas to the more open aspect of the Valley. The Bobcat (Lynx rufus) must have been reasonably common in the wooded areas, with its larger cousin, the Canada Lynx (Lynx canadensis) occurring rarely from the mountains. The Wolf (Canis lycaon) was abundant because there was plenty for it to feed upon, and it had few enemies.

The original status of the Coyote (Canis latrans) is a matter of doubt. It has been said that the Coyote is kept

in a reduced state in western Oregon by Salmon poisoning. Since Vernon Bailey claims that the original Indian dogs fed on fish with impunity, it seems reasonable that the Coyotes were able to do likewise. It can be assumed that they were present, but were not abundant because of competition from the more powerful Wolves.

Both the Red Fox (Vulpes fulvus) and the Gray Fox were present. The former was probably quite uncommon, whereas the latter occurred more frequently.

Of the animals valuable for their furs, the Beaver (Castor canadensis) is probably the most famous. The streams in this vicinity were once well stocked with this interesting and valuable animal. The Otter (Lutra canadensis), the Muskrat (Ondatra zibethica), and the Mink (Mustela vison) lived in the streams and added to the "bag" of the early trapper. It was these animals that were so greatly reduced by trapping before the influx of settlers.

Of the remaining mammals--the hares, the rabbits, the chipmunks, the squirrels, the mice, the gophers, the moles, etc.--it can only be reiterated that they were doubtless present. The mere presence of the carnivores attests to something upon which they fed. Without doubt, these natural enemies kept the smaller mammals within inconspicuous limits.

### Effect of the Indian

Before arriving at a conclusion on early fauna, it is necessary to consider the original human inhabitant--the Indian. In primitive nature, the Indian tends to fit into Nature's scheme of balance. In the present study, however, the aborigines introduced at least one factor which cannot be disregarded. This factor was fire. Douglas made note of this in his Journal as follows:

---. Started at nine and continued in a southerly direction, on the opposite side of the hill from where we were yesterday. Most parts of the country burned; only on little patches in the valleys and on the flats near the low hills that verdure is to be seen. Some of the natives tell me it is done for the purpose of urging the deer to frequent certain parts, to feed, which they leave unburned, and of course they are easily killed. Others say that it is done in order that they may better find the wild honey and grasshoppers which both serve as articles of winter food.  
(47)

In his article on "Forest Fires in Western Washington and Western Oregon", William G. Morris quotes from S. A. Clarke, who says that these fires served dual purposes for the Indians:

One was, to keep down all undergrowth, so that hunters could see game from a great distance; another, that no hostile war party could approach unseen. This was the chief reason, but they also made it the occasion for a grand hunt to secure an ample meat supply for the winter. (48)

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(47) Journal kept by David Douglas. p. 214.

(48) William G. Morris. Forest fires in western Oregon and western Washington. p. 317.

As a further testimony to the prevalence of this practice, it is mentioned by John Work on his journey of 1834. As with other of Work's accounts, which have been used, this is of extra value because it mentions a nearby landmark--the Mary's River (Work's "River Lauries"). He says,

July 2. Fine. Continued our course  $6\frac{1}{2}$  hours across the plain to River Lauries where we camped. The Indians set fire to the dry grass on the neighboring hill, but none of them came near us. The plain is also on fire on the opposite side of the Willamette. (49)

J. B. Horner, in a history of Oregon, cites the fire of 1846 as being the worst fire which ever occurred in western Oregon. Since at this date, settlement by the white man was well started, it is not possible to attribute this to the Indians. In fact, it is partial attestation to the fact that the Indians were careful to control their fires.

If these fires were of regular occurrence, and it seems quite plausible that they were, they undoubtedly had a detrimental effect upon the smaller animals. Protective cover, following a fire, would have been quite scanty, thus exposing these animals to their natural enemies. To some extent, this would apply to the larger animals. In view of this fact, it is necessary to revise the picture of a state of balanced nature in the burned areas. Here, certain predators as hawks, wolves, bobcats, etc. would thrive at

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(49) Leslie M. Scott. John Work's journey. p. 264.

the expense of small birds, small mammals, and many of the larger animals such as deer. The killing by the Indians of deer for food was not of great consequence, since their methods were not very efficient, and their numbers were restricted.

Turning from the fires to more direct effects by the savage upon game, it has already been brought out that Work bought beaver pelts from the Indians. In a natural state, the Indians probably trapped but few fur-bearers. It was the incentive given by white buyers which increased their trapping activity. By this time, they probably only helped in a depletion, carried on mainly by the more efficient white fur-hunters.

Townsend made note of the Indian method of catching Swans on the Columbia River near Vancouver. The account is given here, more for its interest than for its import:

--- Indians have adopted a mode of catching them which is very successful; that of drifting upon the flocks at night, in a canoe, in the bow of which a large fire of pitch pine has been kindled. The Swans are dazzled and apparently stupefied by the bright light, and fall easy victims to the craft of the sportsman.  
(50)

Thus did the aborigine pit his puny weapons successfully against the alertness and cunning of the wild. Undoubtedly, similar ingenuity was exercised against other wild creatures. It is not necessary to recall the old

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(50) R. G. Thwaites. Early western travels. Vol. XXI.  
p. 335.

story of the sportsmanship of the Indian, other than to say that the animals they killed for food and clothing probably didn't make a great deal of difference in the original numbers of wild animals.

This completes a rough description of the stage onto which the white man came as a settler. If the description has seemed inadequate, it is unfortunate but unavoidable. When settlement began, certain species of the wild life were already sadly depleted by earlier hunters and trappers. Whether this trend was continued or altered by the settlers is the problem of the remainder of this paper.

## Chapter II

### The Beginning of Settlement

On the heels of the early fur-trappers and explorers, came the more permanent settlers. The wonderful agricultural possibilities of the Willamette Valley were a main attraction. The migration of 1843 is spoken of as the one which started the settling of the Valley. Prior to this date, only about thirty American families were resident here.

Dealing more specifically with the city of Corvallis is this statement concerning the founding of the city:

Corvallis owes its existence to the efforts and labors of J. C. Avery, ---. (51)

On the same page is recorded:

---long and hazardous journey across the plains to Oregon and secured a claim at the junction of the Willamette and Mary's River. In 1846 he moved onto this and built.

Corvallis was first called Marysville, but this was changed to the present name in 1853 to prevent confusion with Marysville, California. The growth of the town was well under way by 1850. These extracts from the book, "Bushrod Washington Wilson", tend to show this growth:

Marysville at the time Bushrod came was very small. The upper part of the Willamette Valley was just beginning to be settled in 1850, and the census of that year shows that there were only 149 families in

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(51) Portrait and biographical record of the Willamette Valley, Oregon. p. 869.

