JOHN DAY FOSSIL BEDS
A
STATE PARK
OF THE
YESTERDAYS

MILE POST SITES AND DEED DESCRIPTIONS

The John Day Fossil Beds State Park, Grant County, Oregon, is made up of eight disconnected units, distributed along the ascending John Day River, paralleling or astride the John Day Highway (State 19). All excepting two minor tracts, are west of its junction with the Ochoco Highway, where State 19 ends and the John Day becomes U. S. 28 as far as Vale; thence over the Central Oregon Highway (U.S. 20) to Ontario and the Idaho line. Counting in the Pendleton-John Day Highway (U.S. 395), which connects with U. S. 28 at Mount Vernon, Mile Post 154.28, there are four avenues of approach to the fossil beds area - from Ontario, Pendleton and Arlington on U. S. 30, and Redmond on U. S. 97. All these routes may be said to converge at Picture Gorge, which is considered the focal point of the park area.

Beginning on U. S. 19, the first tract is at Mile Post 106, the Cathedral is M. P. 116; Johnny Kirk Springs 116.67; Turtle Cove, east of the Highway, is opposite M. P. 118; the Kennedy tract is approximately M. P. 120; the Cant wayside, between the highway and river is M. P. 121; an unnamed tract, divided by the river, holds M. P. 122; the lofty, pyramidal Sheep Rock is opposite M. P. 123; the Rock Creek tract, on the west side of the river, abreast of M. P. 124, is cut by Rock Creek and traversed by the Ochoco Highway as they reach Picture Gorge, M. P. 125. East of Picture Gorge, approximately M. P. 126.70, nearly a mile south of and 500 feet above the highway, is the William Mascall Overlook; and about seven miles east of Dayville, approximately M. P. 136, a small tract lies between the highway and river.

In their order, these are described as follows: Griffin tract in Section 31, Township 9 South, Range 26 East, 3 acres, the deed date June 18, 1945, Cathedral, in Section 7, Township 11 South, Range 26, East, 40 acres, a gift to the State by the United States, the deed date June 20, 1939; Johnny Kirk Springs in Sections 7 and 18, Township 11 South, Range 26, East, 0.79 acres, a gift to the State from Charles W. Hoffman, the deed date August 4, 1928; Turtle Cove in Sections 20 and 29, Township 11 South, Range 26 East, 200 acres, the deed date January 5, 1939; the Kennedy tract in Section 32, Township 11 South Range 26 East, 40 acres, the deed date July 17, 1945; the Cant wayside in Section 6, Township 12 South, Range 26 East, has 4.8 acres, the deed date September 14, 1935; an unnamed tract in Sections 1 and 2, Township 12 South, Range 25 East, and in Sections 5, 8, 18 and 20, Township 12 South, Range 26 East, 1602 acres, U. S. patent dated May 20, 1931. The Mascall Overlook, a tract of 3.8 acres in Section 29, Township 12 South, Range 26 East, is a gift to the State of Oregon from William Mascall, the deed date September 14, 1935. Situated in Section 7, Township 13 South, Range 29 East is a one and one-half acre tract lying between the highway and river, a gift to the State from the Eastern Oregon Land Company, the deed date January 31, 1931.

The state park units of the John Day basin, have been acquired over a period of years by successive Oregon State Highway Commissions. In part, they were selected and recommended for acquisition by S. H. Boardman, State Parks Superintendent, for some particularly scenic feature, or because of its outstanding geological or paleontological importance as recognized by the earth scientists.

While the park units contain some of the most scenic features of the area which are visible from the highways in passing; up to this time, they do not have the accommodations nor improvements usually found in state parks devoted to conventional recreational purposes. As Harvey Scott, the famed editor of the Oregonian

once commented: "People who go sight seeing are disposed to look at anything out of the ordinary that is brought to their attention". They are interested in natural features, especially those of antiquity, sites of historical pioneering endeavor, early structures, and evidences of old trail and road routes. The John Day country is rich in all these.

REGIONAL HISTORY

The John Day Fossil Beds State Park units, situated approximately in the center of the John Day River basin are in a region endowed with a richly romantic, and historically colorful, pioneering background; and a time history written in the rocks that reaches back into the milleniums of past geologic ages, which mark the beginnings of organic life in the Oregon country.

The John Day River was first identified by the Lewis and Clark expedition, who named it "Lepages River" when passing down the Columbia on October 21, 1805, It was called John Day River in 1812, after John Day, a Virginian, who was left seriously ill on the bank of Snake River in Idaho, by the overland Astor party under Hunt. Ramsay Crook, also of the party, chose to stay with him. When Day recovered, they started for the Columbia River. While making their way down the river the next spring, they were set upon and robbed by Indians, who left them naked. They were seen and rescued by Robert Stuart, also a member of Astor's Pacific Fur Company, when near the mouth of the river that since bears Day's name, and taken to Fort Astor, now the site of Astoria, to rejoin their former companions.

John Work used the name "Day's River" in his journal entry for June 25, 1825, when on his way to the Flathead Country. Peter Skene Ogden when leading a fur brigade to the Snake River country, mentions "John Day's River" in his journal entry of November 29, 1825.

On January 11, 1826, Ogden's party was in difficulties "on the sources of the John Day". On January 15, his journal reads "Five men absent since the tenth.

I am obliged to wait although we are starving. On January 26, is the entry ... "we leave the waters of Day's River. Since joining Mr. McDonald, allowing we had a hundred hunters, had we not our traps we must have starved to death". The inference being this section of the country was then so destitute of game that not enough meat to supply the party could have been obtained by any number of hunters. The very limited catch of beaver was all the food they had. On January 28 ... "our guide says six feet of snow in the mountains (Blue) ... Many in camp are starving. For the last ten days, only one meal every two days. Still the company's (Hudson's Bay Company's) horses must not fall sacrifice". (The Company's horses were preserved, at all costs, to return the bales of furs to the Fort). February 10, "on Burnt River. Two men could not advance from weakness. February 16, Gervais killed two small deer". (Joseph Gervais, later a French Prairie pioneer settler, after whom the town of Gervais, Marion County, Oregon, was named.)

Ogden also passed through this region in 1826-1827, and again tells of the scarcity of food and the wretched condition of the few natives, who were driven into this inhospitable area by the warlike Snake tribes. John Work, as chief trader in the Snake country, passed westward through the John Day country in 1832, and also noted the impoverished condition of the few natives and paucity of game. Some of his "people" were obliged to kill their own horses for food".

In Idaho and eastern Oregon which, generally speaking, are not now considered regions of inclement weather in late spring and early summer; Works journals, written one hundred sixteen years ago, show that from April 18, 1832, when on Lost River, Idaho; thence crossing through the Burnt River John Day country, and on to the Umatilla and Columbia Rivers to Fort Nez Perce, they experienced fifty-five days that were wholly, or partially, bad weather, and only twenty-four that were fair or fine.

Between the passing of the Hudson's Bay Company's large, well organized fur brigades in 1825-1826, 1826-1827 and again in 1832; who, if anyone, traversed this

region until 1845, is an apparent uncertainty. In that year the trek of the so called, "Blue Bucket" immigration party took place supposedly crossing the southerly sources, of the John Day, down Crooked River, down and across the Deschutes Canyon and on to the Columbia, by the notoriously bad, and almost disastrous, "Meek's Cut-off".

