THOMAS CONDON

PIONEER GEOLOGIST OF OREGON

FRONTISPIECE—A LECTURE, "THE THREE BEACHES"

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THOMAS CONDON

PIONEER GEOLOGIST OF OREGON

BY

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PREFACE

We take this opportunity to express our gratitude to the friends who have so kindly helped us with their advice, their criticisms, and corrections; and also for their words of encouragement, so often badly needed by one working alone.

And lest the readers of this little volume be seriously disappointed in its contents, perhaps they should be warned that its pages are not homogeneous. Old friends and lovers of pioneer history will enjoy some of its chapters while perhaps many other pages will seem to them dry and lacking in life. But those same "dry chapters" will be of real value to another large class of readers who are deeply interested in the study of the original *research* that revealed the geology of the Northwest Pacific States. To warn the different classes of readers just what chapters to skip would be a foolish task; but in general, the lover of science will enjoy the letters of discovery written to Professor Marsh of Yale, to Dr. Newberry of Columbia, to Professor Cope of Philadelphia, and to the Smithsonian Institution.

And yet to leave out either of these different lines of interest would be to impoverish the record of a life full of rich and varied experiences, all of which were woven into a character that we hope our readers will learn to love.

ELLEN CONDON MCCORNACK.

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FOREWORD

BY

HENRY FAIRFIELD OSBORN

Senior Geologist of the U. S. Geological Survey
President of the American Museum of Natural History

"The Winning of the West" is the immortal title given by Theodore Roosevelt to his narrative of the pioneer explorers and settlers. The exploring adventures of Meriwether Lewis and of William Clark have now been fully recorded for the inspiration of American youth but a number of biographic volumes remain to be written on the lives of the pioneer scientists of America, touching the adventurous and romantic as well as the purely scientific side. What the pioneer ornithologist, John James Audubon, accomplished in the eastern and middle states was accomplished by many equally inspired and hardly less gifted explorers in one after another of our western territories.

Among these names, bright in the scientific history of America, is that of Thomas Condon. The romantic life of this theist and naturalist stretched across the American continent during the formative period of the sciences of geology

and palaeontology and his eighty-four well-spent years as a high priest of nature qualify him to rank among the immortals. As a preacher of the early days in Oregon his sermons may have lacked the lore of the study and the library but they gained in broadened interpretation for to him every object in nature had a meaning. He believed in the theory of development and considered that his teaching of evolution was an interpretation of the works of God. His writings show him to have been a field naturalist completely enamoured of his subject.

His enthusiastic collecting of fossil plants, shells and vertebrate remains along the Columbia River and its tributaries led to studies and deductions of the geologic sequence in Oregon that have remained virtually as accepted today. Letters written during the pioneer days to the American palaeontologists, Othniel C. Marsh and Edward D. Cope, and the Smithsonian Institution give illuminating and interesting glimpses of American geological discovery and nomenclature.

Condon was not a specialist either by nature, inclination or education. As a true pioneer with a thirst for all knowledge and a capacity to assimilate such knowledge and to impart to others what he had gained, he became a most inspiring teacher of young men and women at the University of Oregon. Of this inspiration, J. L. Wortman, one

of his first students of geology at the University, writes to Doctor Condon as follows:

If my efforts are in the end to be crowned with success, I shall always feel that no one will be entitled to a larger measure of credit for the same than yourself . . . . . To your charming and attractive method of presenting the subject I owe probably more than anything else the impressions which afterward led me to take it up for a life work. And permit me to say just here, that I have never found occasion to question or modify in all my subsequent study those broad principles which you inculcated in so simple and unaffected a manner.

A young Oregonian and devotee of palaeontology in the American Museum of Natural History, Miss Rachel Husband, condenses Thomas Condon's life story as follows:

Thomas Condon was born in southern Ireland in 1822. His family came to America when he was eleven years old. Their first home was in the wilderness which is now Central Park near the present site of the American Museum of Natural History in the City of New York. Here he first studied wild life and the fauna and flora of that region. He spent his boyhood and young manhood in New York, getting his education in various schools. Several years were spent in teaching; then he completed a course in the Auburn Theological Seminary. Shortly after his marriage. he and his bride decided to go to the Oregon country as missionaries and they left New York in 1852.

After a long voyage around Cape Horn and up the west coast, they arrived at Portland, Oregon, and from

there went down the Columbia River to St. Helens, which was then a tiny village in a country partly inhabited by Indians. Here young Condon taught school as well as filled the pulpit of the small church. Later he moved to Albany in the Willamette Valley where he was for a number of years pastor of the Congregational Church.

Believing, however, that he could do more good in eastern Oregon, he moved again, this time to The Dalles. It was a wild and lawless town at the entrance to the new gold fields of Oregon and Idaho. Here he established a church which was open to members of any denomination. Having no library or study, he used to think out his sermons during long walks through the surrounding hills. On these walks he always carried a geology hammer and collected fossils and rock specimens. His enthusiasm for this study was so great that he inspired others and soon had many of the soldiers at a nearby fort, teamsters, trappers and packers collecting for him. During the next few years he devoted much time to collecting and to the study of the geology of eastern Oregon. He got in touch with the Smithsonian Institution and was soon exchanging fossil material for scientific publications. He gave weekly lectures on geology which led to lecture trips throughout the state.

During this period of a half century Condon traced and recorded almost single-handed the geology of a wide section of eastern Oregon, from the ocean period of the Cretaceous through the various periods up to recent time. His work was remarkable in its extent and integrity for "after the passing of more than fifty years of research

most of the findings of Oregon's pioneer geologist still remain basic truths."

Several chapters of the book are devoted to the interesting correspondence carried on between Thomas Condon and Professors Marsh and Cope and other eminent scientists of the period. Another section of the book is devoted to the republication of an article, "The Willamette Sound," first published by him in 1871. There is also a comprehensive report which he submitted to the State on the geography and geology of Oregon. After ten years in The Dalles, he went to Forest Grove in the Willamette Valley to teach in the college there. In 1876, he was called to the Chair of Natural Science at the new State University at Eugene. Here he remained for the rest of his life, occupied with a wide range of subjects, with extensive geological field work during the summers and with many outside interests in scientific matters.

Thomas Condon not only left a deep impression on every Oregon community in which he lived but his influence extended eastward to affect the history of vertebrate palaeontology in America. Most generously, he sent to Joseph Leidy and to Professor Marsh of Yale University the characteristic and earliest known types of what may be known as the *Anchitherium* stage in the development of the horse family in North America. This

stage furnished a most important link in the equine ascending chain and is referred to by Professor Marsh in his epoch-making address of the year 1877, entitled "Introduction and Succession of Vertebrate Life in America":

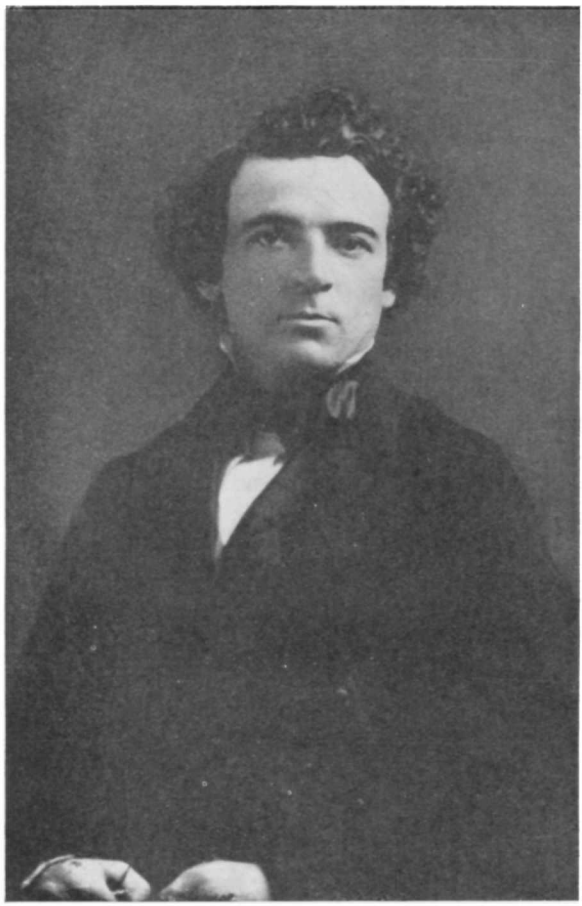
> The oldest representative of the horse, at present known, is the diminutive *Eohippus* from the lower Eocene. Several species have been found, all about the size of a fox . . . . . In the upper Miocene, *Mesohippus* is not found, but in its place a fourth form, *Miohippus,* continues the line. This genus is near the *Anchitherium* of Europe, but presents several important differences. The three toes in each foot are more nearly of a size and a rudiment of the fifth metacarpal bone is retained. All the known species of this genus are larger than those of *Mesohippus,* and none pass above the Miocene.

These most generous contributions to the Yale University Museum hardly received the published recognition they deserved.

The present volume will therefore serve to bring to the knowledge of the present generation of American geologists and palaeontologists the man whom we may designate as the Pioneer Geologist of Oregon. The influence of Thomas Condon's enthusiastic and beneficent character was felt by all who knew him. His spirit was that of kindly and never-failing understanding and sympathy. His patient and enthusiastic research was an inspiration to his students. He has been described as "not merely a scholar and poet, but a

seer," and one of the University of Oregon presidents said of him: "Absolutely sincere, simple in life and manner, gentle and alluring in speech, Professor Condon was nevertheless one of the most courageous of men. . . . . ."

February 24th, 1928.



THOMAS CONDON AT 30 YEARS OF AGE

THOMAS CONDON

PIONEER GEOLOGIST OF OREGON

CHAPTER I

Background

"The name Condon comes of Norman-Irish stock limited to a small Barony in the South of Ireland." Irish history* mentions the Condons among its prominent families from the eleventh to the sixteenth centuries and also among its most prominent families of the seventeenth century. The Norman conquest was in the eleventh century (1066), so it seems quite probable that the name Condon came down from the North with the old Nordic sea rovers and stopped for a time in Northern France. Then followed William the Conqueror across the Channel on his mission of conquest. Tradition says that the Conqueror granted the Condons lands in Southern Ireland because there was not enough in England to satisfy his followers. About six hundred years later Cromwell confiscated most of the Irish lands and gave them to his English followers. The date of this dispossession is given as 1657 and in its record, the Condon Estate in Cork is mentioned. The City of Cork was not far away, but much of the property was on the Funcheon River, a tributary of the Blackwater.

* O'Hart's Pedigrees and O'Hart's Irish & Anglo-Irish Landed Gentry, P. 286.

The records of County Cork contain a chapter on "The Tales, Trials, and Traditions of the Munster Circuit," by J. R. O. Flanigan, and from this record the following quotations are taken: "In 1675 Sir John Perrott leaves record: 'When Cromwell was appointing Commissioners for civil affairs in Ireland, he appointed Miles Corbett—Commissioner for Munster. This barrister was afterward Chief Baron of the Irish Court of Exchequer and obtained a grant of the Condon property on the River Funcheon, which was divided between him and the Lord Deputy Fleetwood. This property was then called Cloghleagh from the Stately Castle of the Condons built on a lofty ledge of rock rising from the break of the river.' "

Owing to the lax ethics of the time, it was quite easy for the lieutenants of Cromwell to connive together and obtain a grant of the beautiful estate on the Funcheon. And when it was confiscated to Cromwell's men and the Condons were gone, the Celtic name Cloghleagh was changed to Moor Park.

Thomas Condon always referred to his grandfather, Bebe Condon, as a grand old man who lived on a small fruit farm near The Blackwater and never mentioned him without the deepest reverence and affection. At the time Thomas Condon was born in 1822, the family lived in the small village of Ballinafana near Fermoy. His

father was an expert stone cutter and the walls of their small cottage were simple slabs of limestone from the nearby quarry while the roof was thatched with straw, and the old castle on the Funcheon was only fifteen miles away.

The writer never heard that there were fossils in the stone quarry, but it must have made a deep impression on the thoughtful mind of the little child that played there, and shed the affectionate glamour of early association over his later study of the rocks for his interest in geology began with his childhood.

Life in New York

When the lad Thomas Condon was about eleven years of age the family left their home in southern Ireland and crossed the ocean to New York. The city at that time occupied only the lower part of Manhattan Island and the first Condon home was within the uncultivated wilderness of what is now Central Park. This was just the place to appeal to a wide awake, unspoiled boy. Here he hunted rabbits, enjoyed the birds and flowers, or wandered with his brothers to the northern end of the island, where they explored old Fort George and the other Revolutionary fortifications. When his play time was nearly over, it was his good fortune to meet Miss Eliza Cox, a

neighboring farmer's daughter who raised flowers for the city market. The flowers were delivered to the city by horse and cart, but the daughter needed help in the garden and was glad to welcome the new boy into the home and teach him her useful art. He was small for his age, but was strong and eager to learn, for he loved the flowers and cared for them most tenderly. His face was earnest and pleasing, with dark curly hair and bright brown eyes full of sunshine and courage. A warm friendship soon sprang up between the Cox family and the boy, and although he could not attend school, he studied his arithmetic evenings and, with the help of the family, made rapid progress. Here he spent two very happy years, and when he finally left her employ, Miss Cox gave him her own gold pencil, which he treasured throughout his life.

Those who have studied the historic development of Old New York may be interested to know that this small Cox farm was on Murray Hill and that later a part of it became the site of the Old Croton Distributing Reservoir, 40th and 42nd Streets, and still later it was here that the beautiful Central Library building was located.

If you now take a double-deck bus at the Metropolitan Museum of Art and go south on Fifth Avenue late in the afternoon, you may find yourself halted on a densely crowded street, every-

thing held up by traffic officers; but you rejoice that you are forced to wait just in front of the beautiful $9,000,000 Central Library building, corner of 42nd Street and Fifth Avenue. This corner is now considered the busiest spot in all the world; but this was once a part of the little farm where Miss Cox and her young helper lived so peacefully, raising flowers for the distant city.

Soon after leaving the flower farm the boy Condon was employed in the office of Dr. McNevin, who was one of the leading physicians of the city. Dr. McNevin was a great Irish patriot, who had been virtually exiled from his native land by the powers that ruled Ireland in 1798. He had continued his studies on the Continent, where he completed his medical education, and finally drifted to America. In New York he married a Miss Ricker, who belonged to one of the old Dutch families that added so much to the early history of the city.

A boy could hardly have fallen into better surroundings than with the McNevin family. They kept several servants, but Mrs. McNevin seemed to have taken a fancy to the brown-eyed office boy and often asked his help about some piece of work at home. At these times she told him stories that enlarged his vision and aroused his ambition for the work of later years. One of the daughters of the family also gave him lessons in drawing.

One day, as they worked in an upper hall, Mrs. McNevin spoke rather sadly of the fact that the floor oil-cloth was so worn in one place that the outline of the pattern was very dim. The boy said quickly, "I can fix it." "Can you?" said Mrs. McNevin. "And how?" "Why, I can get some paints and paint it like the rest." And she, always ready to encourage and help, gave him permission to get the paints and try it. He very carefully imitated the pattern in lines, shapes, and colors; and she was so pleased with the result that she rewarded him handsomely.

Dr. McNevin had a friend who was in poor health and he often sent the office boy with his gig to take the old gentleman for a ride. His name was William Sampson, another Irish patriot, highly educated and of fine character. On one of these rides Mr. Sampson, in talking with the boy, found that he was fond of drawing and gave him fifty cents to buy some pencils; but instead of pencils he bought a small book entitled "The Life of William Sampson." This little book was always a highly prized possession.

In those days New York had no railroad in the western part of the state, and a son of Dr. McNevin had a contract for surveying the Erie Railroad; so they proposed to take the office boy for help on the survey. In order to prepare him for the work, it was arranged that he be tutored with

Dr. McNevin's younger son in algebra and geometry. His preparation in arithmetic had been thorough and he enjoyed his study of algebra, but when he dipped into geometry his joy was complete. He said later: "It lifted me to the clouds; I drank it in as a mental food." Here, too, he had access to a fine library.

But the surveying plan and all railroad projects had to be given up, for in 1836 there was a period of financial distress — partly, it was said, on account of a disastrous fire in the city; and this depression affected New York and New England so seriously that all new financial ventures had to be postponed until a brighter day. By this time Dr. McNevin was over seventy and probably no longer needed an office boy;* and Thomas found a good position in a mercantile establishment, where he remained until he was nearly eighteen years of age. In his nineteenth year, the boy, now nearly a man, made a trip with his father "out west" to Michigan, where they secured some farm land.