Benton County which at the time extended south to the California line. Corvallis consisted of the homes of J. C. Avery and James F. Dixon, a log schoolhouse, in which A. G. Hovey taught school, and of the store of Hartless and St. Clair. Solomon K. Brown, Nicholas Ownby, and Nicholas Martin lived at the juncture of the Muddy and Mary's River. (52)

A year later, this is said of the city:

We have a saw mill and a grist mill here, 14 houses, 5 stores, 1 tavern, 2 blacksmith shops, 1 cooper, 1 carpenter, 1 fanning mill, and 20 buildings going up where last fall there was only two houses, one old log and one split board house. (53)

Thus began the influx of the white man. The earliest population figure available is for 1886, when the number of people in Corvallis was put at 1,200. It is natural to assume that the rural population increased accordingly. Wheat-raising was begun early and was almost exclusively adhered to. In his "History of Benton County, Oregon", Fagan says:

Except the small portion of gravel and clay swales, the prairies of the Willamette are the finest agricultural lands known. They are diluvium----. Whenever granite molders away, there is a strong wheat soil. (54)

Modern agronomists might disagree with his superlatives, but there is no doubt that the floor of the Willamette Valley offered wonderful agricultural possibilities.

The early settlers were not too busy with their land-clearing and farming to disregard the wild game. At

(52) Bruce Martin. Bushrod Washington Wilson. p. 274.

(53) Ibid. p. 275.

(54) David D. Fagan. History of Benton County, Oregon. p. 307.

least two reliable sources furnish testimony as to the abundance of game in those early days. From "Two Years in Oregon", by Wallis Nash, come several references to early animal life and early hunting. Since the author lived in Corvallis during the time of which he writes, his observations are more valuable in this study. On page 97, he says

Among the game birds may be included the blue crane, which flies in bands of from ten to twenty, high in the air. But it does not remain here and is only killed by chance.

Although "blue crane" is a name often given to the Blue Heron (Ardea herodias), Nash probably has reference to either the Little Brown Crane (Grus c. canadensis) or to the Sandhill Crane (Grus canadensis tabida), both of which migrated through western Oregon in early days. On the same page, Nash mentions the killing of a Bittern, which he refers to as Ardeidae minor.

Of the waterfowl, Nash has considerable to say. On page 95, he speaks of the fall migration:

First come the mallard and his mate (Anas boschus), in small bands; next follow the whistling and the common teal (Querquedula cyanoptera and Nettion carolinensis); then the pintail (Dafila acuta) in great bands; following these the wheat duck, or gadwall (Chaulelasmus streperus), in multitudes; then, at a short interval, the redhead (Fuligula athya amerivana) and the black duck (Fulix affinis).

In addition to these, he mentions the Wood Duck (Aix sponsa). The classifications in the quoted section are as taken from his book.

The "whistling teal"; which Nash classified as *Querquedula cyanoptera*, is now called the Cinnamon Teal and is considered to be a bird of eastern Oregon only. His "common teal" is the Green-winged Teal (*Nettion carolinense*). By the "Black Duck", he probably means the Ring-neck Duck (*Nyroca collaris*) or the Lesser Scaup Duck (*Nyroca affinis*). Aside from these technical difficulties, it is evident that all these species occurred in fair numbers. He also speaks of the great numbers of geese, and says, on page 94,

The geese are sorely destructive to the autumn-sown wheat; the farmer welcomes the sportsman from selfish motives, as well as from his usual hospitality.

On the same page, he says that the wild geese were mainly of one species, which he called *Bernicla canadensis*, and which is now the Canada Goose (*Branta canadensis*). He writes of a few Snow Geese appearing now and then. On page 95, he refers to waterfowl shooting:

Our favorite sport in winter is flight-shooting--killing the geese and ducks as they fly round the swamps at evening, ---.

Turning to the gallinaceous birds, there are several references. On page 92, Nash speaks of the Sooty Grouse when he writes,

In harvest time the grouse (*Tetrao obscurus*), here called the Partridge, come down from the fir-woods to the grain-fields and give good sport.

He mentions flocks of 10 or 12 of these birds. In referring to the Ruffed Grouse, Nash says, on page 92,

The ruffed grouse (*Bonasa sabinensis*), --- frequents the oak-grubs and scattering brush of the foothills, and is found all through the less dense portions of the woods of the Coast Range.

He also mentions the Mountain Quail on page 91. One shorebird is written of when he says of the Wilson's Snipe (*Capella delicata*), on page 95,

We have the snipe (*Gallinago Wilsonii*) in our marsh-lands, but not in large numbers, ---.

Fortunately, Nash has a few references to the non-game birds, and mentions two species of woodpeckers as being common (p. 98). From his descriptions, one is either the Gairdner's Woodpecker (*Dryobates pubescens gairdneri*) or the Harris's Woodpecker (*Dryobates villosus harrisi*), and the other is the Northwestern Flicker (*Colaptes c. cafer*).

On page 91, Nash says of birds,

--- here, in Oregon, we have abundance, except of singing birds. Of these last the meadowlark is almost the sole example; ---.

Despite this statement, however, he mentions several of the smaller birds briefly. Among these are references to the Rufous Hummingbird (*Selasphorus rufus*) (p. 99), "blue-jays", by which he probably means the Coast Jay (p. 98), "yellow birds like canaries", which must refer to the Willow Goldfinch (*Spinus tristis salicamans*) (p. 98),

Oregon Towhee (Pipilo maculatus oregonus) (p. 99), and Bullock's Oriole (Icterus bullocki) (p. 98). A further reference to perching birds is made when he says,

Flocks of little bluebirds (Sialia mexicana) frequent the town, the whole of their plumage a bright metallic blue. (p. 98)

Sialia mexicana is the Western Bluebird, but his description is more characteristic of one of the swallows. The exact species of this bird must be left undecided.

Turning from birds to mammals, Nash's book contains several references, most of them dealing with big game. Chief among these were the deer and the elk. On page 41, he makes this statement:

The woods in front of the hut across the valley were a sure find for deer, and we could kill one most any day ---.

On a later page, he speaks of hunting deer with hounds around Mary's Peak (p. 73). The following quotations deal more specifically with the deer, and include several valuable insights on the effect of settlement. Of the Black-tailed Deer, he says, on page 77,

The common deer of Western Oregon is the Black-tailed (Cervus columbianus). In the early spring many of them leave the mountains and traverse the valley-land to the closely timbered sloughs and brush bordering the Willamette River. But, as the valley has been more closely cultivated and the farms spread in a nearly unbroken line, the deer have but a poor chance. ---. But, away in the hills, I do not hear that the number is appreciably diminished; many of the hunters get a deer almost every time they go out. So wasteful are they that they carry off only the hind quarters, --- and the hide, leave the forequarters

and head ---.