If anyone was in the John Day country prior to the Hudson's Bay Company's fur brigades, they did not leave a definite record. Scott's History of Oregon, refers to an article in the Oregonian of February 14, 1896, entitled 'The first discovery of gold in the Territory of Oregon' ... "related by a correspondent to have been by trappers of the American Fur Company, signed W. P. M. Lifford,Baker County, Oregon." He says: "It is generally believed ... that miners from northern California and southern Oregon ... in 1862 discovered the existence of gold in eastern Oregon ... they were not the discoverers nor the pioneers. Gold was first found on the John Day River by trappers in the employ of the American Fur Company, and they made their discovery known". The year of the trappers find was not given. It could very well have been during Ramsay Crook's administration of this Company's affairs, 1834 to 1848, when they were reputedly more or less active in this region.

Conceivably, miners could become trappers, temporarily; but the trappers employed by the fur companies in the early days of this industry were in no sense miners; nor, for many reasons, could they even be prospectors while attached to a fur brigade.

While it is quite possible the American Fur Company's trappers could have found gold nuggets while setting beaver traps along the John Day River or some of its tributaries, the place of its discovery, if it actually occurred, may never be known. There is, however, no doubt of the Meek's party having found gold in some stream they crossed; although Meek, with a party of thirty men, retraced their

trail the next year, and failed to find gold in any of the streams along their route, nor could they locate the brook from which the children were supposed to have picked the nuggets they had found in 1845.

Another Oregonian correspondent in 1896 also related that the first gold discovered in the John Day country was in Spanish Gulch, about mid-distance between the present towns of Dayville and Mitchell, but did not give the date nor the names of the discoverers.

Dr. Merriam, Volume 1, page 445, referring to the geology of Spanish Gulch, said: "Not far from this locality there is associated with the serpentine a considerable thickness of quartzite with quartz veins, which have produced some gold".

There is apparently no definite record of individuals or organized parties having traveled in this area after the "Blue Bucket" immigrant party passed; except Stephen L. Meek and his thirty odd disappointed gold seekers in 1846. Failing to locate the site of the Blue Bucket find, the party disbanded. Some returned safely to the Willamette Valley, some were killed by Indians and four or five continued prospecting, finding traces of gold, but apparently not in what they deemed to be in paying quantities.

Following the exciting days of the 1849 gold rush to California, adventuresome individuals spread over the northern part of the state, into Oregon, and eventually over the entire Northwest, even into British Columbia in the 1850-1860 decades.

'Scattering appearances of gold in 1853-54, were announced from Burnt River in Eastern Oregon, Yakima, Pend Oreille and Cour d'Alene rivers, but their significance was not then realized. "Not enough (gold) has yet been found to repay the labor of procuring it', "wrote Major Benjamin Alvord in 1853". Authorities do not agree upon the first discoveries in the interior country, but it is known that the real awakening came from discoveries near Fort Colville, in the Spring of 1855, and

on the Kootenai River about the same time. Later in the year the John Day Valley in Oregon was favorably prospected.

"Indian hostilities then delayed pursuit of gold in the interior country, ... The Idaho mines began activities in 1860, those of John Day and Powder River, in Eastern Oregon in 1861, .."[1]

These records indicate that prospectors from California and Southern Oregon had overrun the John Day Country, despite Indian troubles, some years previous to the protection afforded by the military expeditions of 1859 and later years.

The next organized party known to enter this territory was a well equipped military expedition, in command of Captain D. H. Wallen in 1859. They established their headquarters on Camp Creek, a few miles southeast of where Mitchell is now; under orders to survey and open a road to The Dalles; and explore the possibilities of a road to the "Great Salt Lake". The road to the Dalles was started and the Salt Lake mission was accomplished without untoward incident.

In the spring of 1860, General William Selby Harney, accompanied by Major Enoch Steen, arrived at the camp of the previous year with two commands; one under Captain Wallen, the other under Captain A. J. Smith.

General Harney and Major Steen, with an escort of dragoons, started for south-east Oregon. "They were resisted by the Indians and called for reinforcements. When these arrived they proceeded to and named the great fault in Harney County, now known as Steen's Mountain. Harney County, created February 25, 1889, was named after General Harney.

1 "The Pioneer Stimulus of Gold", by Leslie M. Scott, in Oregon Historical Quarterly, Volume 18, Number 3, September, 1917 - page 151. For details of John Day mines in 1855 see The Oregonian of July 21, 1855.

Road construction was continued by the military through 1860-1861, and later; attracting a few settlers who, despite the Indian menace, remained to become permanent settlers, mostly stockmen.

Although 1861 seems to be the year gold in paying quantities was found in the John Day River or its tributaries; the great influx of miners from Southern Oregon and Northern California took place in 1862. This was also the year when the definitely permanent settlement of the area actually began. Camp Watson, the military post established for the protection of miners, settlers and travelers from maurading Snake Indians and renegade whites, was first garrisoned in 1863 and occupied until its abandonment in 1869. By that time the Indians were no longer a menace and miners and settlers could care for themselves. Most of the permanent settlers were then, as now, engaged in stock raising, their cattle ranging on the abundant and nutritious bunch grass, which rapidly disappeared after sheep were introduced into the range country.

HISTORY OF EXPLORATION

On Page 438 of Dr. Merriam's graphic story of the John Day, he says: "The existence of fossil mammalian remains in Eastern Oregon seems to have been first noticed by a company of soldiers (dragoons) which passed through that region in 1861. When the party reached The Dalles on its return journey, a number of the men had with them fragments of bones and teeth from fossil beds in the Crooked River Country. The only specimen brought back by this party, of which any definite information is now obtainable, was a fine rhinoceros jaw, which was in the possession of Lieutenant Waymire.

"Professor Thomas Condon, who was then pastor of the Congregational Church in the Dalles, saw the fossils and obtained from members of the party considerable

information concerning their occurrence. Condon immediately concluded that an important field for paleontological research had been discovered and made use of the first possible opportunity of visiting the beds.[1] Early in the next year (1862) he was allowed to go with a company of soldiers taking supplies across to Harney Valley. On the way out he passed through the Crooked River Country and obtained a few fossils there. On the return trip, made by the way of Camp Watson, he discovered the large exposures at Bridge Creek and supposed them to be of the same system as the Crooked River beds.

"In passing through the John Day country on his return journey. Condon met Sam Snook, a resident of the region who had already taken some notice of the fossil bones, and engaged his services as a collector. The following summer, 1863, found Condon again collecting and exploring at Bridge Creek and along the John Day. In 1864, probably in company with Snook, he first saw the large exposures of John Day strata in what he has named Turtle Cove.[2]

"In 1870 or '71, some specimens of teeth from the John Day beds were sent by Condon to Prof. O. C. Marsh. Almost immediately he received a request from Marsh to guide an expedition from Yale into the new field. Marsh came out with a party of fifteen or sixteen persons in the fall of 1871, and under Condon's guidance visited some of the most important localities. ... While in the field Marsh engaged several collectors to carry on the work for him. Systematic collecting began in the following spring and was continued practically without interruption till 1877. Most

1 Professor Condon was born in New York State. In his youthful days he had taken an interest in geology, obtaining mollusk fossils from neighboring rock quarries. Hence, his enthusiastic concern in the mammalian fossils exhibited by the military party upon their return.