Upon his return from Michigan, instead of going back to the city as he had intended, he decided to remain in central New York and for a time attended a collegiate institution at Case-

* Dr. McNevin died five years later and a marble shaft is dedicated to his memory at the historic St. Paul's Chapel on Broadway.

novia. He taught his first school at Camillus, where there was a strong debating society; and he was very fond of a good debate. One winter evening there was to be a noted debate at the Camillus school building and, being one of the principal speakers, he was eager for the fray. Something had detained him so that he was late in starting. He had just reached the foot of a long slippery hill when an old lady called to him. "Oh, Thomas, you are just in time to help me up this steep, icy hill. I could never make it alone." Right there he faced a strong temptation and fought a quick and fierce battle with himself. This delay seemed at first impossible, but the gentleman won; and he gave the old lady his arm and slowly walked by her side up the long icy way. He entered the school house believing that his evening was spoiled, but found that the storm had so interfered with transportation that one or two out of town debaters were also very late, and he was in time after all.

About 1842 he taught in Skaneateles near the lake of the same name. Here there lived a poetical wag who wanted to test the new teacher's ability and sent him a problem to solve in the following language. "In the midst of a meadow well stored with grass, I bought me an acre to feed my horse. What length of rope will feed him all round, on no more and no less than an acre of ground?" The

teacher accepted the challenge, solved the problem and answered as follows:

If in the midst of a meadow a pasture you'd take,
Whose area exactly an acre would make,
X feet of rope would just about give your due I should hope.
But your horse you must tie close by the nose,
Else all this our poetry better were prose.
For if for a holder you'd take his hind leg
The further, of course, he'll roam from the peg;
And you'd be to blame your friends thus to bother,
Besides cheating your neighbor who sold you the fodder.

It was here at Skaneateles that he led in a plan for beautifying the school grounds, the parents and children cooperating with real enthusiasm. The ground was plowed and prepared for plants and seeds which were donated by interested citizens, and the barren yard was transformed into a beautiful flower garden.

These years of teaching were prolonged because the ambitious young teacher was not working to educate himself alone but was helping to educate his brothers and sister.* He was young and full of courage and was a natural born teacher; besides he found this lake country of Central New York extremely interesting and was slowly gathering a small collection of Trilobites,

* His father, to whom he refers as "A noble and generous soul," had died in Michigan.

Crinoids, and other fossils common in some localities near his work. Then, too, he had decided to be a minister of the gospel, and finally settled at Auburn to begin the course in the Theological Seminary. These were busy years for in order to work his way through the seminary he spent his evenings teaching the inmates of the State Penitentiary located at Auburn. The studies required at the seminary, especially the languages, filled out his education and were a source of great pleasure in after life.

When he was ready to begin work in his chosen field, the young minister had some difficulty in finding a parish that wanted his services. The church officials usually asked, "Where were you born, Brother Condon?" And his answer, "In Ireland, Sir" brought him no success, for he found many Scotch people in Central New York who evidently believed that it was quite impossible for an Irishman to be properly "indoctrinated." A good old friend said to him one day: "Brother Condon, you see what a prejudice there is here against your nationality. When next they ask where you were born, had you not better say that you had spent most of your life in New York or some other evasive answer that would be perfectly true?" He quietly considered the kindly suggestion for a moment but answered: "Brother Delivan, if the Lord has any work that He wants

me to do in the world it is work that an Irishman can do."

He graduated from Auburn Theological Seminary in 1852 and a few months later was married to Cornelia Holt, a young teacher from the village of Colden near Buffalo. The bride was of New England ancestry, with large dark blue eyes, a strong, clear mind and tender, loving heart. They were both full of the missionary spirit and decided to go to the Oregon Country made famous by Dr. Whitman and his friends. So Thomas Condon applied to the Home Missionary Board of the Congregational Church and was accepted.

CHAPTER II

To Oregon

In the autumn of 1852, The Trade Wind, a beautiful clipper ship, sailed from New York Harbor bound for San Francisco, carrying besides other passengers a group of Home Missionaries to the Pacific Coast. Among these were Thomas Condon and his young bride, whose lives were to be mingled with the sturdy pioneers of Oregon. Much of interest might be written of the long and romantic voyage around Cape Horn, with its fire at sea when both courage and physical endurance were tested by several days' struggle with flames in the smoldering cargo. Those days of peril were remembered as among the most thrilling experiences of their long and eventful lives.

At San Francisco a transfer was made from the clipper ship to an ocean steamer which carried our young missionaries up the coast and across the Columbia Bar and within a few hours landed them at the small pioneer town of Portland.

Life in Oregon in pioneer days was full of hardships, some real dangers, and much of romantic novelty. Mr. Condon's first missionary assignment was at St. Helens, a small village on

the lower Columbia, and their first home was high above the great river in a lonely spot half a mile from the village. Mrs. Condon was only twenty, a young teacher fresh from the settled home life of western New York. Often strolling Indians would pass the house, perhaps young "bucks" with their bows and arrows after deer, or three or four Indian women with their children gathering blackberries. The small papoose in its stiff little cage was suspended over the mother's back by a broad strap across her forehead, but it would soon be left alone leaning against a nearby tree, or swinging from a low bough, while its mother took off her head gear, a tall, tapering woven basket, and proceeded to fill it with the ripe berries.

The younger women often had round smiling faces, but some of the older faces were very hard, revengeful, and morose, and were made more frightful by disfiguring dabs of red and black paint. As they passed, curiosity impelled them to see the inside of a white man's home; so they came nearer and nearer until finally they flattened their noses against the window panes and gazed into every part of the rooms made visible. They were not on the war path; just bold and impudent and full of curiosity. But since the time of the Whitman trouble in 1847, Indian wars and rumors of wars kept the horrors of that dreadful massacre

fresh and vivid in the memories of the pioneers; so one can imagine the nervous strain of such experiences, especially when alone, as the minister's wife often was; for her husband taught in the village school as well as served as missionary pastor to his people.

Every man in Oregon then made his own furniture or hired a more skillful neighbor to fashion a rude but substantial bedstead, table, or chair. One day the Condons were delighted to learn that the Reverend Horace Lyman and wife, of Portland, were coming down the Columbia to make them a visit. But they had brought around Cape Horn only one good mattress and were at a loss for a second bed. Nothing daunted, Mr. Condon climbed some of the spruce trees near by and detached a quantity of the long streamers of gray moss, with which they made a new mattress that did very well for the emergency. There was certainly nothing helpless about our pioneers; and no one who has always been supplied with life's necessities without responsibility or care, can realize the real joy of quietly studying a needed problem until some bright idea illumines the mind, and then with a feeling of triumph, cheerfully working out and enjoying a substitute for civilization. And this power of initiative has certainly been one of America's most striking characteristics.

MRS. CORNELIA CONDON AT 20 YEARS OF AGE

In 1854 the Condons moved to Forest Grove, twenty-five miles west of Portland. Here they found that a few brave souls had founded both Tualatin Academy and Pacific University, an institution which later became a strong and valuable factor in Oregon's educational system.

The following is culled from a newspaper clipping written by an old time friend at Forest Grove:

> Thomas Condon was the studious, cultivated young minister who was sent out to Oregon Territory in 1852 by the Home Missionary Society of the Congregational Church, and took up his abode with his young wife and infant son at Forest Grove and was given charge of the Congregational Church there.
>
> A log building, long and low, with small square windows and a heavy door that swung on hinges made at the village smithy and seated with low wooden benches, was the house of worship in the little pioneer college town at that time. There stands out clear and strong in the memories of those who knew Thomas Condon then, the figure of a vigorous young man, alert, active, observant, helpful, eager to do and strong to bear.

Here at Forest Grove they met some of the children who were living with Dr. Whitman's family at the time of the massacre in 1847. One of these young girls, now Mrs. DeLaney, after an interval of seventy years, still remembers the Condons very well and cherishes the memory of Mrs. Condon's cordial greeting, her sweet face

within the little bonnet, and the soft dainty lawns she wore, which were so attractive to a girl used only to coarse pioneer clothing.

Since there were very few imported fruit trees at this time in Oregon, the pioneers depended largely on native fruits and berries, which were very plentiful. Wild strawberries covered the rolling hills and low pasture lands—not forlorn little berries such as one finds today—but large, luscious, richly-flavored berries, so thick that a large pan was soon filled to overflowing. Every pioneer in the Northwest learned to love the native wild blackberries, which clambered over logs and fallen trees in great abundance; and who can *now* afford a more dainty luxury than "Thimbleberry Jam?" They also made jelly of elderberries, wild cherries, and Oregon grapes.

Aside from a few river steamers, transportation was almost wholly with teams. Bridges were very few and the pioneer and his brave wife, with three or four children, would pack their lunch box and start for a visit, a church gathering, or some other celebration, twenty or thirty miles away, expecting to ford the Luckiamute or the Rickreall or some other little stream that they had seen months before as a gurgling, sparkling brook that any child might wade; only to find, when they reached the brook, that it was a broad, swift stream. But there was no other way. The

wagon box was tight and the horses were tried and true; so the brave Pioneer—or was he reckless?—started steadily across, headed up stream. The horses were soon swimming; then the wagon box, lifted by the current, was floating around against the team; so there were a few moments of real peril before the horses found the firm rocky bottom, and in a moment more were pulling the precious load up the bank. The frightened children would be very quiet for a few moments, but would soon resume their monotonous chanting song as they jolted over the rough country roads.

The pioneers of western Oregon were typical American citizens of the period. They came from New England, New York, the South and the Middle West. They were quiet home-builders, sturdy and independent, but with little tendency toward lawlessness. They brought with them their love for Church and School, and within a few years an academy or small college was located every twenty or thirty miles up and down the fertile prairie.

In 1857 Mr. Condon had moved to Albany as pastor of the Congregational Church. Even so far away as in Oregon, the spirit of the Civil War was soon hot and bitter; for the North and South were both well represented in our distant state. In 1860 there was a Sunday School celebration in Albany and Mr. Condon made a silk banner,

which was carried through the streets in the procession of Sunday School children. It bore the words: "Liberty is Too Young to Die." The letters were made of fresh white flowers of the old fashioned Feverfew variety, and each flower was carefully sewed to the banner of blue, so that the words stood out bravely in their rustic purity. It was a plea for liberty which must have helped to crystallize local sentiment for a United Country.

Many years after, the following appeared in the Albany Herald as a bit of Oregon history:

RELIC OF THE LATE WAR

Unearthed by the Albany Herald. A Bit of Oregon History.

Carefully laid away at the home of Mrs. Thomas Monteith, Sr., of this city, is a relic of war times which possesses a special interest just now, says the Albany Herald. This relic is a banner which was made by Professor Thomas Condon, of the University of Oregon, during the Civil War, when he was pastor of the Congregational Church at Albany. The banner was wrought in silk and bears the significant words,

"Liberty is Too Young to Die."

The words are suggestive of the noble-minded, patriotic, big-hearted, little geologist at Eugene, whom everybody loves. The banner was made for a Sunday school celebration, and was carried through the streets of

Albany and Lebanon at a time when the spirit of war was raging.

After ten years of active pioneer missionary work in the favored region of western Oregon, Mr. Condon could not resist his longing for a more needy field and finally planned to move his family to the eastern part of the state, where he felt there was much greater need of Christian service.

CHAPTER III

The Dalles—White Salmon

The memorable winter of 1861 and 1862 was nearing its close. It was the winter of December floods, when the river-boats steamed over the rich farms of the Willamette Valley, rescuing the frightened mothers and children and anxious fathers from their own house-tops or upper windows; when barns went drifting down stream carrying their freight of fowls and lowing cattle. It was the winter of deep snows and ice blockades, but, as spring approached, a trial trip up the Columbia had proved the possibility of reaching The Dalles in spite of drifting ice. To be sure, the snow was still ten feet deep at the Cascades, but those were pioneer days, and the first through boat carried among its passengers Mr. and Mrs. Condon and their four children, who had been waiting for the opening of navigation on the Columbia.

On account of drifting ice this first trip occupied parts of two days, making it necessary to spend the night at the Cascades. The next morning found our passengers "Crossing the Portage" around the surging rapids of the Columbia Gorge. They did not travel in an electric car, nor even behind a steam engine, but in a crude conveyance

covered with black oil cloth, drawn by mules on a trolley track. This primitive car line was on the south side of the river and at this time was all there was of railway transportation in the state of Oregon. A few months later the mules were replaced by the historic "Pony Engine," which carried "millions of golden treasure down stream, earning its weight in gold."

The first real portage railway was soon after built on the north or Washington side of the Columbia, where for many years it passed near the old historic Block House used in Indian wars.

At the Upper Cascades another boat of the Oregon Steam Navigation Company was waiting to carry the travelers fifty miles further up the great Columbia. Finally, having reached The Dalles, Mr. Condon was very much surprised to learn that the house he had recently purchased was already filled by three families and a bachelor. The little town was full to over-flowing, and families were indeed fortunate to find comfortable shelter until they could build their own homes. Gold had been discovered in eastern Oregon and southern Idaho, and there was a mad rush to the mines.

The Dalles was the head of navigation on the Columbia River, the gateway through which all the wild, reckless mining population poured eastward to the newly-discovered Eldorado of the

West; so The Dalles, full of lawless and desperate characters, was at this time a missionary field to satisfy the most ardent and devoted spirit. Shooting and stabbing affrays were of daily occurrence, and no good team of horses was safe over night, unless carefully guarded from the reckless gold seekers.

Here Mr. Condon found a small Congregational Church membership, organized by Rev. Mr. Tennie, meeting in the courthouse, for they were without a house of worship. Churches were few and the powers of evil were rampant. But the power of good was there too; all it needed was a strong wise leader. It was just the kind of work our young minister had been looking for, and he threw himself into it with all his latent powers. In a few years he found himself the pastor of a strong working church that would have puzzled any student of ecclesiastical history to classify. There were Congregationalists from New England, Presbyterians from New York, Episcopalians from Virginia, and Baptists from the South, all forgetting themselves and their differences in a common enthusiasm for the work of The Master. To be sure, the minister carried an oil can, for his people were only human; but the wise, tactful use of the lubricating spirit proved one of his most potent elements of success. Then, too, every opportunity was given his people for

hearing ministers of their own denominations; for years a set of prayer books was kept in the church, ready for the Episcopal service; and many times the bishop or white-robed rector accepted a cordial invitation to hold service with the church of many creeds. The pastor learned to love his band of helpers, but his heart went out with all the yearning of his loving nature to the wild reckless sinners around him. And who can calculate the power for helpfulness of one such life? Saloon keepers, drunkards, and gamblers loved him; and to many his earnest, beautiful life, so full of the spirit of The Master, was the only tie that bound them to the higher spiritual life. He attracted their children into the Sunday School, where his faithful helpers threw their greatest enthusiasm. And when the Sunday School gave an evening concert, these same rough characters would go to the church and stand, if need be for hours, delighted with the children's work. On one such occasion the concert was about to close, when a saloon keeper near the door asked to say a word. He said: "The Sunday School is doing a good work; we saloon men like it for our children; we believe in it and want to help. Now, Vic," he called to a comrade, "let's take up a collection. You take your hat and go down that aisle and I will take this side." And the collection was one long to be remembered.

Vic Trevitt was buried years afterward on Memaloose Island in the Columbia, at his own request. This island was an Indian burying ground, "The Island of the Dead."

A minister without a study, Mr. Condon took his pencil and paper, and climbing the steep bluff above the town, roamed over the breezy hillsides while thinking and jotting down notes for the Sunday's sermon. When the sermon was all thought out, and the outline on paper, a stop might be made at the old stone quarry and a tool not usually carried by a minister—a geologist's pick and hammer—would appear from a spacious pocket. A few skillful blows upon the quarry stone might reveal a beautiful branch of acacia, with its long tapering thorns and each folded leaf clearly outlined against the gray stone. The teacher of the Sacred Book would look kindly upon this unburied treasure, as a leaf from God's other book that so few Christian men were then studying. The old question of "how long ago?" suggested by the acacia leaf brought not a doubt; for to him the Bible was given not to reveal scientific, but spiritual, truth. And since this spiritual light was often revealed to the human mind through the veil of human ignorance, without reference to its knowledge of physics, chemistry, or geology, if he found the Bible account of creation did not accord with the geological record, it

brought no shock to his faith in God's revelation of spiritual truth. After all, the cozy study of a more luxurious life would have lacked the fresh breeze of the hillside, the inspiration of the distant snow peaks, the grandeur of the mountains, the calm majestic progress of the onward flowing river. And the study shelf could have held no commentary so rich in its grand outlook into God's past as the acacia branch of the quarry. The sermons thought out on the hillside may have lacked some of the lore of the study table, but they were full of strength and originality, with a breadth of spiritual vision by communion with the Creator of a greater world than Hebrew prophet or Christian sage could have dreamed of in the past. But as he slowly wended his way down the mountain, his joy was tinged with prophetic sadness as he realized the long and painful struggle through which the church must pass during the revolution in religious thought even then so surely coming.