Of the other species of deer then inhabiting the Valley, the White-tailed Deer, Nash has this to say:

The white-tailed deer (*Cervus leucurus*) is now very rare. He frequents the more open spots; he chooses the bare slopes at the top of Mary's Peak and the Bald Mountain; he is not so shy as his black-tailed brother, and so falls an easier victim to the rifle. (p. 78)

Although the White-tailed Deer is generally considered as having been a deer of the valley floor, Nash's supposition as to why so many more were killed than of the Black-tail, is probably correct. He speaks later of the elk herds in the mountains to the west and gives this graphic account of their slaughter:

I have known men, not usually cruel or excitable, to get so maddened in a scene like this, that seven great elk lay dead together before they thought of stopping firing; and yet they knew that from the wilderness they stood in, it was impossible for them to carry off the meat of even one. (p. 80)

No doubt, such indiscriminateness played its part in the later scarcity of this animal.

A very similar picture of the large mammal situation is given by David D. Fagan in his "History of Benton County, Oregon", published in 1885. On page 314, he gives this discussion of the deer:

--- deer hunting in Benton County is restricted to that portion through which the Coast Range runs. At no very distant date, deer were to be found anywhere in the Willamette valley, but the influx of settlers and the irresistible advance of civilization have driven them into the wilder recesses of the mountains.

Though at times, and especially in the early spring, deer may be seen traveling from the mountains to the sloughs, and densely timbered spots bordering directly on the Willamette, these same deer are observed in the autumn on their homeward journey. But they are few and far between and as years advance the likelihood of meeting with any migrating will be considerably lessened.

The white-tailed deer (*Cervus leucurus*) though plentiful in early days is now becoming very rare, owing probably to the fact that they seem to prefer to range the more open country of the foothills and so fall easier victims to the deadly rifle.

On the following page, he says of the elk,

There is yet another of the deer tribe to be found in Benton County; the Wapiti (*Cervus canadensis*) or as it is commonly known throughout the west--the elk. This splendid quarry is now only to be met with in the wild and densely timbered spots around Mary's Peak, Table Mountain, and a few other mountains of the range.--- We had heard of instances where 15 or 20 of these kings of the forest were left lying to spoil, where they were shot.

He goes on to mention the Black Bear (*Euaretos ameri-*  
*canus*) as being plentiful to the extent of harassing the flocks of sheep and goats. The Cougar was present in the mountains, and "the wildcat, beaver, otter, fisher, and mink make up the list." (55)

Even at this early date, it is apparent that the larger mammals were greatly reduced by actual killing and by narrowing down of favorable range. These reports deal with a period when the population of the city of Corvallis was less than 1200. By 1900, the population was 1,819 and it has continued to increase until it now numbers around

(55) David D. Fagan. History of Benton County, Oregon.  
p. 316.

9,500 inhabitants. Something of the conflict between the white man and wildlife has already been seen. With a steady increase in population, an intensified conflict was inevitable. The remainder of this paper turns to a consideration of what this conflict has amounted to.

## Chapter III

## Effects of the White Man's Settlement

Introduction:

In considering the effect of the white man on wild animals, it can best be handled under four headings. These are more for convenience than for explicitness and are, therefore, quite general. Doubtless, they overlap to greater or lesser degrees, but they are separated enough to demand individual discussions. Following is an annotated list of these divisions, explaining briefly their meaning:

Hunting, trapping, etc.--Since the proverbial cave-man first went forth and clubbed the primitive deer to death, men have hunted. In most areas of the United States, hunting is no longer a necessity for the purpose of getting food. Whether due to instincts or neuroses, it is an established fact that a large percentage of modern men go into the field and shoot wild animals for sport. Of a more practical nature is the trapping of the fur-bearing animals for profit. What has been the effect of these practices upon the wild animals--both game and non-game?

Agriculture--The advantages of the Willamette Valley as a farming region have already been touched upon. The

process of farming requires the utter disturbance of large tracts of land. It involves clearing, plowing, seeding to crops, etc. Such an upheaval must surely affect the faunal inhabitants. To what extent?

Progress and industry--Within the scope of this title is included mainly the effect of a city upon the wild animals, and to some extent the effect of railroads and highways.

Education--Although closely allied to the above subjects, this title covers certain phases that merit distinct discussion. The presence of a large college in the town, controlling considerable land in the environs, has its effect. Furthermore, one must consider the effect of various teachings propounded in the schools and elsewhere. The term, education, does not imply a close adherence to schools, for education is far more widely available now.

The remainder of the paper takes up the effect of the white man's settlement as viewed under these four headings.

#### Hunting, trapping, etc.

The fact was mentioned, earlier in the paper, that there are a large number of reports to the effect that our wild animal life is greatly depleted. Most of these reports place the blame indirectly or quite directly upon hunting and trapping. There is no doubt that certain forms have suffered greatly under the guns and traps of the white

man. There is much more doubt as to where the effects of hunting are overshadowed by other factors. An effort will be made here to give some idea of the extent of this direct persecution in the Corvallis vicinity.

As has been seen, many of the larger game animals were killed for food by the first white men coming into Willamette Valley. The fur-bearers were trapped without thought of restriction for the sake of money. As time went on, the large mammals were less needed for food, but their killing was continued under the guise of sport. The fur-bearers were given a little respite from the intensive efforts of the early trappers, but they were greatly reduced in numbers.

As settlement increased, it became evident that, for some reason, game was not so numerous as it had been. As a result, those who were observing decided that the killing must be cut down, and hunting and trapping laws resulted. It is probable that earlier laws were put into effect, but in 1911, the Oregon legislature established a Fish and Game Commission. These men were to regulate the welfare of the game. They were given full power to enforce all laws of the state, respecting the protection, preservation, and propagation of fish, game animals, game and non-game birds within the state.

Based, no doubt, on experience in eastern states, the early hunting laws were fairly drastic. The earliest available record of these laws is from the years, 1917 and 1918. Even at that date, bag limits, possession limits, and open seasons were quite favorable to the animals. Some species, such as the Beaver, were protected at all times in Benton county. In later years, these laws were changed in part or added to, in order to suit changing conditions. (It is unfortunately true that these changes usually came too late to be of fullest benefit.)