2 "The writer (Dr. Merriam) is indebted to Prof. Thomas Condon for the greater part of his information concerning the discovery of the fields. Mr. L. S. Davis, who has accompanied nearly all of the expeditions, contributed most of the facts concerning the later explorations".

of the work during this period was done by L. S. Davis and William Day, who explored practically all of the exposures in the region.

"Early in the winter of 1871, shortly after Marsh's visit to the field, Lord Walsingham, William de Gray, while on a hunting expedition, passed through the fossil fields and obtained some valuable specimens at Turtle Cove and on Bridge Creek. His small collection was presented to the British Museum and furnished material for Bettany's valuable contribution to our knowledge of the John Day Oreodontidae.

"In the summer of 1873, Professor Joseph LeConte, in company with Professor Condon, visited the western border of the field and made some important observations on the geology.

"Parties under Wortman and Sternberg collected for Professor E. D. Cope in 1878 and 1879, obtaining the material upon which Cope based his important publications on John Day vertebrates.

"In the summer 1880, Captain Bendire of the U. S. Army, with a large party of the 7th. U. S. Cavalry, made a short tour through the basin under the guidance of L. S. Davis. Collections of plants were made by him at Bridge Creek, Van Horn's Ranch, and probably also at Cherry Creek. ... Bendire's collections were turned over to the Smithsonian Institution. ...

"In 1882 Davis and Day collected under Marsh for the U. S. Geological Survey ... south of the Blue Mountains.

"No further work was done in the field till 1889, when Professor W. B. Scott spent the summer in the John Day basin with a large party from Princeton University ".

LITERATURE

"The first mention of the fossiliferous deposits in the John Day basin which appears in the literature was made by Dr. Joseph Leidy. In October 1870, Leidy

presented before the Philadelphia Academy of Sciences a short paper, in which he described a collection of fossils recently received for examination through the Smithsonian Institution, from Reverend Thomas Condon of Dalles City, Oregon. The collection consisted of remains of mammalia obtained by Mr. Condon from the valley of Bridge Creek, a tributary of John Day's River, Oregon.

In 1873 Professor Marsh described several new fossil mammals obtained by his exploring party in the John Day country in 1871. He referred two forms to the Miocene and one to the Pliocene, thus making the first statement regarding the age of the beds.

"In his paper on the great lava flood of the West, Professor Joseph Le Conte (1874) makes the first mention of the structural relations of the John Day formations. ... 'The lava in this region is underlaid by the remarkable fossiliferous Miocene lake deposit of the John Day Valley; erosion has cut through the lava cap into the soft strata beneath'".

"Professor Marsh prepared a general discussion of the John Day geology published in 1875. In this account we find the name 'John Day' first used for the principal fossil beds of the basin.

"In 1880 Professor E. D. Cope published a statement concerning the geology of the John Day country; - (See page (442).

In 1899 W. D. Matthew published a bulletin "on a provisional classification", separating the John Day beds. ...

In 1899 and in 1900, the University of California sent expeditions to the John Day basin in charge of Dr. John C. Merriam. Their findings were published in "Volume 1 of the Published Papers and Addresses of John Campbell Merriam, Published by the Carnegie Institution of Washington, Washington, D. C., entitled a Report on the Expeditions to the John Day Fossil Beds. The party included the late Dr. Merriam,

Mr. F. C. Calkins, Mr. L. H. Miller and G. B. Hatch, who assembled at The Dalles about May 20, 1899, and, accompanied by Mr. L. S. Davis as guide ... started for Bridge Creek.

The pertinent opening sentence of this report is: "The fossil field of the John Day region in eastern Oregon has been known to geologists for many years as one of the most important of the numerous West-American localities furnishing good remains of Tertiary mammals. During the past thirty years the leading paleontologists of the country have obtained from it large collections of remains containing a great number of new and interesting animals. Professor Marsh of Yale, Professor Cope of Pennsylavania, Professor Condon of Oregon, Professor Scott of Princeton, and others, have personally conducted expeditions into the field. Beside these expeditions, professional collectors have worked over the ground during more than a dozen seasons, Excepting the collection of Professor Condon, at the State University of Oregon, the whole of the great amount of material accumulated has passed into the possession of a few of the large Eastern museums.

"The John Day fossil beds are exposed in patches over a considerable area in Oregon, to the east of the Cascade Range. The principal exposures being along the John Day River and its tributaries, the name of the river has been applied to them, and they are now known technically as the John Day System. Their age, as determined by comparison of the fossils with those of other systems, is generally supposed to be Miocene.

"The exposure of the John Day beds at Bridge Creek is one of the best for studying the general geology of the deposits. The beds here are about fifteen hundred feet thick and are composed largely of volcanic materials mixed with sand and clay. They are nearly all strikingly colored, and probably vary somewhat in composition in the differently colored strata. At all the John Day exposures

visited by our party the lowest beds were a deep red, the highest ones buff or white, and the intermediate strata blue or green. One of the results of our geological work was the determination of the persistence of these three sets of beds over the whole region. By means of these horizons we were enabled to study the vertical range or distribution in time of the animal species they contain.

"From the character of the fossil remains found in the John Day beds, they are generally supposed to be deposits laid down in an inland sea or lake, once filling a somewhat irregular basin extending over a large part of eastern Oregon and portions of the adjoining states. The fossil remains consist of a few fresh water shells, a number of land shells washed into the lake by rains or streams, and the skeletons of a large number of vertebrates which were either drowned in the lake and buried entire in the mud, or, as was more frequently the case, which died upon the land, only portions of their dismembered skeletons being washed into the lake with river or rain wash.

"The Bridge Creek locality has probably been more thoroughly explored than any other in the country (up to 1899) and has for that reason furnished a large number of fine specimens. ....

"From Bridge Creek the party moved by slow stages to Turtle Cove conceded to be the best and most extensive collecting ground in the region"; discovered and named by Professor Condon in 1862, because of the many fossil remains of land tortoises and turtles. On their way to the Cove the party stopped at Cottonwood Creek and spent parts of two days collecting in what are now the Mascall beds, resting upon the lavas overlying "the John Day system and contain remains of a higher and more specialized fauna than that of the beds below the lava". They collected a few good specimens, "representing several species of horse, mastodon, rhinoceros, etc. The horse teeth serving to fill a gap in the evolutionary series

of horses already in our possession.

... "In the Cove two camps were made from which we worked a number of the best exposures. The largest outcrop, called by us the Blue Basin, is a veritable labyrinth of canyons, gulches and caves cut into the soft blue rock of the middle John Day beds by the heavy rains. The coloring of these beds is frequently most wonderful and of the most delicate shades. Passing along the bottom of any of the larger canyons, the wilderness of finely sculptured and delicately tinted peaks and pinnacles about frequently causes one involuntarily to pause and gaze, astonished that even nature could produce such magnificent architecture".

In Dr. Merriam's chapter on the "Classification of the John Day Beds", he concludes they are about fifteen hundred feet in thickness, and apparently contain a very large proportion of volcanic materials. They seem to rest uncomformably on a thick series of plant bearing, fresh water beds, which have been considered Eocene. The Columbian lavas, rest apparently uncomformably upon the John Day beds.