As he came down from the quarry one day carrying his geologist's pick and hammer and a large hand specimen of rock, he found a stone mason at work preparing a block from the quarry for building purposes. He stopped suddenly and holding up his own specimen, said: "Gaylor, what would you think if I should give this piece of rock a blow with my hammer and find a spray of

leaves on the inside?" Gaylor stared with incredulity as Mr. Condon placed his piece of rock on a solid foundation, carefully studied its probable line of cleavage, struck a quick sharp blow and the two sides fell apart, revealing a beautiful spray of leaves. He, himself was delighted with the result, but when he looked up with a smile into the face of the stone-cutter he found him white with fear and astonishment; for to him it was nothing short of a miracle. No explanation seemed to relieve the poor man's superstition, and he could never quite forgive the minister who was in league with the spirits.

During these early days in The Dalles when the town was still full of professional gamblers and while they as yet seemed unashamed of their occupation, they adopted a certain fashion of overcoat which was well known as a gambler's coat. Some wag among them proposed that they make the new minister a present of one of these elegant overcoats. They enjoyed the prospect of the joke and appointed one of their number to make a presentation speech; then met the minister by appointment and in a very gentlemanly, appreciative address presented the overcoat. It was intended to be very long, reaching almost to the heels. It was of rich dark brown material, elegantly trimmed with a lighter shade of brown fur. Of course Mr. Condon saw it was a practical

joke, but it would do no good to resent it; so he thanked them in the same kindly manner in which they had made their presentation. Then looking at the handsome garment he spoke with hesitation, as if in doubt, as he said naively, "I *think* I can teach that coat to behave itself."

Mrs. Condon came to the rescue by removing the fur trimming from across the bottom of the coat and making it ten or twelve inches shorter. In this way the minister wore the coat several years, and it is safe to say that no garment ever had a better reputation than that gambler's overcoat. Perhaps it was because they felt a little ashamed of their joke, or perhaps only because it served as an introduction, but the gamblers were always among his warmest friends.

Transportation west of The Dalles at this time was almost entirely by water, and beside the river steamers, row boats were quite common. The Columbia with its strong current and high winds was often extremely rough, and the waves with their picturesque white caps ran high. But there were men, trained by long years of experience on the river, who were expert boatmen. And such a one was Mr. Joslyn, a tall, slender, blue-eyed Yankee from Massachusetts, who with his New England wife had selected their homestead along the meadow land of the river at White Salmon. Here they were living in the early fifties when

they were warned by friendly Indians that the Klickitats were "on the war path" and that they must flee for their lives. They hurried across the Columbia to Hood River and, looking back, saw the fire that destroyed their home as the Indians burned it to the ground. Months later they returned and built again under some beautiful oak trees, and this Joslyn home became the Mecca for their friends from The Dalles and Portland, who always welcomed an opportunity to enjoy the hospitality of these most lovable hosts.

In 1862 or 3, Mr. Joslyn rowed down the river twenty-five miles from The Dalles to White Salmon carrying the Condons and the Donalds, including four or five grown people, seven children, and supplies, all in one big rowboat. He guided his craft skillfully under the great perpendicular walls of basalt, past and through all other dangers and then glided over his own home meadows and submerged rail fences, to land finally half a mile from the usual river-bank; for it was the annual June flood-time caused by the melting snows in the Cascade Mountains.

A few years later, it was from this Joslyn home that a party of eight or ten mountain enthusiasts, including Mr. Condon, started for Mt. Adams, made an ascent of the snow peak, then sat in tin pans and slid down the mountain side. They then explored the interesting Ice Caves near the foot

of the mountain and of these caves Mr. Condon later wrote as follows:

In the early sixties, Portland received a supply of ice from a cave a few miles from the base of Mt. Adams. A train of pack mules brought the ice to the Columbia River at White Salmon carefully wrapped in blankets, from which point it was shipped to Portland. The cave from which this ice supply was secured was in itself an object of interest to the curious; and the writer among others was led to an examination of its structure and the origin of the ice which it contained. Caves in the basalt of the region were numerous, all similar in structure and evidently due to currents of melted lava which had once flowed through these now underground passages as lava ducts. The forming of these ducts would seem to be simple: a broad current of fresh lava, after some days of flowing from its vent, would chill and harden except the diminished current of fresh lava along the middle line of its outflow; just as in frosty weather a like flow of water would all freeze up, except a small winding duct kept unfrozen by its fresh stream. But suppose now, while this diminished lava-stream is yet flowing, the supply of fresh lava is cut off or directed to some other channel: the remaining liquid portion at once flows out, leaving the duct, through which it came, a hollow cavernous passage. The side, walls and ceilings of these passages have traced upon their surfaces the evidences of such an origin: ropy masses of twisted, half-cooled lava held onto these surfaces as the current passed out, showing plainly the direction of the current. Small stalactites, droppings of lava, hang from the ceiling and drip upon the floor. Many of these are hardly distinguishable from specimens from Mauna Loa. These characteristics

of lava flow were more or less prominent in all of the caves but only in two of them did we find ice. What made this difference? How was this ice formed? During our examination of the principal ones containing ice, it was noticed that a brisk, cold draft of air came from the interior of the cave. This was soon traced to a small passage now almost closed, but plainly in the direction of the continuation of the lava duct. This suggested a possible connection between this draft of cold air and the ice; for if this long passageway in those volcanic rocks was a real lava duct through which a stream of melted rock once flowed from its source in the mountains, then why not accept the judgment that the current of cold air we felt came through that very duct, rolling down from the snow level where every night brought its frost; and that the very gravitation of this freezing air was the force that brought it through the cave, causing the trickling waters that dripped from the roof of the cave to freeze into vast icicles. The surroundings of these lava flows have in them a feature worth noting. The surface has an almost uniform "dip" to the eastward, indicating of course the line of lava flow, and across this flow one sees at frequent intervals, well marked lines of ground swells, each line marking off a well-defined terrace. These terraces are so numerous as to constitute a characteristic feature of the region, each one marking the limit of an exhausted lava-flow.

The White Salmon of the early sixties possessed many charms. The Dalles had then no public water supply, and water was hauled from the river in great barrels for use in the homes, so that verdure and beauty were reserved for the future.

At White Salmon, besides the charm of congenial friends, there was "The Creek," a clear, rollicking mountain stream of great utility as well as beauty; there were also abundance of fruits and flowers, herds of dairy cattle and a goodly supply of riding ponies. The Condons often enjoyed all of these attractions.

At the close of one of these frequent visits to White Salmon, Mr. Condon with others had been waiting under the cottonwoods for a sight of the river steamer which could always be seen a mile or so down stream looking like a great white swan upon the water. When finally it was hailed and after much swinging and backing and churning of water it was stopped broadside to the sandy river bank, the long, slender gangplank was made fast and the passengers quickly passed over the intervening water, using a tightly suspended rope for a hand-rail. Then the crowd looking down from the upper deck, saw an Indian woman start across with a pack on her back and carrying a heavy child. She had watched the others and had seen the teetering and bending of the slender board. She was too badly loaded down to control her own movements. She was sore afraid, stopped and drew back. If she had been a white woman any deck hand would have offered to carry her child, but she was only an Indian. Suddenly Mr. Condon darted down the plank to her

rescue, reached out his arms for the little "papoose" and carried it across; and the mother, thus relieved, made her own way to safety. The Indians were usually allowed to look out for themselves; but to him she was a woman, one of God's creatures and a mother, needing a helping hand, and his chivalrous nature saw no color line.

CHAPTER IV

The First Glimpse of the John Day Country—Medical Men and Research

One of the most attractive spots in the then arid region of eastern Oregon was Old Fort Dalles, a mile or so south of the town. It was on a rolling hillside which sloped down to the banks of a rushing mountain stream. There was a fine spring just east of the barracks, which enabled the Post to irrigate a luxuriant garden. There were fantastic rock formations, beautiful pine trees, a grand view of the Columbia and the mountains, and, last but not least, the army officers and a few of their families lived there and added much to the social and intellectual life of the town. One of these officers was Captain John M. Drake, who commanded a company of cavalry. Mr. Condon had evidently kindled the interest not only of the captain, but also of many of his company, in fossil hunting. Perhaps he had taken some of them to the old stone quarry near, where he had found the beautiful leaf impressions that formed part of his growing collection.

In 1864 Captain Drake took his cavalry into the Indian country, going as far as the Harney Valley. On their way back they camped on

Beaver Creek near Crooked River, and the captain, with part of his men, left camp and went in search of a band of troublesome Snake Indians. On his return he found his camp converted, as he said, into a "vast geological cabinet. Everybody had been gathering rocks." His letter, written July, 1864, shows Mr. Condon's ability to rouse enthusiasm and interest wherever he went; his enthusiasm was so contagious that it was a very large factor in his success as the pastor of a church, as a teacher, and as a man of science.

CAMP MAURY, OREGON, July 19, 1864.

DEAR SIR:

It affords me a pleasure in being able to send you a few geological specimens, some of them of real value. I had begun to despair of finding anything of considerable interest in that line, as I had but little time to appropriate to the search after curiosities. Last week, during my absence from our camp on Beaver Creek, a tributary of the Crooked River, in pursuit of a party of Snake Indians, some soldiers made a discovery that I take to be of interest geologically.

The locality is a range of low hills on the south side of Beaver Creek; in a low spur of this range, running out into the narrow valley, or creek bottom, was found the out-cropping of a ledge of rock, that contained upon its hard surface, impressions of fossil shells innumerable. I am not able to judge correctly of the character of these fossils; there are some persons here who pretend to know, who say that they are Marine shells; I doubt it, but am inclined to believe that they have been deposited

in the bed of a saline lake. The hill upon which this ledge is found is a bed of washed gravel, cobblestones, etc., like a river bar. The same characteristics mark the hills on the opposite side of the valley, and a few rocks of this character, and bearing these impressions were found there.

I will send you these specimens by the supply train that returns to Fort Dalles in a few days and you will be able to judge for yourself of their character and value. On my return to camp as above mentioned I found our camp converted into a vast geological cabinet; everybody had been gathering "rocks" and as it was but thirty miles distant from this place they were nearly all brought here. You will receive a large contribution to your cabinet.

I send you a few specimens collected in other localities during the summer, but do not consider them of any particular interest. I think a practical geologist would find this an interesting country: thus far I have found but little time to devote to purposes of that kind, picking up only such things as fell in my way.

The weather is pleasant and fine and with the exception of a few wounded, the command all in good health.

Yours truly,

JOHN M. DRAKE.

These specimens collected by Captain Drake's company in July, 1864, were probably the first fossils received by Mr. Condon from east of The Dalles. They were Trigonia and other Cretaceous sea shells from Beaver Creek in Crooked River Valley, and this was the beginning of Mr. Condon's geological work in this region. Of course,

they stimulated his desire to explore this new field and finally he obtained permission to travel with a company of cavalry which was acting as escort to a caravan of supplies for Harney Valley. This trip in 1865 or 1866 took Mr. Condon through the upper Crooked River Valley, where he found a few fossil bones and teeth; and as he returned to The Dalles by old Camp Watson on John Day River he found a few specimens from this fossil field of the future. The road followed Bridge Creek for several miles and it was probably on this trip that the first of the cinnamon-colored fossil leaves were found. A few specimens of these leaves were given to W. P. Blake, who carried them to New York and gave them for determination to Dr. J. S. Newberry, who was a great student of fossil plants.

On the eve of his departure for Europe, Blake wrote the following letter to Mr. Condon:

NEW YORK, June 1, 1867.

MY DEAR SIR:

I have had the plants from Bridge Creek, Oregon, examined by the highest authority, Dr. Newberry, now of Columbia College of this city, who says they are exceedingly interesting and indicate the upper Miocene or Pliocene. He recognizes a Platanus and an Oak, which last is allied to the evergreen oak of California. The deposit is of extreme importance as it will afford us an insight of the former flora of that region. For this it becomes important to have a large collection made. You

remember that I asked you to get me a full suite of these leaves. I have now to ask you to make special efforts to secure a very full and complete series. I am willing to pay part or all the expense of it—at least on Dr. Newberry's behalf and myself I offer to send you $75 or $100 as soon as you have visited the locality and secured a quantity of the material and sent it to us through the Smithsonian Institution. We would like it at once or as soon as you can get it. We will also send you some fossil shells in exchange. If the slabs come out in large pieces and are filled with impressions it will be best to send them as they are, not split up, for in that shape they will ride safer and be more compact. Do go to the place as soon as you can, take workmen with you, and quarry out half a ton of good specimens and send them to Messrs. Blake and Newberry, care of Smithsonian Institution, Washington, and draw on us for amount you think best, inside of $100.

The fossil shells are probably Cretaceous. I have left them with Prof. F. B. Meek for description.

I had a pleasant voyage home and sail for Europe today. . . . . Yours truly,

W. P. BLAKE.

If we turn aside for a moment and note the geological situation in the United States fifty or sixty years ago, it will give us a better understanding of the wider relations of Oregon's geology to that of the educational centers of the East.

The comparatively new science of Paleontology drifted across the Atlantic to the United States in the fore part of the nineteenth century; and the Philadelphia Academy of Sciences, the Smith-

sonian Institution of Washington, and the Peabody Museum at Yale were born. It is interesting to note what an important part the medical profession had in the growth of American paleontology as well as zoology and botany. The surgeon studied human anatomy as did no other student; for it was a vitally important part of his surgical training. The physician also was then obliged to become familiar with a wide range of plants for they entered into the various compounds of value in medical practice, and if the government sent out an exploring expedition, it must of course have a physician and surgeon to care for the health of the men. Now a true medical man is naturally of a scientific turn of mind. His own tastes and training made him a valuable factor on these expeditions; for he usually started across the continent and into the wilderness with the official title of "Surgeon and Naturalist," and his instructions were not only to care for the health of the party, but also to take notes and collect all objects of interest of both animal and vegetable life.

In looking through the annals of the great English and American exploring expeditions or military campaigns, one finds the names of Doctors Menzies (1792), Scouler (1824), Townsend (1839), Torrey (1843), Luckley and Cooper (1860), David Owen, Engleman, Newberry,

Goodale, Chapman, and Wortman, all medical men that were noted as zoologists, paleontologists, or botanists, and many of these names are made immortal by being linked with the forest trees, shrubs, and wild flowers of the United States, especially those of the Pacific Coast.

So it was not strange that vertebrate paleontology had its first great American champion and expert in the person of Joseph Leidy, M.D., Professor of Anatomy at the Medical School of the University of Pennsylvania. In Dr. Leidy's youth medical schools offered little *comparative* anatomy. But the thorough knowledge of *human* anatomy was the best possible foundation for the study of the structure of all vertebrate life. A love for his work and favorable circumstances led Dr. Leidy on until he became perhaps our first, and certainly one of our greatest, vertebrate paleontologists. His reputation was such that the first boxes of fossils sent to the Smithsonian from the Bad Lands of Nebraska and Dakota were soon reshipped to Philadelphia to be examined and experted by the great comparative anatomist, Dr. Joseph Leidy. This was seventy-five years ago, but even yet there seems to be no better way of preparing for vertebrate paleontology than Dr. Leidy's way of first becoming a thorough student of human anatomy in some first-class medical school. It was Dr. Leidy's privilege to

examine and name the first specimens of rhinoceros, camel, oreodon, horse, entelodon, saber-tooth tiger and other fossils found in the United States. Some of this material was first published by the Philadelphia Academy of Sciences and later by the Smithsonian Institute at Washington.

Perhaps ten years later another center of paleontology grew up at Yale College with Dr. O. C. Marsh as leader. It is needless to state that fossil hunting in the United States west of the Mississippi River from 1840 to 1870 was an extra hazardous occupation, for the American Indians were making their last stand for their land, their elk, and their buffalo; and all expeditions into the wilderness must be protected by army escort. It naturally followed that army officers were often drawn into scientific research and were always of great assistance to the work in the field.

CHAPTER V

Correspondence With Dr. Newberry of Columbia College—The Lecture Habit—Railroad Building

In 1867 the United States Government began its exploration of the 40th Parallel with Clarence King as "Geologist-in-Charge." A year or so later, upon picking up a local newspaper, Mr. Condon was delighted to see that the great geologist, Clarence King, was in The Dalles. He knew that Mr. King might leave for Portland on the early morning boat—so probably gathering up a few fossils—he hurried to King's hotel. The tired traveler had retired early but was soon up and ready to talk geology with his enthusiastic guest, and the next forenoon was spent in the Condon home, looking over the unique treasures gathered there. This short meeting with Clarence King was a real treat to Mr. Condon, for at this time no great geologist had visited him and he felt the need of expert consultation. Then, too, he found King a "genial New Yorker," who took a genuine interest in the work being done in Oregon and later reported it to his friends at the Smithsonian in Washington and at Yale.

We have seen that Blake, after writing his letter of 1867, sailed for Europe; and Dr. Newberry,

to whom the fossil leaves from Bridge Creek were referred, had heard nothing from him or the leaves for over a year. But meeting Clarence King one day in Washington, Dr. Newberry heard more of the work in Oregon; and determining to try again for the coveted fossil leaves, he wrote the following letter:

WASHINGTON, D. C., February 6, 1869.