A detailed discussion of the State's hunting laws is not of great benefit in showing the effect of hunting. It should be brought out that the effect of early-day hunting was to make the hunting laws necessary for continued survival of the game. The present game code of Oregon gives witness to the many illegal practices that the laws have had to control. Regulations concerning wanton waste of game, construction of blinds, use of aeroplanes, size of shot, trespassing, disguising of sex of game, and poisoning are a few of the restrictions designed to prevent an excess of killing.

Fortunately, men have not stopped at restrictive laws where hunting is concerned. In the desire for more hunting, they have attempted, sometimes successfully, to introduce new game species; to produce more game on game

farms; and, more recently, to manage game scientifically. The last mentioned will be dealt with under the heading of Education.

Probably the most famous exotic in the Corvallis vicinity is the Chinese Ringneck Pheasant (Phasianus colchicus torquatus). This bird was first successfully established in the United States in 1881, when 26 birds were liberated near Peterson's Butte, some 25 miles east of Corvallis. Other plantings have succeeded and spread, and the bird is now a common sight in the fields surrounding this town. On page 226 of "Birds of Oregon", Gabrielson says that the birds have decreased to quite an extent in late years. However, there has been no hunting of these birds for the last two years, due to a closed season. The result of this protection seems to be a decided increase in numbers of Pheasants. Two other introduced species, the Valley Quail (Lophortyx californica vallicola) and the Eastern Bobwhite (Colinus virginianus virginianus) are also protected by closed seasons in Benton County.

It was not possible to find any accounts of conflicts between Pheasants and the native grouse. It is possible that conflict may occur between the Pheasant and the Oregon Ruffed Grouse where the ranges of these birds overlap.

Several game farms are maintained by the Fish and Game Commission of Oregon. Within the scope of this study, the

Ringneck Pheasant seems to be the only game bird which profits by this system of rearing in captivity and then liberating. In the fiscal year 1938-1939, 2,159 Pheasants were liberated in Benton County. During 1939-1940, 2,848 birds were released. No other animal species has received such beneficial treatment in Benton County. A possible exception is the Beaver, which will be dealt with later.

Before drawing conclusions on the effect of hunting, the practice of killing "vermin" and predators should be mentioned. These are the birds and mammals which sportsmen, bird lovers, and ranchers feel are detrimental to whatever type of animal life they are personally interested in. In addition to considering the effect of actual killing upon the animal involved, one must also consider the possible effect upon the smaller species, which are relieved of predator pressure.

Retaining in mind the earlier accounts of hunting and trapping, plus the preceding general account of the effects of hunting, it is now possible to state conclusions concerning specific animals or groups of animals. Following is an annotated list of the families of birds and mammals most affected by hunting, in the Corvallis vicinity.

Family Ardeidae: Herons, Egrets, and Bitterns. Although protected by law, these birds are often accused,

usually falsely, of being harmful to the game fish. The California Heron (Ardea herodias hyperonca) is a large and conspicuous form and has been greatly reduced by conscientious fishermen and by small boys with rifles.

Family Anatidae: Ducks, Geese, and Swans. It is well known that this group contains many of the favorite game birds. It is further established that the numbers of waterfowl are greatly reduced over the whole North American continent. The effect of local hunters has been in cooperation with hunters over the continent as a whole. This cooperation has consisted of overshooting in early days, leading to the many restrictions of today, which seem to be gradually increasing the waterfowl. Aside from this so-called cooperation, the Wood Duck (Aix sponsa) is probably almost as numerous as it ever was, because it is entirely protected and it finds very favorable nesting conditions in the Corvallis vicinity. Vast flocks of Canada Geese congregate in the Willamette Valley in the winter, but seem well able to resist overshooting. In conclusion, waterfowl in the Valley are greatly reduced, but local hunting has had no great effect except in conjunction with continent-wide hunting, since most of the waterfowl are highly migratory.

Family Cathartidae: Vultures. The Turkey Vulture (Cathartes aura septentrionalis) is still numerous. Man

tends to protect this scavenger of dead animals. As long as sheep or other animals die, the Vulture will be present. The disappearance of the California Condor is probably due partly to shooting, but the bird was probably a vanishing race before the coming of the white man.

Family Accipitriidae: Kites, Hawks, and Eagles. Many birds of this group are on the sportsmen's "black list", and are shot at every opportunity. Every hawk except the Sparrow Hawk (Falco sparverius) has been greatly reduced by shooting. The Sparrow Hawk is quite common in the Corvallis vicinity, and is probably not reduced greatly below its primitive numbers. Douglas's "Silver-headed Eagle" is now a very rare sight in the vicinity, and has probably suffered more because of size and conspicuousness.

Family Tetraonidae: Grouse. The Sooty Grouse has been the greatest victim of hunting. The following account, from a time when they were fairly abundant, gives a clue as to one reason for their depletion.

But with the sooty grouse it is different. He is larger and somewhat slow of flight, and in early days at least, before hard experience had taught him the ways of man, was a fool-hen too. Men, still young today, tell you that in their boyhood they have actually killed the fledglings of these birds with sticks as they fed about shocks of wheat. Others tell of shooting whole flocks, picking them off, one by one, from a fence or tree-branch, down to the last bird.

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(56) Shaw, W. T. The China Pheasant in Oregon.

The bird now exists in greatly reduced numbers in the higher forests and in the fir groves of the Valley floor. The Ruffed Grouse, being a game bird, is reduced in numbers, but is still commonly seen in brushy areas surrounding Corvallis. Both species are now protected, and may be increasing slightly.

Family *Perdidae*: Partridges and Quails. The existence of quail in the Valley may be indirectly due to hunting. They may have been introduced as a possible new game bird by sportsmen. The Valley Quail and the Bobwhite are both well established, with the former occurring more frequently in the edges of and around the city.

Family *Phasianidae*: Pheasants. The Ringneck Pheasant has already been discussed. The bird is quite abundant, and is greatly assisted in its increase by game-farm liberations and by protection from hunting.

Family *Gruidae*: Cranes. Only migratory in the Willamette Valley; both the Sandhill Crane and the Little Brown Crane are now rare sights. A small flock of the latter winters about thirty miles to the southeast of Corvallis. Hunting over the whole continent has diminished these birds almost dangerously. Local hunting probably had little effect, since the birds usually passed over high in the air.

Family Charadriidae: Plovers, Turnstones, and Surf-birds. Of this group, only the plovers are of interest in this study. The former status of these birds in the area is a matter of doubt. All of the larger plovers were formerly shot as game birds. Today, the Killdeer (Oxyechus vociferus) is the only plover seen around Corvallis. They are seen regularly throughout the year, and are probably increasing under the present closed season upon their kind. It is very doubtful that the Golden Plover (Pluvialis dominica) or the Black-bellied Plover (Squatarola squatarola) ever occurred commonly in the Willamette Valley. There are no authentic records to indicate that they did.