He divides the John Day system into "three divisions, lower, middle and upper John Day. The lower beds are mainly colored a brilliant red, and seem to have suffered more disturbance than the higher beds and are practically barren of fossils. The middle beds are blue, green or drab, and are in places quite fossiliferous. The upper beds are buff or white. They are largely made up of volcanic material. Many fossils have been obtained from this division. One horizon particularly is rich in rodent remains. ...".

In his chapter entitled a "Geological Section Through John Day Basin", he says the John Day river and its tributaries have exposed in the erosion of their canyons about 10,000 feet of strata, giving a full series of formations from Lower Cretaceous to Quaternary. The oldest rocks he noted in this region" are a series of altered sedimentaries in the northeastern part of the basin. They are pretty

certainly of pre-cretaceous age and are underlain by quartz diorite[1] ... .

"On Bridge Creek near Mitchell a great thickness of Cretaceous is exposed. The lower 2,000 to 3,000 feet are typical Knoxville. The upper 1,000 to 2,000 feet are Chico.

"Resting upon the Chico, near Mitchell, ...also showing at Clarno's ferry, is a presumably Eocene formation, called Clarno, and made up entirely of tuffs, ashes and lavas" containing many plant remains, apparently in part a freshwater formation.

"The Columbia lava, an extension of the lavas on the Columbia river to the north, rests unconformably on the crumpled John Day formation. ...

"The Cottonwood (an early term for the Mascall) formation, near 1,000 feet in thickness, rests on the Columbia lava. The Van Horn Ranch plants, generally considered as John Day are from this horizon. Remains of a true John Day flora, not previously known, were discovered by the University of California expedition in 1900.

... "Resting on the worn edges of the Cottonwood (new Mascall) beds is the Rattlesnake formation, comprising several hundred feet of gravel, tuff and lavas.

" "In canyons cut through the Rattlesnake and Cottonwood are several terraces. Remains of elephants and later horses found in the lower terrace deposits show that they were formed in Quaternary time".

In his chapters entitled "A Contribution to the Geology of the John Day Basin", he remarks:"... Future investigations will certainly show that very many important things have been overlooked, and doubtless many weaknesses in the present discussion will be pointed out; the writers purpose will, however, be accomplished if the general stratigraphic succession and the sequence of major geological events are here set forth in such a manner as to make intelligible discussions of the extinct

[1] Determined by Frank C. Calkins

faunas and floras of this region which will follow this paper".

GEOGRAPHIC FEATURES

"The existing John Day basin of north central Oregon is a well-defined area almost completely surrounded by the triangular Blue Mountain Range. The rugged eastern ridges, rising to an elevation of over 6,000 feet, are composed largely of pre-Tertiary formations which have been much disturbed. ... The streams have laid bare magnificent sections of all the basin formations, affording unexcelled opportunities for stratigraphic and paleontological studies.

"... Excepting the mountain ranges and some of the highest interior ridges, which support a heavy growth of (Ponderosa) pine timber the country is only sparingly wooded. A fringe of cottonwoods, birches and willows along the streams, and a few scattered junipers comprise the most important part of its sylva."

GENERAL FEATURES OF THE GEOLOGY

"The section of the John Day formation, as it is known to the writer (Dr. Merriam), includes at least nine formations, showing the following sequence:

River terraces, with undisturbed Quaternary fossils.
Rattlesnake formation. Gravels, ash, tuff and rhyolitic lava.
Mascall formation. Ashes, tuffs, and possibly gravels.
Columbia lava. Basaltic flows.
John Day series. Ashes, tuffs and rhyolitic flows. Sands and gravels near the top. Lower, middle and upper division.
Clarno formation. Ashes, tuffs, andesitic and rhyolite flows.
Chico formation. Sandstone and conglomerates.
Knoxville formation. Black shales.
Pre-cretaceous sedimentaries, serpentines. Granitic masses of unknown age.

"The Knoxville and Chico are marine formations. ... From the Clarno formation to the top of the series, excepting a very small portion of the whole thickness, the deposits are made of eruptive materials. The Clarno, John Day, and Mascall are almost entirely composed of ashes and tuffs. They have generally been considered as being wholly lake deposit, but, as will be shown later, the character and occurrence

of the fossil remains which they contain are such as to make it doubtful whether they owe their origin to this mode of accumulation.

"The Rattlesnake deposits also contain a large proportion of erupted material, but is mainly composed of gravels derived from the Columbia lava.

"At the close of a long era of erosion following the Rattlesnake epoch, a series of terraces was formed along the main streams. Undisturbed Quaternary remains give definite evidence regarding the age of these deposits. ...Exposure of the John Day beds and other pre-Columbia lava formations are found only along the streams, where the lava has been cut through".

PRE-CRETACEOUS FORMATIONS

"The oldest fossil-bearing strata which have been found in the John Day basin north of the southern Blue Mountain Range are of Cretaceous age.

"... Near the head of Crooked River, south of the Blue Mountains, there are said to be exposures of Palaeozoic, Triassic, Jurassic and Cretaceous formations"

CRETACEOUS, CHICO AND KNOXVILLE

"Exposures of Cretaceous formations are to be found at several points on the western side of the basin. The best out crops are to be seen at Mitchell and Spanis Gulch. At Spanish Gulch a considerable thickness of conglomerate and sandstone... is found above the serpentine. Fossils (marine) are quite numerous in this formation, and considerable collections were made at two localities. ... One yielded eighteen species, the other eleven, "only four of which were different. One species represented by a single small specimen that seems to be identical with forms from Skidegate Inlet, Queen Charlotte Islands. It also occurs at Texas Springs, California and Jacksonville, Oregon.

"... The whole assemblage of forms in the above lists indicates a horizon

at or very near the base of the Chico formation.

" ... This lower Chico horizon is known to occur at a number of localities in Oregon, as Jacksonville, Grave Creek and Crooked River, usually resting uncomformably on pre-cretaceous rocks...".

EOCENE, CLARNO FORMATION

"At numerous localities along the western side of the John Day basin, there are exposed, either below the lowest John Day beds or above the Chico Cretaceous, several hundred feet of strata which certainly do not belong to either of these horizons. To these beds the name Clarno formation has been applied by Dr. Merriam. Typical exposures of the Clarno are to be seen at Clarno's Ferry on the John Day east of Antelope, near the town of Fossil, on Cherry Creek and near Burnt Ranch. ...

On page 457: Dr. Merriam says, "without having actually measured the John Day section, he would not be willing to consider the exposures north of the southern range of mountains as being much greater than 2,000 feet. Perhaps it is not more than 1,500 feet thick. At Sheep Rock, the whole section is shown rather sharply tilted, and all but the lower division would be in the column between the cap rock and the river[1]. At Bridge Creek, also, the section includes the whole of the series, and may reach a thickness of over 2,000 feet... .

"At many points where the contacts of Columbia lava and John Day were examined fossil wood was found to be abundant. In one place at the lower end of Turtle Cove, where there was much petrified wood at the contact, branches of trees were found pushed up into the lava beds. Some of these stems showed an interesting mode of preservation, being unaltered charcoal on the outside, while the interior was petrified.

[1] The U. S. G. S. quadrangle sheet for this section shows the relief from river to peak to be 1,350 feet.