DEAR SIR:

More than a year since, Mr. W. P. Blake gave me a piece of Schistose cream-colored rock said to have been obtained from you containing numerous impressions of leaves most beautifully preserved. As I have for many years made a study of fossil botany and have given special attention to the plants of the Cretaceous and Tertiary formations, you can imagine that these specimens excited a lively interest in my mind. I then begged Mr. Blake to procure if possible more material from the locality which had furnished that then before me, and authorized him to transmit to you $100 to pay the expense of collecting more, if you could be induced to burden yourself with the effort. Since that time I have heard nothing further from Mr. Blake on the subject. But coming to Washington a few days since I have learned from Mr. Clarence King something more in regard to yourself and the localities from which the plants came and I now address you directly hoping that I may thereby establish a relation between us that will result in my obtaining a large collection of these fossil plants and your getting a full equivalent for any time and trouble you may be able to devote to the enterprise. And first please let me know something of what you

have learned of the mode of occurrence of these fossils, the geographical and stratigraphical position, and whether you would be able to take part in an effort to get some of them. If so what expenditure of time and money would be necessary to secure a full series of these plants. I would gladly pay any reasonable bill of expenses incurred, provided the plants in considerable variety are in as great perfection as the specimens I have seen. Yours respectfully,

J. S. NEWBERRY, Professor of Geology,
Columbia College, New York City.

In answer Mr. Condon wrote:

DALLES CITY, OREGON, February 28, 1869.

DEAR SIR:

Yours of the 6th was received last night. I was glad to hear of your interest in those fossil leaf impressions and this for several reasons. One is this.—In my last visit to the place of their outcrops I found some new things, new leaves, new fruit marks, and several insect impressions; one, a good impression of a dragon fly, or something of similar outline; and these I naturally wished to submit to you for examination.

As the region in which they occur was, when I was there, infested by hostile Indians, whose fresh tracks were on the trail I traveled, I could examine but little of the surroundings.

The few things I noted I will send you together with a rough map of the locality. I hope to visit the place again in May and as I hope to be able to replace then whatever I may now send away, I shall take my own suite of specimens and box them up for you. I want to put one excepting proviso. It is this: I will mark a few

of the specimens with my name as reserved, if I fail to replace them in my own collection. But as I hope to be able in my next visit, to spend more time, and have more help in digging, I have but little fear of failing to replace everything I now send you.

I have other groups of specimens than those you write of, and shall place one or two of each kind in the box, marked respectively "Group A," "Group B," "Group C," "Group D." Please inform me of the degree of interest you feel in each group. Only "Group A" will now be in quantity, the others only as specimens. I may add, "Group A"—the one of which you write—is found nearly 100 miles east of the Deschutes River—"Group B" 20 or 25 miles west of that, "Group C" near The Dalles, "Group D" in a stratum of sandstone with silicified wood, at apparently the very core of the Cascade Range, where the Columbia River sweeps through it. C and D you may have found when you were here. If so they will have but little fresh interest to you now. If not, I think the position in which found will be deeply interesting to you—"Group C" is from a sandstone at The Dalles. I have found in it four kinds of oak and a very fine specimen of acacia, and within a few days a piece of fossil bone beautifully silicified was given me from the overlying rock.

I am just finding out how rich a record our Oregon hills contain. Very respectfully yours,

(Signed) THOMAS CONDON.

DALLES CITY, OREGON, May 31, 1869.

DEAR SIR:

Early in February I received a note from you inquiring about those fossil leaves of which Mr. Blake and Mr. King had spoken to you. As I could not then

obtain any new ones, being unable to leave home, I wrote you that I would in a few days send you my own suite of specimens and replace them if possible in May. My reasons for this course were these: I knew how lively an interest these fossils awakened in my own mind and inferred that if the interest you felt in such things was as much greater as your knowledge of their connection with science was greater than mine, you ought to have them spread before you at once. I took a small box that packed must have weighed about 50 lbs., and having ascertained that the expressage on it to New York would be six dollars and that I could not lessen this amount by prepaying, I sent it.

I then made a rough pencil sketch of the country containing the fossils and enclosed it to you in a letter and asked some instructions in regard to obtaining more for you, stating that I would try to revisit the locality in May. This was, I think, about the last of February. Since then I have heard no word from you. Supposing this due to your absence from home or perhaps to the miscarriage of a letter I have thought best to write you this too and ask whether your examination of those fossil plant impressions I sent, has left any desire for more. I cannot now till I hear from you make my intended visit to the wilderness and yet I am sorry to have it delayed, for there is some reason to apprehend the breaking loose of some of the Snake Indians again, should forcible removal to the Coast Reservation be attended to. The fossils are in their country near a road where they once loved to infest.

I am hungry for a sight of that hill again, when no fear of prowling Indians shall compel me to hold a rifle in one hand and my pick in the other. Besides I have

learned from some young men whose interest I keep up in such things, by furnishing them geological reading, and who pay me back in telling me what they see in their wanderings, of other localities where fossils crop out in that region. These too I want to visit.

Yours respectfully,

(Signed) THOMAS CONDON.

DALLES CITY, June 30, 1869.

DEAR SIR:

Your favor of the 2nd inst. was duly received. I am glad to learn from it that you were not disappointed in the character of that box of specimens.

In about a week I shall try again to visit the spot from which they came—I have just engaged a young man to help me in the work and shall have the opportunity to use the pecuniary help you have so kindly offered. I inquired in one of my letters to you whether you felt an equal degree of interest in that compact agillaceous rock marked "Group B."* Its locality is 20 miles distant from that of the shales, and that fact with the entire absence of that Taxus-like spray with other points of difference led me to think you might wish some of that kind too.

The slates upon which this rock rests are greatly disturbed as is the rock itself. I inferred that it was surrounded by older marks than those of the other. A slab of this rock which I have is exceeded in beauty by nothing I've sent you.

You ask whether I can send you any of that Cretaceous rock containing the Trigonia? The specimens I have left are with one exception poor. I would like very much to revisit that locality. If I could spend two or

* Currant Creek.

three months in the work I might surprise myself and friends in the result. As it is I shall have to send you only a few broken fragments of little value.

Respectfully yours,

(Signed) THOMAS CONDON.

DALLES CITY, OREGON, August 20, 1869.

DEAR SIR:

I sent you this morning by express of Wells-Fargo and Co. a small package, one specimen of which I was quite desirous should reach you soon and safely. The express charge on the package is too high ($2.50) and I refused at first to send it at this rate but my desire to put the large leaf impression it contained early in your possession overcame my sense of wrong and I sent it.

A few words about new localities and old.

First, The Old. The specimens from Bridge Creek. The leaf impression sent you this morning you will see was when entire, 15 to 20 inches in length, at the least, but if the center lobe of the leaf was as pointed as some specimens indicate, then it was over 25 inches in length. And yet I have in reserve a part of one that must have been *one third larger than that.* This last one was in too damaged a condition to send you. The small frill-like sub-leaf at the foot, and surrounding the stems is no accidental position of a small leaf; it is a constant feature, and in one stem I've got, is a beautiful appendage.

In the specimen I send you, you may lay bare the whole of this sub-leaf or frill with your knife or a slender chisel. If you cannot, then I'll send you the stem. It was the stem of a smaller leaf than yours but finely printed, a little maple-like in its enlarged place of attachment to the tree.

The other shale specimen is in two parts which belong, you'll find, together. The varnished appearance is only a little gum arabic mucilage by which I tried to stick them together on a piece of pasteboard and will work off. The impression looks like that of a fish. Please let me know if this is what you make it.

Second Locality. That of Currant Creek 20 or 30 miles from Bridge Creek, westward. The fern specimens are from this locality as also the equiseta looking stems. These occur in a valley with surroundings very much like those of Bridge Creek, of which I will say more.

Third Locality. Northwest from the latter, 5 to 7 miles, at McBee's Canyon, I found the delicate Taxus-like leaves in a firm-grained, hardened porcelain clay or something like it. I did not dig to the rock here; the few specimens I gathered were frost-thrown to the surface.

Fourth Locality. That of the fossil bones—silicified bones. These I found as they had washed from the hills. I only found a few in place, yet enough to determine their belongings. These *fossil bones* so remind me of Prof. Owen's description of the Eocene bones from the Bad Lands that I set them down as associated. Besides I found what I supposed to be an imperfect head of an oreodon, and a soldier found in the same place a fine piece of the jaw bone of a rhinoceros, which I tried but failed to purchase. I compared the rhinoceros teeth with the figures given by Professor Owen and found the correspondence exact and minute. These bones in like hills of hardened clay I now find in the John Day Valley.

General Facts. I succeeded this trip in connecting the rocks of the Crooked River with those of the John

Day extending over a strip of country 100 miles across. Three rocky systems I found the same over this stretch of country.

First and Upper One. The overlying trap, thinned out and in some places only existing in capping to the hills, still originally connected into one extended sheet. This is independent of frequent dykes of traps, massive and columnar, which protrude from all the lower rocks.

Second and Middle One. 200 or 250 feet of non-fossiliferous rock, looking a good deal like Fire Brick, plainly stratified, but very much disturbed like the clay below it. No fossils except sparsely, silicified wood.

Third and Lowest One. This is the strangely-colored hardened stratified clay marked on your map. It contains crystals of gypsum and masses of silicified wood, other minerals sparsely. I have in my last trip found in these hills fossil bones like those I found years ago in like hills of the Crooked River Valley. The small fragments I sent you are from these hills in the John Day Valley. Almost certainly, the fossil leaf impressions of the shales of Bridge Creek are from the base of these hills—quite certainly the fern and equisetum impressions from Currant Creek are from the base of like hills, the fossil bones occurring higher up in the same system.

This indurated clay underlies the whole, extending in a wide belt across the country from the Crooked River Valley across the John Day and beyond, underlying the spurs of the Blue Mountains towards the Columbia River. I traced it through a width of 150 miles or more. So much for the general systems.

Truly yours,

(Signed) THOMAS CONDON.

DALLES CITY, OREGON, January 1, 1870.

DEAR SIR:

Your favor of the 6th ult. was duly received and with it "Surface Geology of Basin of Great Lakes," two pamphlets on Fossil Plants, and your address. Your "Address" and "Basin of the Great Lakes" I devoured at once for I found them full of aliment; the others I shall treasure for reference.

I will answer your inquiries:

1. As to my expenditure in my latest trip into the wilderness, which you offer to reimburse, the people were so kind and gratuitously helpful to me, even to the supply of my pulpit, in my absence, that it cost me but little money, and that I can conscientiously set to the credit of my geological tuition.

It more than pays to visit these grand archives of the past we have here in central Oregon. I shall do it as often as I can and be glad to forward to you whatever I get that is new, for description and publication. The return I would like is this:—As far as you can without anxiety or loss to yourself and from duplicate publications on your shelves, or in your reach, throwing light, old or new upon the geology of our earth, send me what you can well spare. This style of begging one is compelled to; there is so little of such material accessible through the book stores.

2. You ask how large a collection I made of these leaf impressions? Of first class specimens there is perhaps a bulk that might weigh 100 lbs. The others—amounting to about twice that—I brought home for exchanges. These would be interesting to you chiefly to split into thinner pieces and in this way search for other newer things—they are all good. That large leaf impression I

sent you is not the largest of that kind in the collection. I have one nearly twice its size—broken, yet very plainly marked—I have, too, discovered since I wrote you, among the fern specimens from Currant Creek, a beautiful specimen of fan palm and several beautiful equiseta. I have requested the agent of Wells-Fargo and Co.'s express here to ask for special instructions in regard to boxes of geological specimens sent to colleges and have assurance that considerable reduction may be expected in the charges on such packages. I shall send you one box of 60 or 70 lbs. soon, whether any reduction is made or not. Are these ferns from Currant Creek new? I would send you other specimens if you needed them. I will send you some marine mollusks from the Astoria shales with the next box.

Very truly yours,

(Signed) THOMAS CONDON.

DALLES CITY, WASCO CO., ORE., March 10, 1870.

DEAR SIR:

I have just put up a box of geological specimens for you and intend to take them to the express office this afternoon, but while the subject is fresh in my mind let me say a few things about what you will find. First the *Bridge Creek shales.* I have withheld two specimens I wish you had, yes three. These are easily broken—either already too much fractured, or too thin to bear transportation. One is, in its general outline, venation, and other characteristics, like that large one I sent you but very, very much larger. The whole leaf must have been 30 to 35 inches across. This specimen is 12 inches across its greatest dimension and is from the middle portion of the leaf. I can, if you deem it important,

put it up with special care so it might reach you entire. The other two are too much fractured to transport. I found on culling them over, for the really new, much less of this than I anticipated. A few very fine specimens were destroyed on their way here. In bulk I have twice as much left as I sent you, and if more like those sent would be any object, I could send more. I shall go back again in May if I can so arrange things.

I am opening, in that country, another mine of geological wealth. I wrote you that when there last summer I found an extension into that region, of the silicified bones of the Crooked River Eocene. I took with me a little boy who resides there far away from settlements, pointed out to him the fragments of bones I gathered, and promised him a trifling reward for what he might find of them. During the winter he sent me a small box of fragments with several well-preserved teeth—lately another package with two fine rhinoceros teeth still in a fragment of the jaw. A young man in another region sent, and it is now on its way to me, another package of larger bones. Some of the teeth resemble those of the oreodon, figured in Owen's Nebraska Survey.

Second. You asked for some specimens from Astoria. I send you several fragments of Calcareous nodules with fragment of bones, shells, crustacea, etc., in them—some scales of fishes—yes and one chambered shell,—the Aturia, I suppose. Four or five very beautiful specimens I have kept; two of these are like the spiral shell whose name I asked; you will find all the Calcareous nodules from the shales of Astoria and neighborhood. These shales are very much disturbed from their original position.

Third. The fern leaves in drab-colored argillaceous

rock from Currant Creek:—as related to surrounding rocks this has a similar position to that of the shales of Bridge Creek. A very pretty fragment of fan palm I found in this rock.

Fourth. The little yew-like branchlets in cream-colored shale with other associated leaves of same rock—these, all these, lie up higher—against the trap—just covered by the trap.

I have not been able yet to go into the Crooked River country, but hope soon to do so; only a few small bands of Indians remain to be gathered on the reservation, and then one may go there without escort.

One of my means of getting help and information, in the line of my geological inquiries, in Oregon, is to interest our young men. Many of these are teamsters, packers, or trappers who spend their summers in the wilderness, their winters at The Dalles. I have for a few years past tried to keep up weekly lectures through the winter months free to all—my object being understood to be to interest the young people. These lectures have drawn the young people around me, laid open to me a good deal of valuable information, and brought me many a fine specimen. I find these lectures growing difficult for lack of illustration. My shelves have on them fossils of the post-Tertiary, the Tertiaries, and the Cretaceous division of the Secondary, in abundance, but almost entirely bare of Palaeozoic. I feel this the more because Oregon has so little to illustrate that division in her own rocks. Can you without taking your own time for it help me? Can you have one of your assistants put up a box of your excess of material and commit it to the express for me, at my charge? I would gladly offer for such a favor increased service in Oregon.

I have just returned from the express office where I took the box. It weighs 102 lbs. and will cost you, they told me, 10 or 12 dollars. I have waited weeks for an application of reduced rates for geological specimens but this is the best I could get. It will go by the Isthmus as a cheaper route than the Overland.

Should you care to have any more of these ordinary specimens, I can send them; if you would, as I suppose, prefer to await my next raid on the quarry, well. If you will give me your Ohio address, while engaged in your summer's work there, which I suppose you have not yet completed, I can, if anything uncommon should turn up, tell you. Very respectfully,

(Signed) THOMAS CONDON.

Not long ago the writer received the following letter from R. W. Chaney, the paleobotanist, which is of interest because if it had not been for Mr. Chaney's kindly courtesy, many of these letters would have been unknown to the writer, although we had not only discarded duplicates of a few of them but also Dr. Newberry's letters in reply, written over fifty years ago.

BERKELEY, CALIFORNIA, February 14, 1923.

MY DEAR MRS. MCCORNACK:

Last December I was looking over the collections of Tertiary plant fossils at the New York Botanical Gardens. There I found, in one of the trays of material sent to Professor Newberry by your father, a number of letters from him to Professor Newberry. These were of such great interest to me that I have had them copied and shall probably make use of them from time to time

in publications. It has occurred to me that you also might be interested in them and I am enclosing a duplicate copy which I have had made and I shall be glad to have you keep them.

I was interested to note in one of these letters a statement made by Mr. Condon of his opinion that the section in the Crooked River valley was the same as that in the John Day Basin; also his mention of the occurrence of basalt intrusives. It happened that I was giving a paper at the Ann Arbor meeting of the Palaeontological Society during the latter part of the same week that I discovered these letters. As an introduction to this paper I read a portion of the letter announcing these discoveries and stated that the two points here mentioned by Rev. Condon in 1869 constituted my principal contribution on the occasion of reading this paper. It is interesting to see how seldom any of us make a really new discovery, particularly when our field has been worked over by men like your father.