Family Scolopacidae: Snipes and Sandpipers. As in the case of other migratory game birds, local shooting has only played a proportional part in the decrease of the Wilson's Snipe (Capella delicata). Although frequently seen in the Corvallis area, especially in the winter, this bird is still on the hunting list, and is much less common than formerly. The Greater Yellowlegs (Totanus melanoleucus) was formerly on the game list, and it is possible that hunting has been a great reducing factor. They are now of rare occurrence in the Willamette Valley.

Family Columbidae: Pigeons and Doves. The Band-tailed Pigeon is still subject to an open shooting season. Gabrielson and Jewett (p. 325) say that the bird was once reduced to far fewer numbers than it enjoys today, but this does not deny the fact that it is still much below its primitive numbers.

Family Strigidae: Typical Owls. Although shot at almost every opportunity, these birds are more or less protected by their nocturnal habits. Horned Owls are shot occasionally and are often displayed on fences as a possible warning to other vermin, or as testimony to the prowess of the hunter. The Short-eared Owl (Asio flammeus) is quite diurnal in its habits and is often shot with other "vermin", despite its beneficial habits.

Family Alcedinidae: Kingfishers. The Belted Kingfisher (Megaceryle alcyon) is considered by sportsmen to be harmful to fish. As a result, they have been greatly reduced by shooting, which, according to the facts, is quite senseless.

Family Picidae: Woodpeckers. Due to its habits of eating fruits, the Lewis Woodpecker (Asyndesmus lewisi) has been shot to some extent. The Red-breasted Sapsucker (Sphyrapicus varius) is often shot as a result of its practice of drilling holes in the bark of fruit trees. These punctures sometimes cause the death of the tree.

Family Corvidae: Jays and Magpies. Here is another family whose members are often persecuted by farmers and sportsmen because of their predatory feeding habits. The Coast Jay, the Long-tailed Jay (Aphelocoma californica immanis), the Raven (Corvus corax), and the Crow (Corvus brachyrhynchos) are all quite reduced in numbers at the present time. Probably, the Raven was never common, and it is doubtful if the Crow was much more numerous in early days. It is interesting to note that continual hunting has made these birds very wary--a factor which probably contributes very highly to their continued existence.

This concludes the birds affected by hunting, and we turn now to a consideration of the mammals.

Family Cervidae: Moose, Elk, Deer, and Caribou. The Roosevelt Elk (Cervus canadensis roosevelti) is definitely a thing of the past for the Corvallis vicinity. Hunting and settlement drove them early to the more secluded areas of the Coast Range. There are a few of these large deer left in the forest areas on the north and west slopes of Mary's Peak, which is about twenty miles west of Corvallis. These are now the nearest specimens of the race. The Black-tailed Deer has also been practically driven from the Corvallis area by hunting. An occasional deer or two is seen near the city, but these are only

stragglers from the forests to the west. As noted before, the White-tailed Deer has disappeared entirely from Benton County. This disappearance can be blamed almost solely upon hunting.

Family Leporidae: Rabbits and Hares. Members of this family have tended to increase under the agricultural conditions of the Valley, but hunting keeps their numbers reduced. They are not protected at all by laws, but the secretive nature of the Brush Rabbit (Sylvilagus bachmani) and the existence of disease among the Jackrabbits (Lepus californicus) are factors which discourage too much hunting.

Family Sciuridae: Squirrels, Chipmunks, and Woodchucks. The Silver-gray Squirrel (Sciurus griseus) has been much hunted and is now extremely rare in the Corvallis vicinity. Former depredations on nut orchards turned the hand of the nut-grower against them, and this was a factor in their decrease. Douglas's Squirrel (Tamiasciurus d. douglasii) and Townsend's Chipmunk (Eutamias t. townsendii) are kept somewhat reduced by small boys with rifles.

Douglas's Ground Squirrel (Citellus beecheyi douglasii) has increased greatly under agricultural conditions. Hunting has aided them by relieving them of predator pressure. On the other hand, many are shot for sport.

Apparently, they are benefited more than they are harmed, by general shooting.

Family Muridae: Rats and Mice. The Muskrat (Fiber zibethicus) is said to be of very rare occurrence in the Willamette Valley. If the early accounts of its presence are accurate, trapping has greatly reduced its numbers.

Family Castoridae: Beavers. The animal which played such a large part in the opening of the West is now practically gone from the Corvallis area. Quite abundant in early days, they were very greatly reduced by trappers before settlement began. Continued trapping by the early white settlers cleaned them out. At present, a small colony has been started on Oak Creek, some four or five miles west of Corvallis, by the Fish and Game Department of the State College. Whether or not these will remain to increase, it is yet too early to say.

Family Felidae: Cats. If the Cougar was ever abundant in the Corvallis vicinity, or even occurred there, hunting and trapping have pushed it into the mountains. A bounty of fifty dollars is paid for each dead Cougar so the animal has little chance except in the most primitive areas.

The Bobcat carries a bounty of five dollars on its head, in the state of Oregon. This has contributed to its decrease. However, the Bobcat is extremely wary,

and probably exists in limited areas in some of the wilder areas west of town. The Canada Lynx probably occurred in the area in early days, but the records are not authentic. It is not present now.

Family Canidae: Wolves, Foxes, and Dogs. The Northwestern Timber Wolf (Canis lycaon gigas), which was reported as so numerous in early days, is now gone from the Valley, except as it occurs here and there as a straggler from the Cascades. Fearing only man, these animals have been driven to the wilder regions, aided by a thirty dollar bounty. It is probably that the agricultural interests have been the strongest factor behind their disappearance because of their predatory habits. The Coyote has been discussed to some extent. They are occasionally seen in the Corvallis area, and may be increasing slightly. Sheep-raisers and sportsmen will see to it that they never become numerous.

The Gray Fox is now quite rare in the Corvallis area, due probably to trapping and hunting.

Family Mustelidae: Weasels, Minks, Martens, Wolverines, Otters, Skunks, and Badgers. It is hardly necessary to be reminded again of the early fate of the fur-bearers in the Willamette Valley. Trapping is responsible for the nearly complete disappearance from the area of the Martin (Martes caurina) and the Otter (Lutra canadensis). The

Mink is greatly reduced, but seems able to resist trapping surprisingly well. The skunks are kept reduced by trapping, but have thrived under the agricultural set-up.

Family Procyonidae: Raccoons. These animals occur in limited numbers today, and have probably been reduced to quite an extent by trapping for their fur.