"Evidently the John Day had been slightly crumpled, had suffered erosion for a considerable period, and was at least partially covered by forest when the first lava floods were poured out.

MODE OF DEPOSITION

"The John Day beds have generally been considered as entirely of lacustrine origin, and probably a part of the series has been formed that way. There are, however, certain peculiarities about a considerable portion of the section which it is difficult to explain by this theory. ... Following this paragraph, three pages are devoted to a discussion of the possible manners of deposition of the materials that hold the fossilized remains of the many animals that once lived in the John Day and contiguous areas. The undecided question seems to be; were the deposits lacustrine, aeolian, volcanic, or an intervaled combination of all these modes of accumulation.

On page 465, Dr. Merriam remarks: "Having originally held to the lacustrine theory of origin for the whole series, it would seem to the writer, after consideration in lights most favorable to this theory of all the evidence obtainable, that, as commonly accepted, it fails to meet fully the necessities of the case for a large part of the section. If it is retained for these beds it will be in some modified form".

FOSSIL REMAINS

"... The flora of the John Day was unknown until the summer of 1900, when a small collection of leaves was obtained by the University of California party from the upper beds near Lone Rock. These specimens were examined by Professor Knowlton, Salix sp. (willow); Phyllites n. sp., (fern); fragments.

COLUMBIA LAVA

"The name given to the lava formation above the John Day was first used by I. C. Russell, who applied it to the series of eruptives which forms such a prominent

feature of the geology in the area drained by the Columbia River. ... In the John Day basin it is found that the lavas of the Columbia form a well-defined series which lies between the John Day and the Mascall formations. Other eruptives in this region are hardly to be confused with it. This series is, moreover, that one of the several to which the name is applied which has the greatest lateral extent, forming probably the largest lava field of the world and one of the most important formations on this continent. It would seem advisable to restrict the name Columbia lava to this horizon. The lava series is composed of a large number of basalt flows which are sometimes separated by beds of tuff. At Turtle Cove twenty-three flows were counted in the bluff. Nowhere does it seem to be less than 1,000 feet thick, and it would average much above that over the greater part of the basin. "A hint as to the mode of exit of the lava is furnished by the occurrence of basaltic dikes in the John Day beds at many localities. The largest and most important of those that have come to the writer's (Dr. Merriam) notice are the Davis dikes, which run in nearl a straight line, with few if any breaks, for about fifteen miles through the lower end of Turtle Cove and on out into the valley of the main river". (It crosses beneath the highway and river, Mile post 107, (State 19).

MASCALL FORMATION

Nomenclature - "Along the valley of the East Fork and south of the Blue Mountains (page 469) there is found, resting upon the Columbia lava, a series of sediments which have been known in the literature as the Cottonwood beds, the Loup Fork beds, the Ticholeptus beds (in part), and the Amyzon beds. Recently Wortman has placed his paleontological horizon known as the Protolabis beds in this formation. None of these names appear to be applicable to the formation considered as a stratigraphic unit... It is, therefore, proposed to designate these beds as the Mascall formation. The typical exposure is near the Mascall Ranch, four miles below Dayville.

"At Rattlesnake Creek (page 470) near Cottonwood the Mascall is not less than 800 or 1,000 feet thick. The beds are made up of ash and tuff and are generally light colored, though there are some brownish and reddish strata. Coarse detrital materials are generally absent from the typical section on the north side of the East Fork Valley.

FOSSIL REMAINS

(Page 471) The Mascall formation has furnished many fossil remains, includin those of mammals, testudinates, fish, and plants. The vertebrate fossils are neither so numerous nor so well preserved as those in the John Day. Teeth and single bones comprise the greater part of most collections made here. The mammalian remains show the fauna to have been of a much more specialized and higher type than that of the John Day.

"Fish remains are found associated with plants in the lower part of the formation near the old Van Horn ranch. The single species known from this locality has been referred by Cope to the genus Plioplarchus, a member of the perch family.

"Plant remains (page 471) are very abundant in the shales at Van Horn's Ranch and other localities near the bottom of the section. The collection made here by Captain Bendire was studied by Professor Lesquereux, who considered it upper Miocene. A Collection made by the University party in 1900 was submitted to Professor F. H. Knowlton, who has furnished the following list, with a statement regarding the probabl horizon to which the flora belongs: On "Van Horn's Ranch, about half way between Canyon City and Dayville on East Fork; (twenty-three varieties were noted as Follows:

One China cypress, one Bald cypress, "Idynites", one willow, eight oaks, one "Planua", one fig, one laurel, three maples, one soapberry, two "Prunus", (plums or cherries), one "Hydrangea", one pepperwort, one "Povana", and in "Locality 880" one hornbeam.

"The flora of Van Horn Ranch finds its greatest affinity with the Auriferous gravels and allied floras of California and is to be regarded as upper Miocene in age." The locality four miles east of Dayville (loc.880) is represented by a single species. ...

" ...It is the plant and fish horizon of the lower Mascall which Cope referred to the Amyzon beds. It was apparently supposed to have the same relation to the John Day as the Clarno leaf beds at Bridge Creek."

ORIGIN

"The numerous remains of plants and fish in the fine white beds at Van Horn Ranch indicate lacustrine conditions at this locality during the early portion of the period". ..

RATTLESNAKE FORMATION

"Throughout the length of the Mascall-formation, Page 473, exposures in the valley of the East Fork, they are seen every where to have been capped at one time by a series of later deposits which hav e sometimes been confused with them. To these beds the name Rattlesnake formation is applied by the writer, (Dr. Merriam) the typical occurrance being on Rattlesnake Creek about one mile west of Cottonwood."... (Rattlesnake Creek enters the John Day just east of the east end of Picture Gorge).

FOSSILS

"The Rattlesnake gravels contain many vertebrate remains, most of which have heretofore been listed with the Mascall fauna. The Rattlesnake fossils when weathered out are frequently to be found resting upon the Mascall beds below, and as most of the material from Rattlesnake and Mascall is found detached from the matrix the difficulties of separating the faunas are considerable. So far no segragated lists of the species have been published. (1901)

AGE OF THE RATTLESNAKE

"Without making any attempt at exact correlation of the Rattlesnake with any

other formation, there seems to be sufficient evidence to show that it should be considered as belonging to the Pliocene of the standard scale; perhaps it represents only the later portion of that period".

QUATERNARY

Terraces - "At numerous points along the John Day and its tributaries, one or more terraces are to be found not far above the existing floor of the valley.

"... Along a considerable part of the river, terraces representing parts of ancient alluvial fans or slopes are very common. On the north side of Bridge Creek near Allen's Ranch numerous broad, gently sloping tables separated by gullies sometimes several hundred feet deep represent an old and very regular alluvial slope. The stream cuttings here show in places a considerable thickness of the John Day beds capped by irregularly stratified wash from the adjacent lava bluffs.

"In terrace deposits remains of Elephas and Equus have been found at several localities. Near Mt. Vernon, on the East Fork, a nearly complete skeleton of Elephas primigenius was discovered in an alluvial deposit not much above the level of the river. Whether or not other remains have been worked over from older deposits, this skeleton has evidently not been disturbed.

CANYON CUTTING

"The discovery of typical Quaternary forms in deposits so near the valley floor shows that the canyon cutting had been practically finished for some time when Quaternary mammals were still in this region. In other words, the period of canyon-cutting did not extend to the close of the Quaternary. ...