Sincerely yours,

RALPH W. CHANEY.

This lecture habit referred to in a letter to Dr. Newberry began in the sixties and was continued for years not only at The Dalles but throughout the Willamette Valley and other localities. Some of the subjects were: "The Three Stone Heads," "How Oregon Was Made," "The Lime Makers of the Ocean," "The Development Theory," "The Fossil Horse: His Place in the Theories of the Present and His Record in the Past," "The Habits of Climbing Plants and Their Lessons,"

"The Permanent Forces of Society," "The Salmon Fisheries of Oregon," "The Three Beaches," "Lectures on Revelation," "Natural Selection, Market Selection and What Next," "Evolution Not Atheistic," Address to Oregon State Fair in 1873 on "The Making of Soils," "Human Antiquity."

When going to lecture in Portland or elsewhere away from home, he usually went loaded with specimens to illustrate his subject; or if the necessary specimens were too heavy to carry they were sent by express.

This letter to Mr. Terry of Salem gives a glimpse of some of the difficulties encountered in taking specimens away from home to illustrate his lectures.

DALLES CITY, February 3, 1871.

DEAR MR. TERRY:

Your telegram received in Portland last Monday in regard to my lecture, I answered by telegraph on Tuesday in which was a promise to answer more fully by mail. It is herein contained.

My Three Heads were badly damaged by the trip to Portland and I was afraid of the added risk of transportation to Salem without repairs and added precaution which would require several days. I had not made adequate provisions at home for so long an absence as lecturing on Friday would have required and after newspaper reports for Tuesday's lecture had been published their power to draw a house in Salem would be diminished. But I am painfully conscious that in re-

fusing on two successive winters to go to Salem I have injured my reputation among you. I now propose this reparation: The two lectures, the one of last winter on "How Oregon was Made" and that of Tuesday "The Three Stone Heads" have really a serial connection with each other.

I will give both lectures on two successive evenings in Salem. To connect them thus will make both more convincing and plainer.

The proceeds of the first will go to your Young Men's Christian Association, that of the other evening I need myself to help carry on the work that enables me to prepare the materials of these lectures.

Give me ten or twelve days notice.

Lectures on geology were popular in Oregon fifty years ago, although some of the reasons for this were not connected with the personality of the lecturer. Oregon was of course isolated from the great centers of culture with their many forms of entertainment. There was no surfeit of higher educational topics. Good plays were very rare and it was long before the days of movies.

Some of these lectures were given by Mr. Condon as helps to the Portland and Salem Young Men's Christian Associations, some for church benefits, or for the farmers, a lecture might be given at the State Fair dealing with the formation of soils. But each of these meant research and a thorough turning over of the facts and their con-

sequences in the lecturer's own mind in order to present the subject in a clear, forceful, attractive way to his audience. Perhaps his own enthusiastic love for truth was one of Mr. Condon's greatest assets; but as a result there were few pioneer states whose young people were better informed on natural science than the early Oregonians of fifty years ago.

During Mr. Condon's first years at The Dalles, when he was building up his church and becoming acquainted with the people, there sprang up an unusual interest in the man and his work among the officers and employes of the Oregon Steam Navigation Company. As early as 1864, when he had been in The Dalles less than two years, he received the following letter, and for years he was furnished a free pass for himself and family over the O. S. N. Co.'s lines.

THE DALLES, January 7, 1864.

DEAR SIR:

Accompanying this will be handed you a purse containing $235 which please accept for *your personal use*, as a token of Respect and Esteem.

From your friends,
THE EMPLOYES OF THE O. S. NAV. CO.

The river steamers of those days were a delight to all tourists as well as to people living in the region. And when the first Transcontinental railroad was finished to San Francisco in 1869 there

were many tourist parties of men and women who enjoyed the ride from Portland up the Columbia and through the Cascade Gorge over the portage railroad drawn by the historic pony engine. They were then transferred to another attractive steamer which took them to The Dalles, where they had to remain over night. In talking with Captain McNulty or George Naggs, the affable purser, on their way up the Columbia, they would hear all about The Dalles and be advised to see Mr. Condon's geological collection. So about four o'clock of any pleasant day the Condon home might be opened to a party of from two to twenty or more ladies and gentlemen who were Eastern tourists, perhaps accompanied by one or two of the O. S. N. Co.'s officers living in Portland.

The following letter illustrates these pleasant experiences which extended the Condons' acquaintance and often their friendships to include many delightful people.

THE DALLES, OREGON, December 1, 1870.

REV. AND DEAR SIR:

The undersigned before leaving The Dalles desire to express the great pleasure they have experienced this evening in examining the extensive geological collections in your possession and in listening to the views expressed by yourself in reference to their origin and existence; above all they desire to express their admiration of the zeal, labor, and patient investigation which

you have brought to the increase and diffusion of useful knowledge; and the valuable addition to science which through your agency the Columbia River and Valley have thus contributed.

Please accept the enclosed mite as a slight testimonial of our appreciation of your valuable labors, with the hope that it may aid you in your researches and future investigations. It will afford us real pleasure to render you any assistance we may be able to hereafter and we shall be happy to hear of your progress and prosperity at all times.

We are respectfully and truly your friends,

R. D. RICE, Augusta, Maine,
J. C. AINSWORTH, Portland, Oregon.
R. R. THOMPSON, Portland, Oregon.
JAMES TILTON, Wilmington, Delaware.
THOMAS CANFIELD, Burlington, Vermont.
JOHN W. SPRAGUE, Winona, Minnesota.
F. E. CANDA, Chicago, Illinois.

And our record also contains evidence that these pleasant tourists' calls were sometimes of real value to the visitors. The Northern Pacific Railroad was not completed until 1883, but in 1870 the Washington Division had established engineering headquarters in Portland and the preparatory work was progressing. Mr. Condon's callers one day were two division engineers, Gen. James Tilton and Col. Smith. They seem to have enjoyed their call and later reported its general geological information to Col. E. A. Flint, in charge of the engineers of the Washington divi-

sion of the surveys. Col. Flint was so anxious for geological help that Gen. Tilton wrote as follows:

PORTLAND, OREGON, October 8, 1870.

MY DEAR SIR:

At the request of Col. E. A. Flint, in charge of the engineers of the Washington Division of the Northern Pacific Railroad Surveys, I beg your opinion as to the probability of any tunnels along the course of the River Columbia encountering primitive rock.

In your investigations of the "genesis of the rocks" of the country east of the Cascades how many distinct overflows or eruptions of basalt have you noted and what thicknesses do they exhibit? In fact, we would be very glad to be informed if you have written any essays upon the geology of that country, and where such could be found. The report made by Colonel Smith, division engineer, of the River Columbia, and myself as to the most interesting conversation we had with yourself at The Dalles, on the geology of that upper region, has greatly impressed Col. Flint, and your knowledge of this subject will be of infinite use and interest to us. Should you come to Portland please call at the railroad office and in the meanwhile if you have leisure please address Col. E. A. Flint a letter upon the geological characteristics of the country, at as great length as your inclination and leisure will permit. I go tomorrow to the Snoqualmie Pass and in a month or two hope with Col. Flint to visit The Dalles, when we will do ourselves the pleasure to call on you.

Most respectfully your friend,

JAMES TILTON,
Division Engineer, N. P. R. R.

Mr. Condon answered promptly, evidently following his usual custom of rewriting any important letter and discarding the imperfect draft; but as the following fragment of an unfinished letter bears the early date of 1870, it may be of interest as showing his familiarity with the structure of the Cascade Mountains at that time.

DALLES, October 10, 1870.

DEAR SIR:

I have just received a letter from General Tilton in which he requests me to send you, at such length as my leisure may admit, answers to two inquiries he makes bearing on the geological structure of the banks of the Columbia River in its course through the Cascade Mountains.

The answers that my merely surface examination suggests are very cheerfully tendered. *First.* As to the probability of any tunnels along the course of the Columbia River encountering primitive rocks.

The structure of the Cascade range is such that primitive rocks where present at all, are found at, or near, the principal lines of upheaval. The axis of the principal line of upheaval crosses the Columbia at the Cascades, and there primitive rock would be found, if at all, along the river.

But that there is no primitive rock there the following facts would seem to prove: That there is none in sight, is settled, but may there not exist concealed cores or nuclei, covered from sight by the softer materials of more recent rocks? On the north side of the Cascades this cannot be the case, for the whole slope of the mountain has a slow, glacier-like movement towards the river.

So constant is this movement that the railroad of the O. S. N. Company now built over the ground, needs yearly readjustment of its lines which are continually and irresistibly pressed towards the river. This outward movement of the bank is not due to mere surface slides of wet weather; for it covers too wide a front for such an explanation, and the evidence of its long continued action in past times are very strong.

* * * * *

We regret that we have not been able to find more of this unfinished letter, but the subject of the Cascade Mountains was evidently discussed that same autumn of 1870 with Arnold Hague, who was engaged with Clarence King in the United States Geological Exploration of the 40th Parallel. Hague was much interested in the formation of the mountains at the Cascades and must have enjoyed the fossil leaves and wood found in 1868 or before in stratified sediment two or three thousand feet below the rim of the gorge. Mr. Hague spent a month in Oregon and wrote of his impressions from San Francisco and later from New York as follows:

DEAR SIR: SAN FRANCISCO, November 21.

I presume by this time you have made your trip to the Cascades. If you remained there any length of time, I have no doubt you settled the question in dispute, and I have also no doubt as to the conclusion you came to in regard to it. I trust you saw sufficient to give me the promised letter, in regard to your observations at that point.

My object in writing to you at this time is to ask if you ever observed a stratum of infusorial silica in the Miocene strata of the lower John Day Valley. I inferred from remarks made by Mr. Flynn, that such a stratum existed in the "bone beds." If this is true, it is very important.

I expect to return to Oregon next season, and also to extend my journey as far east as the Blue Mountains. If I make the trip I anticipate great pleasure in having your company for the journey. I wish to study the relations between the volcanic rocks and the tertiary lake deposits. The John Day Valley affords a fine opportunity. We will yet see the John Day country together. I leave tomorrow for the east.

Yours truly,
ARNOLD HAGUE, New Haven,
Care United States Geological Survey.

DEAR SIR: NEW YORK, May 11, 1875.

I see in the last number of Silliman's Journal a notice of your report upon Oregon. May I ask for a copy? I have always looked upon Oregon as a state of very great geological interest and would be pleased to have anything which throws light upon it.

When I left you in the autumn of 1870 I fully expected to return to your state before this, and looked forward with pleasure to the time when we would have more talks about the Columbia River region. I certainly look back with great pleasure upon my stay at The Dalles and the very pleasant acquaintance I had with you.

We are now busy at work upon our last volumes, and they will all be published at the same time with an atlas of topographical and geological maps. Yours truly,

ARNOLD HAGUE.

Among many interesting tourists an English Lord drifted in one day to see the collection of western fossils. And with other treasures he was shown a beautiful specimen of the lower front teeth of a small three-toed fossil horse. Each little incisor was perfect and only one small canine was missing. Such specimens are common in museums now, but then they were extremely rare. The idea of that being a horse fossil was too much for the visitor, he really believed it an attempt to deceive him, to impose on his credulity, and he showed his indignation and made his protest in no uncertain terms. He said plainly he did not believe the specimen ever belonged to a horse at all. Finally Mr. Condon said to him: "There is a perfectly reliable and intelligent stableman a few blocks away. If you will come with me we will see what he says." When they reached the stable Mr. Condon held out his fossil to the proprietor and said: "Grimes, will you look at this and tell me what you think it is?" Grimes took it, looked it over carefully, with the query, "You said when you found it there was a small tooth in that little hole?" "Yes." His interest and excitement soon reached their climax as he exclaimed, "Four years old—past, horse! By George, it is!" And the English Lord apologized like a gentleman.

CHAPTER VI

Before 1871

It seems best to pause in our record and speak of what geological work had been accomplished before the close of 1870. Mr. Condon's research had led him to believe that the Cretaceous sea-shells from eastern Oregon represented the last of the ocean in that region. He had made five or six trips into the Crooked River and John Day Valleys and collected largely of the Bridge Creek "cinnamon-colored" leaves which he always found in low protruding hill tops surrounded by a later sedimentation containing fossil bones and teeth of extinct mammals. Among these he knew he had the rhinoceros and hoped he had the oreodon, before Dr. Leidy's report in 1870. He had also collected many fossil leaves from Currant Creek, and from the relations of both Currant Creek and Bridge Creek leaves to the underlying Cretaceous, he had decided that these leaves represented Oregon's forests in the Eocene, with the suggestion that the Bridge Creek leaves were perhaps later than those from Currant Creek. Just beneath the great lava flow he had found another fossil-leaf bed, where the sediment containing delicate yew-like leaves had been changed by the heat of the overflowing basalt. These leaves were

found in McBee's Canyon, a few miles from the older beds mentioned above.

By the summer of 1869 he had correlated the extensive post-Cretaceous sediments in Crooked River Valley on the west with those of John Day Valley on the east and traced the same for one hundred and fifty miles toward the Columbia River on the north.* He had studied the great piles of intrusive "trap" protruding through the older sediments of this same region and noted that they were quite independent of the overlying sheet of volcanic rock originally covering the whole region.

He had also visited and named Turtle Cove and identified its sediments with that of the mammal beds of Bridge Creek; but at Turtle Cove the sediments were covered by 2,000 feet of basalt, and as this basalt was found everywhere covering the Miocene fossils, he believed this lava flow was the closing event of the Miocene.

As he traveled up the John Day River in September, 1870, he found a new and altogether different chapter of life in sediments laid down upon this great lava flow. This he called Pliocene and wrote of it to O. C. Marsh of Yale as: "A rich chapter in the life of the Tertiary Horse." Passing still further up the valley, he found that a heavy volcanic shower had covered those sediments con-

* See letter to Dr. Newberry, Aug. 20, 1869.

taining fossil horse specimens with thirty feet or more of ashes and cinders; and above this thick bed of volcanic cinders were still later beds containing Pliocene fossils of the camel and later horse history. Still carefully exploring in this region, he discovered the Pleistocene record of life exposed in surface sediments through which recent streams had cut their way. For here were half protruding tusks and teeth of the elephant, and skulls and horns of the extinct bison.

He had thus traced and recorded through letters and popular publications the geology of a wide section of eastern Oregon from the ocean period of the Cretaceous through each successive step to that of recent times. In all of this unfolding he had but little help. He was depending on the paleobotanist, Dr. Newberry, for the determination of his fossil leaves, but when in June, 1869, this expert pronounced them Upper Miocene or Pliocene, Mr. Condon did not accept the conclusion, for it did not agree with his own observations in the field. He knew they were the lowest of fresh-water sediments superimposed upon the Marine Cretaceous and believed them to be Eocene; and it is interesting to note that all modern geologists and paleobotanists have agreed with him that they are Eocene, or, a part of them, Oligocene.

The only work on paleontology Mr. Condon had

possessed was published by the government in 1852. Its author was David Dale Owen, United States geologist. In this volume Dr. Leidy had described a few fossil mammals from Nebraska, calling them Eocene. More than twenty years later, in 1870, when Dr. Leidy examined the Oregon specimens, he recognized not only the genera but many of the same specimens and said: "They are Miocene, similar to those of Nebraska and White River, Dakota." We infer that Dr. Leidy considered his decision concerning the Nebraska fossils given in 1852 as out of date, and that he no longer believed the oreodon and rhinoceros fossils from Nebraska were Eocene but had decided that they were Miocene. But this change brought no confusion to the Oregon collector; for in his field-work he had always found the rhinoceros and oreodon fossils superimposed upon the Eocene leaf beds and had thought of them as representing a later chapter in Eocene history.

The old stone quarry at The Dalles had, of course, been thoroughly studied in the sixties, and had yielded an interesting group of leaves and one fossil bone before it was reported to Dr. Newberry in 1869. In his series of geological formations, Mr. Condon found this Dalles Group above the great lava flow along the Columbia River and at this time or later he called this Dalles formation Pliocene.

About 1868, or earlier, Mr. Condon had collected fossil leaves found in a stratum of sandstone where the Columbia River sweeps through the very core of the Cascade Range. This discovery as recorded in a letter to Dr. Newberry in February, 1869, was very important as helping to determine the age of the Cascade Mountains; and as the Columbia Lava towered 2,000 feet above the leaf beds Mr. Condon undoubtedly called them Miocene or possibly Eocene. They are now known as the "Eagle Creek leaves" of Oligocene age and are the "sub lava leaves" Prof. Joseph Le Conte asks for in his letters of 1873.