Family Ursidae: Bears. The Black Bear (Ursus americanus) has followed other large animals into the wilder areas. Never protected in Benton County, it is only a matter of logic that the few, once present, either left or were shot and trapped. The Klamath Grizzly (Ursus klamathensis) once occurred sparingly in the Corvallis area. It seems to have disappeared early--even before settlement, and today there is no form of grizzly to be found in the state of Oregon.

These conclude the animals affected by hunting, trapping, etc. The following section deals with the animals which have been most affected by the introduction of agriculture.

### Agriculture

According to A.A.A. statistics, Benton County's land area of 440320 acres is 55.7% farm land. This percentage is much higher around Corvallis where there is more arable land available.

The effects of agricultural are quite diverse. In order to be planted to a crop, land must be cleared of large vegetation and of stones, plowed, and planted to the desired product. This means that the animals present must either adjust themselves to the new conditions or leave for less disturbed areas. It is possible for many animals to thrive in spite of this annual disturbance of the soil. Fences are usually constructed around farm fields, offering a definite barrier to some animals, but preserving small strips of undisturbed land where other animals can thrive. Farm buildings may offer shelter and home to many of the wild animals.

The farm crops may be grain, hay, fruit, or others. Any of these may furnish food to native animals, either in winter or in summer. In addition to the desirable crops, cultivation tends to encourage certain weeds and insects, which may become food for wild animals.

Vegetative crops are not the only product of the farms. Domestic stock is raised, and in the Corvallis vicinity sheep are grazed in good numbers on the hills to the west and north of town. These keep the grass well grazed and act as a competitor for available food, besides reducing cover for the small mammals. Poultry is raised on the farms and may offer food to some of the predators.

There are certain introduced animals, which should be considered here. Primary among these is the common house cat (Felis catus). Almost every farm has one to several of these animals, which are usually nothing less than predators on available small birds and mammals. The domestic dog has less effect on the wild animals, but must be considered. The House Mouse (Mus musculus) and the Brown Rat (Rattus norvegicus) are part of every farm, both originally coming from Europe. The effect of each will be brought out in the individual discussions.

Not quite so apparent as these previous facts are the effects of agriculture upon soil and water conditions, and the consequent effect upon animal life. Leopold has tentatively set forth the theory that depletion in soil fertility may have an effect upon the animal life in the vicinity. Intensive agriculture often results in a lowering of the water table, which has a profound effect upon the vegetation. Neither of these is of serious import in the Willamette Valley as yet.

Following is a discussion of the various families and species which have been primarily affected by agriculture.

Family Anatidae: Ducks, Geese, and Swans. In the Corvallis area, the most noted effect of agriculture is to be seen in the case of the Canada Goose. Large flocks

of these, totalling several thousand, winter in the Willamette Valley, feeding mainly on the young wheat shoots. It is quite possible that the raising of wheat has increased the wintering flocks of these birds to a considerable extent. Certain water areas have been drained to make room for crops, but this is not of great importance in the Corvallis vicinity.

Family Cathartidae: Vultures. The Turkey Vulture, in the Corvallis area, feeds mainly on the carcasses of dead sheep.

Family Accipitriidae: Kites, Hawks, and Eagles. Agriculture has directly and indirectly furnished more and better available food to many of the predatory birds. The increase of rats and other rodent pests is a boon to the Red-tailed Hawk (Buteo borealis) and the Marsh Hawk (Circus hudsonius). Insect pests increase to benefit the Sparrow Hawk. The small birds seem to have profited by agriculture, thus furnishing more food to the Accipiter group. The Sparrow Hawk is increasing under these agricultural conditions, whereas the other forms are kept to limited numbers by shooting.

Family Tetraonidae: Grouse. Being birds of the forests, these birds are only affected by agricultural to the extent that desirable range is reduced. In the Corvallis area, this has been of small consequence.

Family *Perdidae*: Partridges and Quails. The Quails thrive under the agricultural conditions of the Willamette Valley. Sufficient brush has grown up to furnish excellent cover, and the insects and seeds of the farm areas furnish abundant food.

Family *Phasianidae*: Pheasants. The Ring-necked Pheasant is noted as being a bird, well adapted to certain agricultural areas. The Willamette Valley offers no exception in this respect.

Family *Charadriidae*: Plovers, etc. In winter, one sees many Killdeer in the plowed fields and around the little pools in the wheat fields of the Willamette Valley. The bird is probably attracted to the area in winter by more available food.

Family *Scolopacidae*: Snipe and Sandpipers. The Wilson's Snipe may be affected in the same manner as the Killdeer.

Family *Columbidae*: Pigeons and Doves. A few of the farms in the Corvallis area are hosts to small flocks of the Domestic Pigeon or Rock Dove (*Columba livia*), an introduced bird which does well in agricultural areas. The Mourning Dove (*Zenaidura macroura*) is not common in the Willamette Valley, but seems to have increased with agriculture.

Family Tytonidae: Barn Owls. These birds tend to be protected by the farmers, because of their habits of feeding on pestilential rodents. Possibly, the birds have increased to quite an extent because of this.

Family Strigidae: Typical Owls. Agriculture has aided these birds by making their food, of rodents, more plentiful.

Family Picidae: Woodpeckers. The Lewis' Woodpecker's habit of eating fruits and nuts has been mentioned. The effect on the bird has been to change its feeding habits, and expose it to the protecting guns of the fruit-raisers.

Family Alaudidae: Larks. Agriculture, through grazing and cropping, has made the land more suitable for the nesting of the Horned Lark (Otocoris alpestris). The Horned Lark prefers open areas where little vegetation occurs.

Family Corvidae: Crows, Jays, etc. The Crow is a bird which prefers agricultural areas. Although comparatively scarce in the Corvallis area, the Crow is probably increased over pre-settlement days.

Family Turdidae: Thrushes, etc. The Robin (Turdus migratorius) has apparently profited greatly by the white man's settlement. A typical bird of almost every town within its range, this bird winters in the Corvallis area in large numbers. They feed in the wheat fields,

where much of the soil is wet and soft, affording easy access to many invertebrate food forms. Many nest in the trees and buildings around the farms.

Family Motacillidae: Pipits. The more open condition of the ground, due to agriculture, induces large flocks of these birds to winter in the Willamette Valley.

Family Ploceidae: Weaver Finches. The English Sparrow (Passer domesticus) was introduced into Oregon, as well as several other states, and is now all too painfully established. This adaptable bird finds numerous breeding places in the buildings of the farm, and it finds abundant food in the barnyard and surrounding fields.