ASH BEDS

"At many localities, particularly in the northern part of the John Day basin, an ash bed of comparatively recent origin is seen in the flood plain deposits or on the alluvial slopes near the streams. In the upper end of Haystack Valley near Spray

a stratum about 1½ feet thick is exposed at several places in the river bank. On Rudio Creak (just east of Kimberly) there are fine exposures of an ash bed along the bank of the stream. The bed here is much thicker than at Haystack. ...(page 477.

"Though deposits somewhat similar to those described might be formed by material washed down from fossil beds or other deposits of volcanic materials, the origin of these beds cannot be ascribed to such a cause. Where they have been carefully examined the ash is perfectly pure and is sharply separated from the deposits above and below. It has apparently not been worked over appreciably and was probably deposited rapidly, otherwise it would be mingled with other detrital material. Its deposition is evidently to be correlated with some catastrophic volcanic outburst occurring in comparatively recent times. Possibly it has been derived from the volcanoes of the Cascade Range.

CARNIVORA FROM THE TERTIARY FORMATIONS OF THE JOHN DAY REGION

"In 1899 and 1900 field parties from the University of California, working under the direction of the writer, (Dr. Merriam), collected over the greater part of the exposed area of the Tertiary formations in the John Day Valley of Eastern Oregon. In the fall of 1900 L. S. Davis and V. C. Osmont continued in the field after the University party had returned, and made additional collections, particularly in the region of the Crooked River and Logan Butte. ...

"... In working over the subject of variation in the dentition and skull characters of the recent Canidae, Dr. C. Hart Merriam and Vernon Bailey have furnish most valuable data. In the examination of the Canidae, Mr. Bailey has worked over a very large series of skulls and has reported on over fifteen hundred examinations.

OCCURENCE

"The general stratigraphic succession of the Tertiary formations... has been discussed... in a previous paper. The sequence of formations recognized is as foll

John Day River Terraces	Quaternary
Rattlesnake Formation	Pliocene
Mascall formation	Miocene
Columbia Lava formation	Miocene
John Day series	Mioceneto Oligocene
Upper John Day	
Middle John Day	
Lower John Day	
Clarno formation	Eocene
Upper Clarno	
Lower Clarno	

"... Of these formations, those included in the beds below the Pliocene are made up mainly of igneous materials The John Day and Mascall beds are almost entirely composed of volcanic ash and tuff in various forms. Mammal remains are known from the John Day, Mascall, Rattlesnake and Terrace deposits.

". . Excepting the uppermost portion of the series, the John Day beds show a remarkable eveness in their stratification, and contain a fauna which is characteristic of dry land. In the higher strata, . . a number of fresh water types are seen in the fauna.

"The greater portion of the total thickness of the Mascall is, like the John Day, made up of evenly stratified ash beds. In the lower portion of the formation there is, however, evidence of accumulation of a considerable thickness of fine sediment in a body of fresh water. In this there are numerous remains of fresh water fishes and mollusks and large quantities of fossil plants.

"The Rattlesnake beds consist mainly of heavy gravels. "... Although the Carnivora of the Tertiary faunas of the John Day have been known through numerous types, the actual number of specimens is not large, and they may be counted as the rarities. It is interesting to note that in the collections obtained by the University of California, there is a considerable percentage of new forms, although the number of specimens is relatively small. This indicates that the fauna is still only imperfectly represented in the collections. As yet carnivore remains are

certainly known only from the John Day and Mascall. "... The number of specimens known to occur at each horizon is indicated by the figures in the table. These number twenty-three from the Middle John Day, twelve from the Upper John Day and two from the Mascall; a total of thirty-seven carnivores.

"The Tertiary beds of eastern Oregon have furnished a remarkable variety of canid types (dogs, wolves, etc.) compared with other formations in America. Nearly all of these are known from the John Day beds, only two of the eighteen species occurring in the Mascall. The classified cats number nine.

"Though fairly well known from skulls and teeth the John Day cats have, as a whole, presented some of the most puzzling features of this fauna. The most common and best known forms included in the genera, Archaelurus and Nimravus, were established by Cope to include three feline species related to the sabre-tooth forms, but having very primitive characters, They were referred to by Cope as the 'false sabre-tooth's',..." One of these was named Pogonodon davisi, by Dr. Merriam recognition of the efficient service of Mr. Leander S. Davis as a guide and collector in the John Day field.

"Taken together the Canidae and Felidae of the John Day represent a state of evolution somewhat more advanced than reached in the White River (Colorado) and less advanced than that of the Loup Fork (Kansas or Colorado). Compared with the known faunas of Europe, they appear to be not older than the middle Oligocene of Fontainbleau and not as young as the middle Miocene of Sansan."

In Dr. Merriam's volume, (page 540) he says: "the oldest formation in the basin affording mammalian remains is the John Day which overlies the plant bearing Clarno beds". In Dr. Stock's article "Oregon's Wonderland of the Past", page 59 of the Scientific Monthly, July 1946, we read: "The oldest mammalian fossil so far known from Oregon is a single tooth, discovered in the Clarno formation (of the Eocene period) near the crossing on the John Day River, called Clarno's Bridge ...In the

same formation occur fossil nuts, seeds and leaf impressions".

"Before the extravasation of the Columbia Lava, the John Day formation was subjected to erosion. The surface thus produced is known to have supported a growth of timber in at least one locality. Partly charred and silicified wood has been found at the contact of the buff beds with the lava, numerous sticks and stems extending upward into the lower portion of the lava flow.

"The Columbia Lava is built up of numerous heavy sheets of olivine basalt with relatively insignificant amounts of basaltic tuffs interbedded with the flows. In Oregon the lava series reaches a thickness of one to two thousand feet.

"Resting on the Columbia Lava without observed unconformity is the Mascall formation. The lower beds, from which numerous leaf impressions and poorly preserved fish remains have been obtained, are described by Calkins as fine-grained chalky rocks, probably in part of organic origin . ...The upper beds which yield the mammalian remains are tuffs of light color, fine grain and harsh texture. ...

"Upon the uptilted and eroded edges of the Mascall there lies a considerable thickness of gravel, tuff and rhyolite lava which has been named the Rattlesnake formation, from its typical occurrence on Rattlesnake Creek (just east of Picture Gorge). The basal gravels of the Rattlesnake contain many pebbles evidently derived from the Columbia Lava. Vertebrate remains have been obtained from both the tuffs and gravels.

"... It has been suggested that the deformation of the Rattlesnake occurred after the John Day River had established itself in its present course.

"Stream terraces are found along the John Day and its main branches, ... Remains of Elephas and Equus are preserved in the Quaternary terrace gravels. ...

"The earliest expression of opinion regarding the correlation of the Tertiary formations in the John Day valley seems to have been that of O. C. Marsh in 1875. Of the John Day Marsh wrote 'The typical localities of this Miocene basin are

along the John Day River, and this name may very properly be used to designate the lake basin. ... The upper beds alone (Mascall and Rattlesnake) correspond to the deposits in the White River (Colorado) basin. The lower portion also is clearly Miocene as shown by its vertebrate fauna, which differs in many respects from that above'. The Clarno is referred to as the 'Eocene beds containing fossil plants'.