To have accomplished all this, virtually alone, seems remarkable; for after the passing of more than fifty years of research most of the findings of Oregon's pioneer geologist still remain basic truths. Of course, there have been many changes, usually the sliding of a formation up or down the scale of geological nomenclature. The new period of Oligocene has been created for the period of time just above the Eocene, and the rhinoceros and his friends have been slipped across the line of Miocene into the Oligocene. Mr. Condon's lower Pliocene has followed the tendency to recede into the past and is now called Mascall, or Upper Miocene.

The formations which he recorded have been divided and subdivided and new names intro-

duced and new fossil localities discovered. In fact, the full light of modern research has been employed, and yet, strange as it may seem, the basic truths of his different chapters of Oregon geology, their relation to each other and to the whole historic series still remain about as he first saw them in the sixties and early seventies.

Later Mr. Condon wrote of The Dalles Group as follows:

> One standing on the streets of The Dalles and looking southward will hardly fail to notice a well defined ledge of gray stone set against the hills a mile or so from the town and extending westward three or four miles. It is a remnant of an old lake bed that once extended across the valley till its further margin set against the Klickatat Mountains. What remains of this lake bed is today an unbroken level although surrounded by many of the grandest exhibitions of volcanic and earthquake power, proving that no great violence has troubled the region since the waters of a quiet lake deposited its sediment there. All Miocene deposits are disturbed in Oregon. This deposit is not disturbed, it must therefore have been deposited after the Miocene.
>
> A few years ago this rock was extensively used for building purposes in The Dalles and in one of the blocks taken from the quarry was found a well defined fragment of a *metacarpal* bone of a camel. This fossil became of added interest when some years later a fragment of a very small *radius* was found which came into the hands of the writer. This fossil was discovered among other bones two or three miles from The Dalles

by men searching for gypsum in an eastward extension of the same gray quarrystone. The animal to which it belonged was of the camel family and represents an individual perhaps twenty-five to thirty inches in height.

From this same quarrystone the writer, many years ago, made a collection of fossil plants which passed into the hands of Dr. Newberry. In this collection was a specimen of birch and a beautiful branch of acacia, the leaflets all finely outlined upon the gray sandstone, and the branch carrying three or four large thorns so distinctly impressed on the rock as to give a vivid impression of its place in plant life.

Besides these, there was an intensely interesting group of oak leaves, indicating a range of four or five different species, the whole collection leaving on the mind a conviction of a cold unfriendly climate producing a stinted growth of leaves.

There is a curious piece of geological history brought to the front in endeavoring to explain the circumstances under which this gray stone of The Dalles Group must have been deposited in those far away times. It, today, represents the bottom of a former lake. It is 250 or 300 feet above the present level of the Columbia River. The river has, in excavating its present bed, washed away the whole of that lake sediment, excepting this sandstone remnant and in addition has worn its way through over two hundred feet of solid basalt in reaching its present level. The east and south borders of this lake sediment are concealed by a covering of later deposit under which it may be traced eastward two or three miles.

Years ago the writer designated the group of rocks to which this gray quarrystone belonged as The Dalles Group and Pliocene.

Mr. Condon might have been satisfied with the later term Mascall or even with early Pleistocene but Dr. Knowlton, the paleobotanist, places it (provisionally) as upper Eocene, correlating the formation with the Bridge Creek leaves* and Mr. Condon had always found the Bridge Creek leaves not only beneath the Columbia lava, but also beneath the still older oreodon and rhinoceros beds, while The Dalles Group was above both of these older formations.

* "The Fossil Flora of the John Day Basin." U. S. G. Sur., 1902. P. 112.

CHAPTER VII

Correspondence With Secretary Henry and Secretary Baird of the Smithsonian Institution

By this time the geological collection was growing rapidly, for there was less danger of roving bands of hostile Indians. New fossil exposures were frequently discovered, for Mr. Condon had made friends of the ranchers in the mountains and of the rough teamsters who carried freight to distant settlements and to the mines, and when they were in the wilderness they all thought of him and brought him many treasures. He, too, had a way of remembering the teamsters' home folks with an interesting book or other token of friendship and appreciation; and as one of these ranchers said: "He often called at our house, and he always brought sunshine."

A regular mode of transportation at this time was Uncle Sam's mule trains carrying supplies to the various military camps in the interior. The freight wagons were immense and several would start together, each heavily loaded and drawn by 18 or 20 sleek government mules, each bearing suspended over its neck an arch of tiny bells.

Mr. Condon interested these soldier freighters

in picking up any curiosities on their way, and on their return trips many an empty freight wagon with its long line of dusty mules and tinkling bells halted at his door long enough to gladden his heart with some rare fossils or sparkling crystallization carried scores of miles by the kind-hearted teamster. So, not only through his own vacation trips and by hired help in the field, but through the kindness of many warm friends, his collection was steadily growing in value. But the more the specimens accumulated, the more new scientific problems were made evident.

When we realize the many trained specialists now required to determine the different forms of life found in a large geological collection, and that each specialist has access not only to all the scientific literature in his line of research, but to museums containing mounted skeletons of both fossil and modern forms for comparison, we can better appreciate the magnitude of the work accumulating in the hands of one busy man and he, thousands of miles from other collections, without the needed books and far from other scientists with whom to confer. Our scientist gathered bleached bones of modern life from the hillsides and often examined the dentition of patient domestic animals with more than dentist's care. The story was that he even trained a poor old donkey to follow him about, lest its last resting

place might be too far from the naturalist. The sequel lends color to the tale, for some of the donkey's bones were long honored by a place in the Condon collection, and served well their mission for comparative study.

There was something heroic in the patient, persistent struggle for light; but in spite of all his efforts, many stone heads with their beautiful glistening molars and long, graceful canines firmly locked over a bite of gray stone, stared at him with exasperating silence when he vainly questioned them as to their names, lineage, and family connection.

In 1869 H. S. Osborn, professor of mining and metallurgy at Layfayette College, wrote asking an exchange of Oregon specimens for those of Pennsylvania. The following letter in reply gives a glimpse of needed help:

DALLES CITY, WASCO COUNTY, OREGON,
April 4, 1870.

DEAR SIR:

Your note of November last inviting me to exchange Oregon for Pennsylvania specimens I briefly answered at the time, and promised to begin by sending you a box of fossil plants. In fulfillment of this promise, I have just packed a small box, 15x12x10 inches, small because of the present high rate of express charges "across the continent," which we may reasonably hope will soon be materially reduced.

In regard to the contents. I would say, the cinnamon

colored rock, so full of leaf impressions, is that which I aimed to make the burden and the bulk of this package; the other things are only intended to help me explain geological surroundings. The teeth and fragments of bone you will find will serve to give us a point from which to start. They are found in a loose friable rock, the rock itself nowhere so densely silicified as these bones it contains. I have supposed these silicified bones to be the equivalent of those of the Bad Lands of Nebraska and thought I could find the oreodon teeth among them. I am sure I have the rhinoceros. I have lately found a fine skull almost entire that may be an Archeotherium, but I cannot find access to works in which recent discoveries are described, such as those of Dr. Leidy and Prof. Hayden, for which help I must wait. I have also some fine bones from the same rock large enough for those of the rhinoceros, and part of a jaw which contains three molar teeth, evidently those of the rhinoceros. The soft, friable rock that contains these silicified bones always surrounds the leaf-bearing beds.

Twenty miles farther west the same rock, soft and friable, encloses another leaf-bearing spot of compact, argillaceous, drab colored rock, a few specimens of which containing ferns, equiseta, etc., I send you.

You will find besides the above some small fragments of a cream colored shale or schist with impressions of a delicate Taxus or Taxodium which abounds in the rock as if showered upon it. This is newer—is removed far above the others—separated from them by several hundred feet of a coarse fire brick sort of rock without fossils. Over this last comes the great trap overflow from the Cascade Mountains.

I ought to have said that the last named fossil leaf

impressions you will find marked "McBee's Canyon" in your labeling mark. The cinnamon colored specimens are from Bridge Creek.

And in June Osborn wrote as follows:

EASTON, PENNSYLVANIA, June 17, 1870.

DEAR SIR:

Dr. Joseph Leidy has carefully examined the specimens sent and decides that they are of the Miocene similar to that of Nebraska. . . . . Please gather all the bones and especially those of this formation and send at my expense, or let me know the expense and I will pay it. They *are extremely interesting.* Please gather *all you can.* And I will report immediately. . . . . .

Yours truly,

H. S. OSBORN.

A few months earlier than Osborn's last letter came the following from Joseph Henry, secretary of the Smithsonian Institution, Washington, D. C., and it will be of interest to Oregonians to know that Harvey W. Scott, the able editor of the Portland Oregonian, was partly responsible for the opening of correspondence between the Smithsonian Institution and the Oregon geologist. Henry's letter is as follows:

SMITHSONIAN INSTITUTION,
WASHINGTON, January 18, 1870.

DEAR SIR:

Understanding from Mr. H. W. Scott of Portland, that you are interested in geology, we write to say that

it would give us pleasure to enter into correspondence with you in regard to this subject.

We take the liberty of sending you, herewith, copies of our circulars in reference to Ethnology, Natural History, etc., and would be pleased to receive from you any specimens or information that it may be in your power to send.

Yours very truly,

JOSEPH HENRY.

In reply to this welcome letter, Mr. Condon filled a small box with leaves and a few fragments of bones and teeth and started it across the continent with the following letter to the Smithsonian.

DALLES CITY, WASCO COUNTY, OREGON,
April 20, 1870.

DEAR SIR:

Your note of last January, kindly inviting correspondence on the geology of this region, was duly received. I have delayed an answer that I might see the circulars you mailed at the same time but these have not yet reached me, and a little leisure occurring to me this morning I have spent it in putting up a small box of Eocene fossils for you, from the valley of the John Day River.

The cinnamon colored rock with leaf impressions came from a delta-like extension of that rock into an Eocene Lake whose sediment in some places abounds in silicified bones of mammalia, a few small fragments of which I send you. I have two very fine heads from that rock but have no means of ascertaining just what they are. I need very much Dr. Hayden's and Dr. Leidy's researches in the Eocene of Nebraska.

If I can do you any service in Oregon, collecting, to pay for them, you would be conferring on me a large favor by sending me such work or works in this department as you may have for distribution, and then, within my capacity, you may assign me the work you wish done.

The best specimens of those leaf impressions I had culled out and sent to Dr. Newberry. Some of these were quite large. I have several fine ones on my shelves too much shattered to bear transportation. One of these is the central portion of a leaf that entire must have measured 30 to 35 inches across. A handsome piece of a fan palm I took from a neighboring ledge. The flora of those rocks is very rich.

I have paid the express charges on the box I sent you to insure its quicker reaching you. I will, with the next box I send, make you a rough map of the region and send with it a brief description of geological features and I would like to be able to send you a box of those Silicified Mammalian bones if I am successful in a trip I intend making into their region in about two weeks.

Would you like more of those shale rocks with the leaf impressions? Very respectfully yours,

THOMAS CONDON.

Without waiting for the box of fossils, Professor Henry wrote the second letter and as soon as the fossils reached Washington they were reshipped to Dr. Leidy at Philadelphia.

It will be seen from the following letters that passed between the Smithsonian and Mr. Condon that the isolated Oregon geologist was receiving

just the help he needed; that it came promptly, with sympathetic appreciation and delightful courtesy.

SMITHSONIAN INSTITUTION, May 17, 1870.

DEAR SIR:

We are much gratified at receiving your letter of April 20th, announcing the transmission of an interesting series of fossil remains of animals and plants from the John Day River, and without waiting for their arrival we write to express our acknowledgements and to say that you could hardly have made a more acceptable donation to the Institution. The region in which you reside we know to abound in objects of the highest paleontological interest, and if you can, conveniently, continue your researches and transmit a series of the results to us, you will place us under very great obligations. If an appropriation of a small sum of money, say fifty dollars ($50), would enable you the more readily to make explorations we shall be glad to place this sum at your disposal. We shall also be pleased to send you such of our publications as may interest you, and herewith mail a copy of our catalogue of works that you may select from the titles there indicated.

We are particularly interested in the subject of vertebrate remains as the Institution possesses ample means in the way of recent skeletons and skulls for determining them, and shall hope to have, from time to time, such additional specimens as you can spare. We send you, with pleasure, all the works we have published on vertebrate paleontology and if you desire, in addition, the systematic works on the recent mammals you will oblige us by mentioning the fact.

Dr. Leidy has just finished a very complete work on the fossil mammals of the United States, of which we shall endeavor to obtain for you a copy.

Among the bones sent by you to Dr. Newberry, were those of fossil birds and as this class is perhaps already properly represented in the deposit in question you will do well to direct your attention to gathering them. They are generally of very diminutive size, of course, and particular care will be required in their search; but in all probability many species before unknown will be found.

Yours very truly,

JOSEPH HENRY,
Secretary Smithsonian Institution.

SMITHSONIAN INSTITUTION,
WASHINGTON, D. C., May 21, 1870.

DEAR SIR:

Since writing to you in regard to the fossils of your region we have heard from our application to Dr. Leidy for a copy of his great work. He promises to send us one for you, and begs that, in return, you will send the Smithsonian Institution for his examination the unique fossil crania of your collection, promising that they shall be promptly returned. Please inform us what to say to him.

Very truly yours, etc.,

JOSEPH HENRY,
Sec. Smithsonian Institution.

DALLES CITY, OREGON, June 6, 1870.

DEAR SIR:

Your favor of the 17th ult., informing me of the measures you had taken to secure for me works giving information upon fossil vertebrates; and your added favor of the 21st ult., informing me of Dr. Leidy's kind response to your application to him, have both been re-

ceived. Many thanks to you for your kind promptness in all this. You ask whether in addition, I would like to have you send me "the systematic works on the recent Mammals." Please do, by all means, for that will save me a world of work among old skeletons, in the fields, to learn a little of Comparative Anatomy. I feel already rich in anticipation of Dr. Leidy's work on The Fossil Mammals of the United States.

Your second note asks on behalf of Dr. Leidy that the fossil crania I have collected here, be sent to the Smithsonian Institution for his examination. I would answer promptly, Yes, all that will bear sending. But just here is a great difficulty, for what he would most want to look at himself is too brittle to bear ordinary transportation and those fragments of skulls that are strong enough to bear transportation would give him too inadequate a view of the truth they together tell. Let me specify. There are in the collection four heads that were when I found them, nearly entire. The rock that contained them is a crumbling shale. The bones of the heads were all silicified but crumbled with all the fickle brittleness of their matrix. To keep the fragments in place I took with me a quantity of flour paste and carefully laid on the exposed surface a layer of this and on it two or three thicknesses of paper. After this was thoroughly dried I dug the specimens from the hill and keeping the paper on till they reached home I then carefully washed off both paper and paste. But even with all this care they suffered much irreparable damage. Enough, however, of the surface outline remains to make them fine specimens yet; but transportation to Washington by ordinary means would almost certainly destroy two of them, perhaps all four.

Would it not answer to send two or three good photographs of each head and such measurements as Dr. Leidy would suggest? Especially as I could send you eight or nine fragments of heads that would bear transportation, twelve or fifteen pieces of upper and lower jaws with teeth in place, a handsome collection of single teeth and a large collection of other bones of the skeletons. Some of these bones I am persuaded will have added interest from their wide range of size and form.

Truly and respectfully yours,

THOMAS CONDON.

SMITHSONIAN INSTITUTION,
WASHINGTON, June 9, 1870.

DEAR SIR:

In the absence of Prof. Henry, now on his way to Europe, I have much pleasure in acknowledging in behalf of the Smithsonion Institution, the arrival of the box advised by you some weeks ago containing fossil plants and some mammalian remains and beg your acceptance of the thanks of the establishment for this valuable addition to its collections. They will be placed at once in the hands of a specialist for examination and any information the Institution may receive in regard to them will be transmitted to your address.

Through the kindness of Dr. Leidy a copy of his great work on the fossil mammalia of the United States has been secured for you.

The Institution hopes that you may feel inclined to accept the suggestion made in its last, to lend it, for a suitable time, the unique specimens of fossil animals in your possession. It is greatly to be desired that they be promptly determined and their characteristics com-

municated to the scientific world, and if you will lend them to the Institution, it promises their safe return. If you should feel inclined to permit them to remain here on deposit subject to your order the Institution will guarantee their preservation in a fire-proof building.

Trusting that the correspondence thus begun between yourself and this establishent may be continued with mutual interest and profit.

I have the honor to be,

Very truly yours,

SPENCER F. BAIRD,
Ass't Secretary in Charge.

DALLES CITY, OREGON, June 28, 1870.

DEAR SIR:

Your favor of the 9th inst. apprising me of your receipt of the box of fossils I sent, has been received.

In regard to Dr. Leidy's work on Fossil Mammalia which you have obtained for me I would say: I am grateful to Prof. Henry and yourself for your promptness in obtaining for me this coveted work. Enclosed you will find five dollars to pay express charges on it, to me. Please send it to my address by Wells Fargo Express. My apology for troubling you with this is the fact that they often require prepayment.