Family Icteridae: Blackbirds, etc. Most favorably affected by agriculture is the Western Meadowlark (Sturnella neglecta), which nests in the fields and fence rows where there is a little grass for shelter, and which feeds on the insects of the farm acres. The Brewer's Blackbird (Euphagus cyanocephalus) seems to appreciate the farm also, nesting in the shrubs or on the ground, near the farm buildings, and feeding in the barnyard or farm fields.

Family Fringillidae: Grosbeaks, etc. The Common House Finch (Carpodacus mexicanus frontalis) is extending its range into the Corvallis area. Because it nests around farm buildings to quite an extent, the presence

of these nesting sites may be an influential factor in this influx. The increase of brushy areas, due to fencing, grazing, and land-clearing has tended to encourage the increase of such birds as the Oregon Towhee (Pipilo maculatus oregonus), The Oregon Vesper Sparrow (Pooecetes gramineus affinis), the Puget Sound Sparrow (Zonotrichia leucophrys pugetensis), and the Rusty Song Sparrow (Melospiza melodia morphna).

Following are the mammals affected primarily by agricultural.

Family Cervidae: Elk, Deer, etc. The fencing and cultivating of the land serves effectively in keeping these large animals from thriving in the Corvallis area, even if hunting did not exist. Combined with hunting, the effect is to drive them completely into the less settled regions.

Family Leporidae: Rabbits and Hares. The Jack-rabbit finds conditions of agriculture to its liking. However, disease and hunting combine to keep their number limited. Inasmuch as there are more brushy areas present, the Brush Rabbit is aided.

Family Sciuridae: Squirrels, etc. The effect of agriculture upon the Silver-gray Squirrel is perhaps best shown by Vernon Bailey, who says that large numbers of squirrels are attracted to nut orchards, where their

persecution has been vigorous. Since there are no very large nut orchards in the Corvallis vicinity, the same situation does not apply so drastically. The benefits of agriculture to the Douglas Ground Squirrel have been mentioned. Because they are often destructive to crops, extensive poison and trapping campaigns have kept their numbers down.

Family Muridae: Rats and Mice. The Norway or Brown Rat and the House Mouse are both found on almost every farm, around the buildings or in the fields. The Rat may drive out some of the native small rodents, because of its aggressive habits. The native wood rats (Neotoma) often adopt abandoned buildings as locations for their homes.

The meadow mice (Microtus) are not extremely numerous in the Willamette Valley, but are probably doing well under a condition of more agriculture and less predators.

Family Geomyidae: Pocket Gophers. The pocket gopher (Thomomys) has been considerably reduced in the Corvallis area, because it is harmful to crops, young trees, lawns, etc.

Family Felidae: Cats. The effect of agriculture upon the Cougar and Bobcat is probably of small import. It is only necessary to remind one that, should either of these animals become annoying to domestic animals, their

continued existence would be precarious. The House Cat has been discussed. Probably this animal has a far greater effect than has yet been discovered, for they hunt almost constantly, and the toll of small birds and mammals must be enormous.

Family Canidae: Dogs, etc. The Red Fox (Vulpes fulvus) has apparently increased in late years in the Corvallis area. The animal thrives in agricultural regions, because of the increase of rodents, insects, and certain game birds as the Pheasant and Quail. Others of this family (Wolf and Coyote) are probably hunted more intensively because of their predatory habits upon domestic animals.

Family Mustelidae: Weasels, Minks, etc. The weasels (Mustela sp.) profit by the increased rodents available through agriculture, and to some extent by the farmer's poultry. The advantages of this last source of food supply are probably off-set by the farmers' reactions to the depredations. The Mink and the skunks also profit by the increased rodent supply. The skunks feed to quite an extent upon insects. The Raccoon (Procyon lotor) has not profited greatly by agriculture in the Corvallis vicinity.

This concludes the forms, which have evidently been affected by agriculture. The discussion now turns to a consideration of the effects of building a town, railroads, and highways.

Industry, Progress, etc.

The growth of the city of Corvallis has been mentioned elsewhere in this paper. A city of almost 10,000 people occupies a considerable portion of the primitive area. It is obvious that none of the large game mammals nor the more wary birds will be found in the city. However, the possible effects of homes, back yards, shade trees, and shrubs on many of the smaller animals will be brought out here.

Accompanying a large town are the highways, roads, and railroads which lead into it. Aside from direct, but in the Corvallis area insignificant, mortalities caused on these traffic lanes, an increase in cover often occurs adjacent to such roads. If the effect of such is noticeable, it should be mentioned. The animals affected by such forms of progress will be brought out in the following pages.

Family Accipitriidae: Hawks, etc. The smaller members are often attracted to the city by the concentrations of small birds, which serve them as food. Both the Sharpshinned Hawk and the Cooper's Hawk are often seen well within the city limits.

Family Charadriidae: Plovers, etc. The Killdeer is one of the many birds attracted to feed on the large lawn expanses of the College campus. At times, over a dozen can be seen there in the winter.

Families *Perdidae* and *Phasianidae*: Quails and Pheasants. These birds are often encouraged to nest and skulk in the brush, bordering railroads, roads, and highways.

Family *Micropodidae*: Swifts, etc. Vaux's Swift (*Chaetura vauxi*) is known to nest in chimneys as does the Chimney Swift in the East. The Rufous Hummingbird is common around town during the warmer months, being attracted by the many flowering plants in the gardens of the city.

Family *Picidae*: Woodpeckers. It is difficult to determine the effect of a city upon these birds. Because the city is liable to be more sheltered in the winter, it is probable that some forms winter there. The climate is so mild during the winter that this influx from surrounding areas is probably not great. The Northwestern Flicker is quite common about Corvallis.

Order *Passeriformes*: Perching birds. It is in this order that so many birds are found which seem to take man as a matter of course, or which even thrive under the city conditions of plentiful shelter and food, and lessened predators. The various families are dealt with more specifically.

Family *Herodiasidae*: The Violet-green Swallow (*Tachycineta thalassina lepida*) is well known to every Corvallis

resident who ever pauses to look at the birds. These birds profit greatly by the various nooks and crannies to be found in the buildings of the city, nesting in them much as the English Sparrow does. They also occupy nestboxes.

Family Paridae: Chickadees, etc. and Family Sylviidae: Kinglets, etc. Chickadees and Kinglets feed unconcernedly in the trees and shrubs of the town. These groups of birds have probably been affected very little by the white man's settlement.

Family Turdidae: Thrushes, etc. Of these, the Northwestern Robin (Turdus migratorius caurinus) has accepted human habitation most completely. In addition to nesting in trees and shrubs all over the city, they occur in large wintering flocks, which feed on the lawns of Corvallis. The bird has increased considerably since white man's settlement. This is due to protection and more easily available food. The Varied Thrush (Ixoreus naevius) and the Hermit Thrush (Hylocichla guttata) winter sparingly around town, but prefer less populous areas. The Russet-backed Thrush (Hylocichla u. ustulata) and the Western Bluebird (Sialia mexicana occidentalis) breed within the city limits, the latter taking advantage of nest boxes.