"Paleontological Classification. Two faunas may be recognized in the John Day, corresponding to the middle and upper stratigraphic subdivisions. The Lower John Day will probably prove to be faunally distinct from the beds above, but until its fauna is better known it must be left without a paleontological designation.

"... It has been suggested that the sands, gravels and tuffs of the Upper John Day may represent a third faunal subdivision".

The Total Fauna. For convenience in reference a complete list of John Day vertebrate species is appended. The list is by no means a final one, and ... changes will be made as a complete revision of the fauna progresses".

John Day Fauna

Canidae - dogs, wolves, coyotes and a type of bearlike dogs	18
Mustelidae - weasels, martens	1
Felidae - cats	10

Rodentia

Sciuridae - squirrels	2
Haplodontidae - sewellel or marmot	4
Castoridae - beavers	2
Geomyidae - gophers	10
Muridae - mice, rats	4
Leporidae - hares	1

Perissodactyla	
Equidae - horses	8
Lophodontidae - "like a tapir"	1
Tapiridae - tapir	1
Rhinocerotidae - rhinoceros	7
Chalicotheridae - ground sloths	2
Indeterminate	1
Artiodactyla	
Elotheridae - large pigs	3
Suidae - peccaries	8
Merycoidodonts - oreodonts	14
Camelidae - camels (small)	2
Hypertragulidae - ?	2
Testudinata	
Testudinidae - tortoise	1
Squamata	
Boidae - armadillo type	1
Mascall Fauna	103
Canidae - coyotes, wolves, dogs	17

"In addition there are hoofed mammals, oreodons of an advanced type, a peculiar member of the deer family and one of the horses resembled a pony in size. The flesh-eating mammals include a huge bearlike dog and another member of the canid family that serves well as an ancestor of the modern wolves".[1]

[1] See p.p. 62, 62 The Scientific Monthly, July 1946, article by Dr. Stock.

Rattlesnake Fauna

"Resting on the worn edges of the Mascall beds is the Rattlesnake formation comprising several hundred feet of gravel, tuff and lava.

"... The fossil mammals collected in the Rattlesnake are not only different from those known from the Mascall, but wherever related forms occur in both, the more advanced or progressive types are found in the upper or later formation"[1]

"The following list of mammals, representing the Rattlesnake fauna, is based chiefly on materials collected in these deposits by the University of California expedition of 1916".

Rattlesnake Fauna

Carnivora		Rodentia - squirrel	1
Canis - wolf	1	Lagomorpha - hares	1
Ursid - bears	2	Edentata - ant-eater	1
Mustelea n. sp. marten	1	Proboscidean - remains)	
Felid sp.-B-small cat	1	Equidae - horses (one of pony size)	6
Felid sp. -A-large cat	1		

Proboscidean - elephants, mastodons (remains too indeterminate for classification)

Rhinocerotidae - rhinoceros	1	Suidae - peccaries	2
Camolidae - camel (large)	1	Bovidae - antelopes	2

The bear remains, discovered in 1916 in the Rattlesnake beds of the Pliocene period by Chester Stock and Clarence L. Moody, from the University of California, created great interest in paleontological circles, "because it closely resembles, or is identical with, a fossil bear described from (the Siwalik beds) northern India. This intimate relationship between two forms so widely separated geographically is some of the evidence regarded ... as implying that North America and Asia

[1] Ibid

were joined by land when these animals were in existence".[1]

Terrace Deposits

"The last stage in the history of life of the John Day area, before the coming of Recent time is recorded in terrace deposits now exposed along the present stream courses. In comparison with the earlier fossil assemblages, this unfortunately is a meager one, for it comprises only extinct species of elephants and an equine essentially similar to the modern horse. In at least the latter instance fossil evidence indicates that the earlier mammals continued in their evolution to higher, more advanced, or more specialized kinds".[2]

May 12, 1948 W. A. LANGILLE

[1] See page 64, The Scientific Monthly of July 1946, article by Dr. Stock.

[2] See page 65, The Scientific Monthly of July, 1946 article by Dr. Stock.

CONCLUSIONS

The John Day Fossil Beds State Park units lie in the midst of a land of the yesterdays.

Today, throughout the entire area there seems to be an atmosphere of inscrutable silence and solemnity pervading this region of a hidden antiquity, with its canyons of depth and towering layered cliffs that were eroded and shaped during the millions of years that have elapsed in the multiple eras of geologic time since the land rose from the sea.

Following this uplift the region believably became a comparatively level land surface, later abounding with the strange, primevous animal life which was successively destroyed and renewed, in the several recurring, evolutionary periods of its creative development, when conditions were again suitable for animal life, usually of a higher type than their predecessors.

The John Day areas are not only an outstanding scenic feature of Central Oregon, but from a geologic and paleontologic standpoint, have also been of great scientific importance to earth students of the state and nation for eighty odd years, and will continue to be so into an indefinite future. The yet undisturbed portions of the fossil bearing beds are enormous and excavations by human hands make but little impression upon the massive rock structures.

To scientific minds the geologic sequence of the rock formations is readily traceable through all the changes that have taken place since this part of Oregon was lifted from its ocean bed to become an inland sea, and later transformed into fresh water lakes, surrounded by land features that were a suitable habitat for the strange creatures that came into existence, only to be destroyed by earth disturbances in five, widely separated geological periods of life, followed by their

destruction, that can only be measured in terms of approximate millions of years.

Through the ensuing eons of time the outflow from the vast extent of impounded waters channeled out the now richly scenic gorges, through hundreds, yes thousands of feet of one of the world's most extensive outpourings of lava, and down into the underlying sedimentary deposits, revealing the fossiliferous formations that have yielded so generously of the identifiable remains of strange animals and, in places, earlier plant fossils, fish forms and mollusca.

Under existing conditions it is difficult to visualize the present John Day country as having had a warm, humid climate, with placid lakes, wide prairies radiant with exquisite flowers and sylvan groves of beautiful known and unknown trees which supported the abundant animal and bird life of the period. Assemblages which included the more than a hundred forms of animal life, great and small, that made up the listed mammalia in the transitional stages of their early existence, when the numerous and fierce carnivores preyed upon the defenseless types of animals, thereby maintaining the biological balance that was necessary for their continuation.

In the course of time they all disappeared in catastrophic earth upheavals or volcanic disturbances which deeply entombed and preserved their remains only to be revealed by the floods of later times; where scientists now delve into their repositories and with scrupulous care recover the scattered remnants of the fossilized remains of the mammalia and leaf impressions of the plant life, that they may read the riddles of their abridged existences; each a chapter of geological and paleontological history for comparison with others of like kinds over the world and thus contribute to the great work of studying the origin and evolution of animal and plant life as it came down through the ages.

The presence of Professor Condon in the Dalles when the returning military party exhibited their fossil finds, was a fortuitous circumstance in hastening the

revelations of the John Day fossil beds. In his boyhood days he had gathered marine fossils in New York state rock quarries, and was thus mentally prepared to realize the importance of the find, physically able, and keenly enthusiastic about making a trip to the scene of the discovery, despite the probable difficulties and dangers such a trip at that time implied. Arrangements were finally made for him to accompany the first military party going to the area in the spring of 1862. Some surface specimens were picked up in the Crooked River section, before returning to the John Day beds. There he engaged Sam Snook as a guide and collector. Of Snook very little is known. He is spoken of as a"resident", when inhabitants of the John Day were practically non-existant. However, the circumstance of his having been with Dr. Condon in this first examination of the John Day beds makes of him a character in connection with the first chapter of the story of this pioneering examination of the John Day fossil beds and collection of specimens. Also, whatever the future may develop in the study of the area; to Dr. Condon will remain forever the credit of discovering its rich possibilities, almost unaided, and presenting them to the scientists of the world.