I intend a full suite of these mammalian and botanical specimens for the Smithsonian Institution, and shall at the proper time designate them. Meanwhile I shall be grateful for such of your works as may throw any, near or remote, light upon any part of the great geological record.

I am satisfied that the Basin of the Columbia River contains an unbroken record of its past history from the

Eocene to the Present and I feel a deep interest in all that shall tend to unfold it.

Very truly yours,

THOMAS CONDON.

So it happened that Dr. Leidy examined the Osborn box and Smithsonian box of Oregon fossils about the same time and in June made the following report to Prof. S. F. Baird of the Smithsonian.

The few fossils were of interest as indicating in Oregon the presence of a formation similar to that of the Mauvais Terres of White River, Dakota. . . . . I have prepared a brief communication referring to this collection together with another I have seen from the same locality, for the proceedings of the Academy of Natural Sciences to appear in the next number. . . . . Hoping before long to see some of the interesting subjects of Mr. Condon's discoveries in paleontology,

I remain,

Your friend and at your service,

JOSEPH LEIDY.

DALLES CITY, OREGON, July 15, 1870.

DEAR SIR:

Your favor of the 28th ult. enclosing Dr. Leidy's of the 25th was duly received. On receiving these I put up a small box of jaws and teeth and sent them on their way across the continent in charge of Wells Fargo & Co.'s Express. I did this instead of sending them through your agent in San Francisco because I was afraid of the risk attending change of hands in Califor-

nia, especially as the box was so small as to enable me to do so and the specimens were such as I could not replace if lost.

Enclosed you will find three photographs. I have twelve fragments of heads which with about thirty different sized vertebrae I shall make my second installment. Should you and Dr. Leidy, on seeing these and the photographs, desire to have sent you any other bones, I have them in abundance and in great distinctness and beauty of outline. The fragments of skulls and casts of brains I shall send by the longer passage of the Isthmus. It will be several weeks before they will reach you. You will find among the teeth in the cigar box a small paper box enclosing three shells. These are from the same rocky matrix with the bones.

In a previous note you had inquired how Dr. Leidy's book was to be sent to me. I enclosed and sent you five dollars with a request that it be sent by Wells Fargo Express.

Truly yours,
THOMAS CONDON.

SMITHSONIAN INSTITUTION,
July 19, 1870.

DEAR SIR:

Your letter of the 28th of June has just reached us, and in Prof. Henry's continued absence I beg leave to say, in reply, that we cannot permit any one who promises to be so valuable a Smithsonian correspondent as yourself to be at the expense of freight on a box sent to the Institution; we accordingly return the $5 you recently sent us.

We send you the work of Dr. Leidy and such of our

own publications as promise to be of interest to you. They go in one package by express, charges prepaid.

We look forward with much interest to the result of the communication we have made, together with that inclosed from Dr. Leidy and hope in the course of a few months to receive what you can spare for the purpose. We trust that you will continue your explorations and investigations until the whole vertebrate form of the country shall have been completely determined.

Do you ever find an opportunity to collect ancient Indian relics? As we have, perhaps, already written you, we are much interested in this branch of science and are collecting material for an extended work on the subject to be illustrated by figures and descriptions. We are informed that the Valley of the Columbia furnishes many remains of this kind, such as mortars, pestles, axes, arrow-heads, etc., but none of them have yet reached the National Museum. If, therefore, you can conveniently secure and forward to us some of these you will place us under many obligations.

SPENCER F. BAIRD,
Asst. Secretary in Charge.

SMITHSONIAN INSTITUTION,
WASHINGTON, October 17, 1870.

DEAR SIR:

We have great pleasure in acknowledging the arrival of the two boxes of fossil mammals forwarded by you in the middle of July and September, which reached us in each case, about two weeks after their shipment. My absence from the city during the summer prevented an earlier notice of the arrival of these transmissions. We have just sent the collection to Dr. Leidy with the re-

quest that he will communicate to us, as early as practicable, a preliminary notice of the character of the specimens, for your information.

We trust that the new researches which you purpose instituting will prove equally important with those of the past few years and that you may continue to enlarge the boundaries of our knowledge in regard to the fossil botany and zoology of the West.

Holding ourselves in readiness to do anything that may lie within our power to advance your studies,

I am, Yours very truly,

SPENCER F. BAIRD,
Asst. Secretary in Charge.

SMITHSONIAN INSTITUTION,
WASHINGTON, October 21, 1870.

DEAR SIR:

We have much pleasure in inclosing an extract of a letter from Dr. Leidy of Philadelphia, presenting a preliminary notice of the specimens inclosed in the two boxes of fossil mammals sent by you to this Institution during the past summer. As soon as a more detailed account shall reach us we will at once transmit a copy to your address.

I am, Yours very truly,

JOSEPH HENRY,
Secy. Smithsonian Institution.

Dr. Leidy's report to the Smithsonian:

The two boxes containing the specimens from Condon arrived safely this morning and I overhauled them this afternoon. The more abundant remains appear to be those of a large species of Oreodon which I presented

tonight at the Academy under the name of oreodon superbus. There were remains of two species of rhinoceros, but these appear to be R. occidentalis and R. hesperius already characterized. There are also remains of Lophiodon occidentalis, Oreodon Culbertsoni, Anchitherium Bairdi. There were several small teeth of pachyderms which may perhaps turn out to be new.

And about three weeks later he adds:

Two species of Elotherium and one tooth appears to indicate a new Anchitherium to which I gave the name A. Condoni.

It is interesting to notice the prompt and decisive action taken by Dr. Leidy. The boxes arrived in the morning; he overhauled them the same afternoon, found a new oreodon, selected its name and carried it to the Philadelphia Academy of Sciences the evening of the same day, where the animal was officially reported from Oregon and its new name registered for all time.

Spencer Fullerton Baird, the writer of most of these pleasant Smithsonian letters, was one of the finest types of American scientific men, and his memory is still so loved and cherished that there was a national movement in Washington to celebrate the one hundredth anniversary of his birth on February 3, 1923. In referring to this plan a writer in "Science," Hugh M. Smith, speaks of him as follows:

While Spencer Fullerton Baird's scientific attainments and public services are well and widely known, the letter which Dr. Walcott has sent out recalls that Baird was the secretary of the Smithsonian Institution, the virtual founder of the United States National Museum, the creator and head of the United States Fish Commission, and a prime mover in the establishment of the United States Geological Survey and the Bureau of American Ethnology.

His personal contributions to knowledge in the domain of biology were numerous and profound. His ability and achievements, his fidelity to the public weal, his unselfish devotion to duty, the encouragement and aid he extended to other workers, and the beauty and simplicity of his character combined to produce one of the most noteworthy figures in our national history and one whom America will undoubtedly delight to honor on this appropriate occasion.

CHAPTER VIII

Correspondence With O. C. Marsh of Yale College and With Professor Cope of Philadelphia

In the autumn of the same year that Mr. Condon had received so much help and encouragement from Professors Henry and Baird of the Smithsonian, he received the following letter from Prof. Marsh of Yale College:

OCCIDENTAL HOTEL, SAN FRANCISCO, Nov. 6, 1870.

DEAR SIR:

I have heard for several years past a great deal of the good work you are doing in geology and of the very interesting collection of vertebrate fossils you have made, and I intended during my present visit to the Pacific Coast to come to Oregon to make your acquaintance personally and examine your fossil treasures, which my friends Prof. George Davidson, Clarence King, Mr. Raymond and others had often wished me to see. As I have now been absent from New Haven for over four months I find it necessary to start east without seeing you, much to my regret; but I hope one or two of my party of scientific students who have been exploring the Rocky Mts. with me, will be able to call on you.

We have as you doubtless know at Yale College nearly eight hundred students and probably the finest geological museum, in many respects, in the country. As

this is now in my charge, I am very desirous of securing for it as complete a series of the vertebrate fossils of your region as possible. I am at present making a special study of the Tertiary and Cretaceous Vertebrate animals and have a large work on the subject in preparation. Hence any specimens from your vicinity would probably be of more service to me than to any one else, and be more fully appreciated.

If you are willing to make me a good and full collection of the animal remains of your region, I will, with pleasure give you full credit for your discoveries in my work and also bear all the expense you may incur in the necessary exploration, or in purchasing specimens should opportunity occur. I shall, besides, be very glad to send you any scientific book you may wish and consider myself in addition greatly obliged to you personally. I enclose a draft for $100 which you may use in any way you think best in securing specimens and I will send you more funds at any time you may wish them.

Please let me hear from you as soon as convenient and I hope you will soon be able to send me a fine series of specimens. . . wishing you all success in your investigations, I remain, Very truly yours,

O. C. MARSH.

DALLES CITY, OREGON, November 20, 1870.

DEAR SIR:

Your favor of the 6th inst. from San Francisco, has just been received. Had a line from you reached me six months ago I could have turned over to you, for examination and report in your new work, one of the most interesting pages of Miocene fossil record. Two boxes of jaws, teeth, and fragments of heads are now in Dr.

Leidy's hands for examination and description. Three entire or nearly entire heads I have still here for I dared not send them on so long a journey—other bones I have in sufficient number to enable me to send you a suite of specimens of these—but I have just opened a new field from which I hope much. This latest field has for me a good deal of new interest because of its remains of the horse and its congeners. These specimens I will send to you for your examination and report. One small package I will send you at once, and with the package a rough map of the region containing them. My late discovery is, I am already satisfied, a record of a geological horizon different from that represented in the lot sent to Dr. Leidy. I shall send without reserve everything from this new field that shall seem at all characteristic, and will designate those you may retain.

I am collecting an Oregon cabinet of Oregon fossils and am ambitious that it shall be as full as possible. Those sent to Dr. Leidy are but lent the Smithsonian Institution for that purpose. There are repetitions enough among them to enable me to divide without impoverishing what is left. While therefore I cannot just now send you specimens enough to warrant me in appropriating that check for (100.00) One Hundred Dollars you generously sent me, I shall retain it and use it and say more of it by and by.

Your kind promise to send me any scientific book I may wish is so seasonable and so suggestive of some of my deepest wants that I shall remember it with pleasure and say more about it to you.

A word or two upon the aim I have in collecting—for it may throw light for you on the cause of my disposi-

tion to part with so few things and retain so many, I have a strong conviction that since its first elevation from the sea in the Cretaceous period, Oregon was never again submerged; and that therefore its entire record from that period to the present is preserved in the sediment of its lake system. The remains of these lakes I am after. Their succession is perhaps more complete in the watershed of the Columbia River than in any other, crossing as it does half the continent, and cutting its channels through the friable masses of the Tertiary.

I will hasten the first installment of the record to you.

Very truly yours,

THOMAS CONDON.

DALLES CITY, OREGON, December 5, 1870.

DEAR SIR:

A week or more ago I wrote you a promise that I would send you a small package of fossils from the Valley of the John Day River. Tonight I have taken the first leisure hour to pack them and now add a word of description and explanation. . . . . A new field is just opening to me. I visited it in September with just time enough at my command to skim a few specimens from the surface of a few of its ravines, and bring home just teeth enough of the equine family to keep me dreaming of the fossil horse till I can go back again.

Very truly yours,

THOMAS CONDON.

YALE COLLEGE, NEW HAVEN, CONN.,
February 20, 1871.

DEAR SIR:

Your two letters were duly received and soon after the box of fossils came in good order. I should have

written much sooner in reply but have been waiting to first examine carefully the specimens you sent. This I have so long been prevented from doing by a multiplicity of duties that I will now only say a few words in regard to them and hope soon to write you more fully on the subject. I am very much pleased to find the fossils in such an excellent state of preservation, and congratulate you on having access to such a fine locality as the specimens clearly indicate. I also thank you sincerely for your promise to save for me all you secure from this region.

As you say the *horse* is well represented in the lot. The teeth are superb and I will say more of them in my next. Some of the separate bones indicate, as you suggest, a very small species of horse, but I am not yet sure that any of the present teeth belong with them. Were any of them found with the bones you mention? The large fragments of teeth are those of a mastodon and perhaps I may be able to fit some of them together so as to determine the species. One large weatherworn tooth to which you do not refer is of peculiar interest. It is an upper molar of a rhinoceros. Have you any more? The small black teeth are also very interesting; they belong to a small pachyderm which I think will prove to be new. The animal was not much larger than a raccoon. Have you any more of this fellow? In a few days I hope to be much more at leisure and will then look over the whole lot with care and let you know the result. I regret exceedingly that I have not been able to do so before, but six months' absence put me behind with everything here. . . . . It is now decided that I am to prepare the volume on paleontology for Mr. King's Survey of the 40th Parallel and hence I am very de-

sirous of getting sufficient material to fully restore each species if it can possibly be done and you can render us great assistance in this respect. Mr. King will probably soon inform you of his plans for next summer's explorations and it is not unlikely that Mr. Hague will spend considerable time in Oregon with you in making collections which will be described in the volume I have mentioned.

Please let me know if you wish any scientific or other books. I send you one today on the "Osteology of the Mammalia," which is just out and I am sure will please you. It is by far the best work of the kind I know of in any language.

Do you ever find any small, very hollow bones in the locality you visit? I am on the lookout for bird bones. . . . . Please keep an eye out for them as they are of great interest. Thanking you for your kindness, I remain,

Very truly yours,
O. C. MARSH.

YALE COLLEGE, NEW HAVEN, CONN.,
April 20, 1871.

DEAR SIR:

I have decided to come out this fall to Oregon and hope you can make it convenient to go to the most interesting localities with me. . . . . I shall have several students or assistants with me and hope you can arrange to spend a month with us. . . . . .

I sent you a book on the Origin of Species not long since and have just ordered The American Naturalist for you. Hoping soon to hear from you, I remain,

Very truly yours,
O. C. MARSH.

DALLES CITY, OREGON, May 23, 1871.

DEAR SIR:

On my return from my trip last week I found awaiting me another favor from you. I found, too, the volume on the "Origin of Species" you kindly sent me. You promise also a visit here next fall and inquire whether I can accompany you to the John Day Valley. Yes, most assuredly, I shall be glad to avail myself of such a help to comprehend the wonders of that region. My late trip was a timely one. I got from the boys I had engaged to search for me in the fossil-horse locality of the Upper John Day, some fine trophies, among these a new, a perfect specimen of your Parvulus, the extremity of the lower jaw. The whole set of incisors is perfect and in place. One of the bridle teeth is in place, the other broken off. I inquired of the father of the boys, in whom I unexpectedly found an old acquaintance, whether he had sent or promised to send some of these specimens to other parties. He said he had but would only send a few to fulfill his promise. I saw that the best way would be to fee the boys pretty well and trust to their gleanings through the summer. I found fragments of a head there which I am yet trying to reconstruct, not without some encouragement.

I have gathered in all 25 or 30 fine specimens from that locality besides single teeth and fragments of bones. Of these I shall select and soon send you a small package for examination. I had another object in making my late trip at so early a season of the year. I had heard that once, in pursuit of stolen horses, a man had found beyond the John Day River in a wide depression among the mountains, some fossil bones. I found two young men willing to accompany me and we started. A

ducking in the river at the start seemed to promise good luck and encouraged us to persevere. We found the place or some places as good as we expected, camped there over night and returned next day. Of this new region I can say without hesitancy, it is the wildest, strangest, most wonderful region of this wonderful country. I found post-Miocene lavas 2000 feet in thickness overlying fossil shales like those of Bridge Creek, and unlike those of Cottonwood Valley. The prominent characteristics of each could be recognized a dozen miles away—and no wonder, for the fossiliferous rocks were arranged into galleries each painted in the brightest hues of red, green, white, and endlessly mixed into neutral shades between. A fine fossil turtle obtained from one of these galleries suggested a name for the vast excavation around us, and it was accordingly called Turtle Cove and its bright galleries of fossiliferous shales were named respectively, the Southeast Gallery, Southwest Gallery, Northwest Gallery, and Northeast Gallery. We found a fine lower jaw of a rhinoceros, some teeth of an Archeotherium which were all I could save of the head whose fragments were everywhere crumbled around the spot. How I longed for a week to spend in that wild cove. I brought away many fragments of bones large and small, but we only visited two of the galleries; the others were left for another day. The shales are a continuation of those of Bridge Creek and the oreodon was largely represented in these fossils. At Bridge Creek locality, which I also visited, I found some new things, among them the back part of the head of what may be an Anchitherium. Some fragments of its teeth were secured.

FORT BRIDGER, WYOMING, August 26, 1871.

DEAR SIR:

Your kind letter of July 4th reached me while in Kansas digging out sea serpents from the Cretaceous and I was glad to learn that you can join us at Canyon City, as we have about decided to come overland, via Kelton and Boise City. I regret that October is likely to prove a rainy month in the John Day country as we have been looking forward to a very pleasant as well as successful trip in that region.