Family Ploceidae: Weaver Finches. The English Sparrow is a well-known resident of Corvallis. Taking advantage of any available opening, they nest everywhere

and feed upon the insects and litter of the city. An intrinsic part of almost every city, the effect of settlement on this ubiquitous little foreigner speaks for itself.

Family Icteridae: Blackbirds, etc. The Brewer's Blackbird winters to some extent in the city, foraging in the fields by day, and returning to the shelter of the city at night.

Family Fringillidae: Sparrows, etc. Several members of this large family profit by the presence of a city. The Western Evening Grosbeak (Hesperiphona vespertina brooksi) descends upon the city in large numbers in the spring to feed on the elm and maple seeds. Among the birds breeding in the city are the California Purple Finch (Carpodacus purpureus californicus), the Common House Finch, two gold finches (Spinus tristis and Spinus psaltria), the Chipping Sparrow (Spizella passerina), the Puget Sound Sparrow, and the Rusty Song Sparrow. Flocks of Juncos (Junco oregonus) are common about Corvallis in the winter.

This family concludes the birds affected by the presence of a town. Following are the mammals affected. Any mammals not listed, if they occur in the Corvallis vicinity, are not able to live under the conditions of the city. This is obviously true of such forms as the deer, the elk, the bear, etc.

Family Leporidae: Rabbits, etc. The Brush Rabbit occurs sparingly within the city limits, living in the brushy hedges or other spots offering sufficient protection.

Family Sciuridae: Squirrels, etc. Members of this family are strangely lacking in Corvallis. The Silver-gray Squirrel occurs in other towns, and should get along in Corvallis. The Flying Squirrel (*Glaucomys*) is so nocturnal that its presence may not be suspected. The absence of many large trees in the town may be a factor in the scarcity of squirrels. The remaining forms do not tolerate crowded city conditions.

Family Muridae: Rats and Mice. The Brown Rat profits greatly by the construction, efforts, and waste of human beings. The College dumping grounds, west of Corvallis, is well populated with this form, and they occur in varying numbers throughout the city. More common in city buildings is the house mouse. It is probable that a few native mice may seek temporary shelter in homes on the city's edge.

Family Geomyidae: Pocket Gophers. The pocket gophers are quite willing to live in the lawns and gardens on the city. However, their unsightly mounds and burrowing habits have instigated a campaign against them, until they are now quite rare within the city limits.

Family Felidae: Cats. The House Cat is common in Corvallis, and probably takes its toll of the city's birds and small rodents.

Family Canidae: Dogs, etc. Domestic dogs are fairly numerous in the city. Their effect on wild animals is probably negligible, except as they roam the surrounding fields and disturb nesting birds, kill rabbits, etc.

Family Talpidae: Moles. Townsend's Mole (Scapanus townsendii) has encountered much the same treatment as have the pocket gophers.

#### Education:

Education is having an increasingly beneficial effect upon the wild animals. The Fish and Wildlife Service, Universities and Colleges, and individual observers are gathering facts, which are helping the American public to appreciate its wild animals more and more.

Through stomach analyses, study of life histories, etc., people are learning how the birds and mammals live, what they eat, and other of their habits. They are learning which animals should be rigorously protected, and which have been falsely persecuted. Courses in ornithology, mammalogy, ecology, zoology, etc. are teaching more about birds and mammals to the public. To know is to appreciate, and to appreciate is to protect. It is

highly doubtful if the valuable birds and mammals of this country will ever again be subjected to such devastating practices as market-hunting, a destructive feather-trade (a recent slight revival of this cruel practice may test this assumption), unlimited trapping and hunting, or similar wholesale slaughters. It is true that there are many imperfections and violations still existing, but the knowledge is increasing.

Many colleges and universities are offering courses in the management of game. Here, scientific principles are taught, which, if applied, tend to insure a steady or increasing game population. Undoubtedly, this valuable study is still in its infancy.

Dissemination of facts concerning animal populations is educating people to the fact that the wild animals are not unlimited. Through such startling examples as the Passenger Pigeon, the Bison, and the Beaver, they are made more conscious of the necessity of conservative measures.

In this local study, all of these points can be applied. Their effect is probably not very noticeable as yet, but they are steadily at work as evinced by the increasing numbers interested in birds and mammals, whether they be members of the general public, fish and game students, or specialists.

### Summary

This manuscript deals with the various effects of the white man's settlement on the wild animals of the lower Mary's River valley in the region of Corvallis, Oregon. The first white men came into the region in the early 1800's, and settlement began around 1850. The early settlers found the area well adapted to agriculture. That part of the Willamette Valley where Corvallis is situated was mainly level grassland, with trees along the rivers, and covering the hills to the west and north.

The animal life existed in a more or less balanced state, interrupted somewhat by the numerous fires of the Indians. These fires tended to favor certain of the predatory forms. As a result of the white man's settlement, some forms have been greatly reduced or have disappeared from the Corvallis region. Other animals have spread into the area or have been introduced. Many birds and mammals have adapted themselves or even increased with settlement. Hunting and trapping, agriculture, the building of a city, and a national educational policy, regarding wildlife, have affected the different animals in varying ways.

Animals valuable for their furs or as game, and animals considered harmful to man's interests have been greatly reduced or have disappeared. Such forms as the

California Condor, the deer and the elk, the Beaver, the Cougar, the Lynx, the Wolf, the Marten, and the Bear have disappeared from the Corvallis region. The birds of prey, the grouse, the Gray Fox, the Silver-gray Squirrel, and the herons are quite reduced. Where rigorously protected, some of these animals are making a comeback.

Certain animals have increased under settlement conditions. Lessened predator pressure and more food and cover benefit them. The Horned Lark, the Violet-green Swallow, the Robin, the Brewer's Blackbird, the Meadow-lark, many of the sparrows, the Red Fox, possibly the Coyote, many rodents, and the hares and rabbits are examples of forms which are more numerous than in pre-settlement days. The House Finch has recently extended its range into the Corvallis area.

Some introduced species are thriving, as the Valley Quail, the Bobwhite, the Ringneck Pheasant, the English Sparrow, the House Cat, the Brown Rat, and the House Mouse. Certain of these may offer a definite conflict to native forms.

Many of the remaining species are not noticeably affected by settlement. This is true of the warblers, the chickadees, the kinglets, or other animals whose welfare is not noticeably changed by a settled condition.

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