The era that marked the beginnings of the John Day country had, as scientists have judged by its fossil plant life, a mild and humid, perhaps semi-tropical climate. It was a land with beautiful landscapes, marked by charming lakes and streams, plains with waving grasses and lovely flowers; bordered by wooded slopes with trees of kinds, known and unknown today. Its abundant animal life was of primigenous origin, and of many kinds. From the silences of this ancient wilderness,- rose the cries and songs of birds, the trumpeting of elephants; the snarls and screams of feline carnivores, and the nights were hideous with the chilling, nocturnal choruses of dog and wolf packs, mingled with the terrified cries of their stricken, defenseless prey.

Gone are all the primordial lakes, flowered plains and sylvan slopes that abounded with the newly created animal life which mysteriously appeared in its early forms, only to be destroyed and regenerated in five progressive, long between, periods,of subsequent geologic time. The John Day formations and their fossils are given as Oligocene and Miocene, the Columbia lavas and Mascall to the later Miocene, the Rattlesnake to the Pliocene and the terrace deposits to the Pleistocene or Ice Age. A single tooth belonging to an early rhinoceros, found in the Clarno formation, of Eocene age, near the Clarno Bridge over the John Day River, is the oldest mammalian fossil so far found in Oregon.

When the convulsions of the earth had ceased, and the deeply layered, widespread lava flows had chilled; then began the erosive action of immense flows of water. After these subsided the land surface of the John Day basin was shaped practically as seen today; a region deeply and widely eroded, that has left high, flat topped buttes, their walls formed of layered basalt, in places showing up to twenty-three successive strata of their volcanic formation overlying the frequently exposed, variously hued, sedimentary fossil bearing bases.

From time to time the state parks department has acquired certain portions of the John Day basin. The primary purpose of these acquisitions is to secure their particularly scenic features in state ownership and under control of the parks department, in advance of any private occupancy and usage that would be inconsistent with their scenic and scientific values.

There is an act - Section 111 - 3831 to 3834, which provides that the "removal of Archaeological, etc., Material from State Lands ... requires "a permit from the state land board and the president of the University of Oregon; ...

This act covers the excavation and removal of fossil remains; but would not prohibit objectionable structures on private lands fronting the selected scenic

features which, fortunately, are now under state ownership and state parks control. Whether or not this is an overlapping authority has not been determined.

On page 57, of the July 1946 number of the The Scientific Monthly, Dr. Chester Stock has said: "Perhaps nowhere in North America are these conditions met quite so favorably, nor does a representative portion of the past history of mammalian life unfold so clearly and impressively as in the John Day region of north-central Oregon. Here in at least five out of seven or eight readily recognizable and superimposed formations occur the skulls, teeth, jaws, or skeletal elements of extinct mammals".

In the opening sentence, on page 425, Dr. Merriam says: "The fossil field of the John Day region, in eastern Oregon, has been known to geologists for many years as one of the most important of the numerous West-American localities furnishing good remains of Tertiary mammals. During the past thirty years the leading paleontologists of the country have obtained from it large collections of remains, containing a great number of new and interesting animals".

In the"History of the Oregon Country", Volume III, page 86, is a copy of an editorial, published in The Oregonian of November 24, 1877, in which Mr Scott takes issue with Professor O. C. Marsh, a noted paleontologist of Yale University, over Mr. Marsh's statement, ..."that, until within a year or two, it was universally supposed this animal never existed here until introduced by the Spaniards". .... tracing its development from "the Lower Eocene ...to the Post-Tertiary period" when the true equus "roamed over the whole of North and South America".

"In one important particular it is necessary that Professor Marsh be corrected. The discoveries to which he lays claim are not so recent as he supposes, ..."When he speaks of discoveries that were unknown until within a year or two, he falls into mistake; for it is a number of years since Professor Thomas Condon found fossil re-

mains of the horse in Oregon ...and published the fact "five or six years ago".[1]

"It was universally supposed that the horse never existed in America till brought here by the Spaniards, and Professor Condon's demonstration to the contrary was an occasion of much surprise; and we believe he is entitled to the honor of the discovery". ...From such eminent authorities these statements place Oregon's collective John Day formations in the forefront as a locality for unearthing the remains of prehistoric animals of many kinds, ranging from mice to mastodons; and indicate the importance of these fossil beds to the scientific world, and the prestige Oregon derives from their presence within the state. Their great value is not ephemeral, but something as endurable as the hills themselves, which will continue to yield their primordial treasures far into the future.

In this connection, the average visitor, either from Oregon or out-of-state, who travels the highways of the scenic John Day section of central Oregon, even if interested, finds no concise, immediately available information relating to the geology or specific points of interest anywhere along their route of travel.

Road signs designating the location of the outstanding scenic and geologic features, or the most important localities and rock structures which have yielded fossil remains would be of informative interest to visitors. If these were supplemented by envelope size folders, naming, briefly describing, and giving the mile post locations of the outstanding geology, or other features, would arouse visitor interest in this rich field of paleontology, and Harvey Scott's pertinent expression of years ago: "They, (the tourists) will look at anything, especially if someone will point it out to them. ...", would bear fruit. As Mr. Scott further said: "They just want to see things". That is why they come to Oregon. Let us help them.

W. A. Langille

1 See "Rocks of John Day Valley", by Dr. Thomas Condon, Overland Monthly, San Francisco, May 1871".

Proposed John Day Recommendations

Where small streams drain through nearby exposed fossil clay beds, develop in close range of vision to the highway, holding ponds and dam spillways. Seepage drainage from these clay banks color the water, paint thick greens, reds, and pinks. A colored water phenomena unknown in any other part of the state bordering a highway. These streams operate from the Sheep Rock section, but the one to be developed flows west of Turtle Cove. The development may be made adjoining the east line of the highway. The cost of the development will be little. A water falls with green and red vivid coloring, flowing into a pond with a water coloring unlike anything else in the world. This water is seasonal, mostly in the spring.

It is necessary to acquire additional lands to block up the park properly. These lands are between mile posts 1203 and 1255. The lands are owned by the Government, John Cant and John Mascall.

There should be a small fossil museum constructed at the Junction of the Ochoco and John Day highways, 19 and 28. A foot bridge giving direct contact with the Sheep Rock clays should be constructed across the John Day River some where between M.P. 123 and M.P. 124. Rules and regulations should be compiled regarding the run of the park, but confined to a segregated section. The scientific side of the park must be reserved for investigations of west coast colleges and all other scientific bodies. A pamphlet from a mile post standpoint should be compiled for the benefit of the passing laymen which will bring out the main details of the park. The Ochoco canyon for some five miles westward towards Mitchell is very scenic. We already own a mile of it. There should be four miles more added to our mile. I believe the land is owned by the Government and should cost little to obtain.

S. H. Boardman

S. H. Boardman
State Parks Superintendent