We shall make a party of about a dozen and on reaching Canyon City shall be glad to find you there. Should you reach Canyon City first, or if you have friends there, we should be greatly obliged if you would make inquiries about our outfit, wagons, tents and riding animals. If there is a fort or government camp near I can get my outfit there, as I have authority from General Sherman for all such purposes. Please consider yourself my guest during the entire trip and you will do me a personal favor. In haste,

Very truly yours,
O. C. MARSH.

Mr. Condon met Professor Marsh and his party at Canyon City as planned and while there he found time to give one sermon and two lectures to the people of that small frontier town. The Yale party arrived about October tenth and proved to be an interesting company of young college men. Some were sons of wealthy parents who were enjoying their first trip into the "wild West." Others were student helpers of Professor

Marsh with some experience in the field. Soon after their arrival they were all seated on the banks of the John Day River when one of the boys asked, "What have you got of interest in this country, Mr. Condon?" "Well, it is not an item of small interest that we have come into a region where the rocks float on water," answered Mr. Condon, and he gathered up an armful of chips and flakes of diatomaceous earth-rock and threw them into the river. The boys laughed to see them float off and answered, "You have scored one, professor."

This party had been out for about five months. They had been digging fossil reptiles in Kansas; Cretaceous and Eocene Mammals in Wyoming; then, after spending a week in Salt Lake City, had taken a long, hard stage ride from Utah to Oregon, where they arrived too late for favorable summer weather, and as they did not wish to go far from the stage road, they missed many interesting localities including "Turtle Cove."

Mr. Condon writes home October 26th as follows:

COTTONWOOD STATION, Thursday, October 26, 1871.

We have reached Cottonwood on our way home. The inconvenience of being away from tent and wagon comforts, together with the effect of a severe cold have led Prof. Marsh to decide not to leave the road for a visit

below the Canyon, so we go on down the road. This trip is getting a little tedious. I cannot yet venture an opinion on the time of our getting to The Dalles. The whole party is in a hurry to get through. We will hasten from here to the Bridge Creek region.

T. CONDON.

They finally reached The Dalles, where the party spent two or three days studying the Condon Collection, and then were off for Portland and by steamer to San Francisco, where they took the overland train for their homes.

During the Spring of 1871 Mr. Condon received letters from Prof. E. D. Cope, corresponding-secretary of the Philadelphia Academy of Sciences. For many years Cope of the Philadelphia Academy and Marsh of Yale College and Peabody Museum were ardent rivals in their chosen field of science. Each one sought the coveted advantage of furnishing material for the great volumes published by the government on Vertebrate Paleontology. Cope was from an old Quaker family of Philadelphia and still retained some of the quaint Quaker forms of expression. His first letter requesting Oregon fossils was written May 14th and the second a week later. Extracts from these are here given:

* May 14, 1871.

I will publish early analytic essays on the collections thee may send and will forward copies to thee at once.

They will be published in the scientific journals of Philadelphia with any notes thee may attach, and will be reported immediately to Nature, the well known weekly Journal of Science of London, with which I correspond. I send as samples of these preliminary essays a number of extracts from journals. I also send my last copy of a work on fossil Reptilia I have recently issued, in which you will find notices of many remarkable monsters. I send with these Hayden's last report on Wyoming Territory to which I contributed three reports. Should you desire any other books let me know. Let me know also about pecuniary matters.

I learn that you are collecting for Prof. Marsh. We wish in Philadelphia to be able to exhibit to our students and citizens specimens as expressing some results of your explorations. We would be glad if you could send them to us at an early day if agreeable.

EDWARD D. COPE,
Cor. Sec. of Academy of Natural Sciences,
Philadelphia, Pa.

* First part of this letter is lost.

PHILADELPHIA, MAY 21, 1871.

EST. FRIEND, DR. CONDON:

I wrote some days ago making inquiries and suggestions respecting the procuring of collections in the "Bad Lands" of the John Day River. I now send the books I promised, and say that I have $75 with which to aid thy explorations, if thee has a valuable lot of fossils on hand now, such as would be in thy estimation an equivalent for the amount in expenses or otherwise. On receipt of a favorable answer I will at once send the money. . . . . Write early.

E. D. COPE.

In answer, Mr. Condon writes more fully than usual of hopes and plans for his geological work; not only of its educational effect upon the State of Oregon, but its influence upon the wider problems of Natural Science.

DALLES CITY, OREGON, June 10, 1871.

DEAR SIR:

Your kind letter of May 14 I received a few days since, and tonight I am feasting on the pages of your "Batrachia & Reptilia," grateful to you for your kind thoughtfulness in sending them. Your note of the 21st inst., also reached me with the volumes.

I am about leaving home to be gone two weeks. On my return I will write you more at length, and now only make some explanations that may indicate my position, opportunities, and ability to comply with your request for Oregon fossils. I am not able to spend much time in the field. I am pastor of a Congregational Church in the place, and besides that charge, have a family to watch, guide and care for. From these home duties I am occasionally able to break away for four or five weeks to pursue my wild search for fossil wealth in the wilderness. A week or more of this time is taken up in the journey leaving me but from two to four weeks of working time, large deductions from which are often made by stormy weather; and only within two years past could one be safe from Indian annoyance, except when an escort of soldiers was occasionally granted.

Another restriction to my ability to work for others: I have been for several years satisfied that the fullest record of mammalian life in the world would yet be found here in the basin of the Columbia River, and

that the archives of Oregon's rocks would yet become the real battle ground of conflicting views on the origin of species. Let me indicate briefly the grounds of this conviction. First, An uninterrupted series of lake depressions has existed in the Columbia basin from the Cretaceous to the present time. Three great mountain ranges were slowly rolled up as vast dams thrown across the water shed. Minor dams of lesser ranges made smaller lakes. The John Day Valley contains five distinct records. The lower one, I have as yet only found represented in its botany—but this is gorgeous. The period of the oreodon and rhinoceros is very full of the finest material. The next above is rich in the remains of the horse, in four or five species. And its equine kindred is represented by several other species, whose teeth are among the finest specimens I have. In the next record the mastodon is found. The upper one is washed gravel and contains the horse, mammoth, mastodon, ox, elk, etc. All these in a general lake depression that could not have ceased to receive the wash of the surrounding mountains till the last elephant yielded up his ponderous tusks to close the record.

Other branches of our great river, I reason, may be equally full of history. If found so, the importance to science of the materials that may be gathered here will be greatly enhanced by their being kept together. I have been for ten years quietly gathering these materials. I want to keep all but the plainest duplicates myself. I shall be glad to *lend* anything that will bear transportation. So much for my own plans and aims.

And now to show you how I stand with regard to engagements. I have a very indefinite arrangement through the Smithsonian Institution with Dr. Leidy

through which some boxes of teeth, jaws, crania, vertebrae, etc., of mine have been sent him for examination and determination. Other specimens from the same locality I have retained, not daring to trust so much brittleness to ordinary transportation. These I would like to submit if possible to Dr. Leidy as they belong with the lot already submitted to him. I have also made a promise to Prof. Marsh of Yale College. Nearly a year ago he asked me for some help in raw material for a work on which he is engaged in connection with King's report on the 40th parallel. As I had just then discovered a new field in which the horse family was evidently well represented I promised him what I should find there for examination. He sent me a check for a suite of specimens, but I wrote him I could not, consistently with my plan, sell any unless I should find duplicates.

The work on which Prof. Marsh is engaged will have much local interest for Oregon and I would like to see as much Oregon material as possible described there, as an added means of awakening interest in our own state. But beyond all this there are accumulating on my hands many fragments that are more or less duplicated and a fine supply of specimens of fossil botany from the same region, which I would be glad to send you. While then, I cannot now *sell* you any first class specimens I shall be very glad on my return home to present you a box of fossils. When those now lent out are returned, I shall let you know what I can do to furnish a full suite of specimens for the Academy.

Yours truly,

THOMAS CONDON.

CHAPTER IX

The Summer of 1871—The Willamette Sound—Turtle Cove—The Fire

During his ten years of pioneer life in the Willamette Valley, Mr. Condon had become quite familiar with the geology of that part of the state and now combined a delightful pleasure trip with Mrs. Condon and an opportunity to do some research work on one of his unsolved geological problems. The following paper tells of this trip and its results. The Willamette Sound was first published in the Overland Monthly in November, 1871.

The Willamette Sound

"A desire to study some of the evidences of the more recent changes of level along the coast of Oregon and Washington, with a view to compare and if possible to connect them with evidences of like changes in the interior, led to a visit to Shoalwater Bay (now Willapa), an inlet of the coast a few miles north of the Columbia River. June, on our northern coast, is a pleasant season for such trips and ours received its full measure of help from such accessories as bright sunshine and pure air above us, unmeasured wealth of form, color, and fragrance below.

"The ride from the cape at the mouth of the Columbia to Shoalwater Bay, is one of the finest in the country. The road for the greater part is along the ocean beach, always strewn with the numerous wrecks of life cast upon its sands and often presenting to the naturalist objects of rare interest. An abrupt turn of the road inland ends this finest of beach drives at ten or twelve miles from the cape. A short distance through woods of spruce and pine, thickly undergrown with a rich variety of flowering shrubs, and the road opens upon a fine view of Shoalwater Bay at the pleasant little town of Oysterville. The general outline of the bay is in sight from this point. The bluffs that define its shores appear, seen northward, fifteen or eighteen miles away, and in the direction of its southern extension, ten or twelve miles. At intervals along this whole shore line, one can plainly discern what in the distance appear as land-slides, but on nearer approach prove to be portions of the bluff shore undermined by the storm-surf, and in their present form showing fine sections of the strata of which they are composed. On examining these more closely one sees a bank, not of common earth, but disposed in stratified layers of sediment, once evidently continuous over the whole region and of nearly uniform thickness, now worn away above into a rolling surface, yet showing everywhere a fine

persistence in the old water-lines that ruled its formation. Buried in this mass of sediment, and occasionally cropping out in exposed sections, are vast beds of sea-shells. So completely do these represent the life now around them that when an apparently exceptional form does appear, memory at once recalls having seen it somewhere on the coast. And yet, identical in species as these shells unquestionably are with those now living in the surrounding waters, the two sets of conditions are separated by the whole import of the term 'fossil.' The waters that buried there those fossil shells, and covered them with one hundred or more vertical feet of ocean sediment, were waters that so defined our northern coast as to give it a far different outline from that of its present geography.

"In some of these bluff-exposures their past record is read in masses of buried forest trees; trunk, leaves and seeds so buried in clay and so well preserved that the spruce cone, fragile at all times, is scarcely discernible from one of last year's fruitage drifting in the neighboring waters. From these vegetable remains, as from those of the shell-fish, the same truths are taught; for the trees are the same in kind as those growing on the bluffs one hundred feet above them, although the waters that covered them there with one hundred feet of sediment have passed away. The fossil story then, that may be read here, is linked to our

own times by the sameness of vegetable and animal life and separated from ours by the passing away of the agencies by which the records were written. It is useless to ask, how long ago? There is no chronological record legible here. Future discoveries may connect these things with human story. We may not attempt this now.

"The lowest marine remains of these bluffs plainly prove that when they lived, the waters around them were at, or near, their present level. They are species that love shoal water and they are in place where found. The oyster is very abundant among them, and the shells of most of them are neither broken apart nor water-worn as they would be if drifted here from some other locality. They evidently lie here as fossils on the same bed they occupied while living, and oysters then, as now, rarely bed in waters more than a few feet in depth. The common cockle—another lover of shoal water—is also abundant among these remains, and like the oyster, lies fossil where it lived, the opposite valves often occupying the very positions, relatively, that they held while living. So, too, with the members of the clam family —whether Mactra, or Solen, or Venus—all are evidently in their native beds where they lived and died. We conclude that when these shell-fish lived, the surrounding waters held nearly their present level.

"Another truth plainly taught in these stratified bluffs is this: the waters here became afterward much higher, or speaking more exactly, the land became much lower. There must have been a change of more than one hundred feet, for a stratified sediment of one hundred feet in thickness, as now seen in some of these bluffs (that, for instance, near North River), would require more than that depth of water to place it there; and this sediment is so fine in material as to warrant the conviction that it once existed evenly distributed over the whole region, bay and all. The upper layers, too, have in them the finest materials and the fewest fossils; both facts indicating increasing depth of water as the upper beds were deposited.

"Yet another plain truth is legibly written here: the changes indicated in depth of water over the place were quiet changes. Any sudden catastrophe would leave signs of violence and consequent strong current; but nothing of the kind appears here. The fragile cone of the spruce tree of the period, buried in that sediment, is found today among these shells as little marred by time as the shells themselves. The line of deposit along the sheltered bay just as it was at its deepest stage of water, is now as unbroken as it was then. Neither the violence of earthquake nor the suddenness of deluge has left any trace of such agency to dis-

turb the conviction one feels that the changes indicated there were quiet ones, covering a long period of time, yet scarcely disturbing the quiet order of life over which they presided.

"That every inlet on our northern coast has its group of facts of like import, there can be no doubt. Our line of thought needs only those that mark its extension to the Columbia River, and there the lessons gleaned from the bluffs of Shoalwater Bay reappear in all their clearness. A fine instance of this is seen in a bluff on the old Wheeldon farm, just inside the cape. Several others may be seen along the streams that fall into Young's Bay, on the south shore of the river, and just back of Astoria. All these contain remains of animal and vegetable life linked to our shores and forests of today by identity of species; and separated in our minds from the present order of things by the conviction that the agencies which placed them there have passed away.

"In all this, we are obviously studying only the lower limit of this latest of Oregon's geological changes. Where shall we look for its upper limit? In other words, how high did those waters rise above the present sea-level? We might look for traces of its upper reaches in the remains of old sea-beaches in elevated places on the abrupt slopes of the hills along the coast; but in such exposures old beach-lines are but rarely preserved against

the storms of a thousand winters, still less against those of tens of thousands. To find them and their records plainly legible, we must look to more sheltered localities inland. It will help us a good deal in our search for such shore-lines of the interior, to carry with us a theory that will point out the possible limits within which they may reasonably be sought. Will the facts we have gathered from Shoalwater Bay and the lower Columbia warrant us in forming such a theory? Let us see.

"Stratified sediment of a hundred feet in vertical thickness, finer far in its upper layers than in those lower, and in its upper layers entirely deviod of marine remains, while the lower ones are densely crowded with them, plainly indicate shoal water to begin the work, and deep water afterward over its highest layers. But the sediment itself is one hundred feet or more and deep water over its upper surface, equal to the requirements of its facts, could not be less than another hundred feet; thus making a total depth of at least two hundred feet above the present water level. Let, then, a depth of two hundred feet be our theory and with this let us pass inland for facts to confirm it if true, to reject it if false; and if confirmed, to trace by its help the outlines of that fine old Willamette Sound that in the days of the mammoth and the broad-faced ox may have

welcomed to its scores of sheltered harbors, the ancient hunter who in his canoe, if he had one, floated one hundred feet or more above the present altitude of the church spires of Portland and Salem.

"But as we pass along, let us in imagination reconstruct the fine inland sea that two hundred feet of elevation in the waters of the Columbia must have made. We have first the noble entrance, like that of the Straits of Fuca, extending from the present site of Astoria to that of St. Helens, eighty miles or more in length, varying from five to twenty miles in width, and over two hundred feet in depth. At St. Helens it spreads out into a broad inland sea, extending from the Scappoose Mountains to the elevated land east of the Willamette Valley. Like the Puget Sound of today, whose general outline this old Willamette Sound strangely resembled, it was in its southern extension over the present valley, among elevated islands, deep channels, and land-locked bays reaching from the Scappoose Mountains to Spencer's Butte, that it spread out its greatest wealth of scenic beauty. Our theory would make it cover the whole of the lower levels through which the Willamette now flows.

"Let us trace this grand water system eastward, along the present course of the Columbia River. We started, it will be remembered, from

the capes with a theoretic elevation of the waters two hundred feet above their present level. The fall of the river, from the lower cascades to the ocean, may be stated at forty feet; the fall through the five miles of cascades, at thirty-five feet. Above this there are forty or fifty miles of narrow gorge through a mountain range, with slopes too steep for preserving old shore-lines and through which the river falls twenty feet more. Here we find the first open space east of the Cascade Mountains, in which the waters of that period, if two hundred feet higher at the capes than they now are, would have an elevation above the present river level of one hundred and five feet. There was at this place, a lake-like extension of the river seven or eight miles wide and fifteen or twenty long; and into this a semicircular system of streams, six in number, brought a continued supply of sediment—sand, clay and gravel—and buried, year after year in its strata along the margin of that lake, the record of the passing events of the times. Now, manifestly, at whatever level we may here find elevated beach-marks, with buried remains at all corresponding with those with which we started, there we shall find the figures to correct the theory with which we set out.

"Within a few miles of the mouth of the Des Chutes River, the very evidence we need turns

up. More than two hundred and fifty feet above the present level of the river, and therefore one hundred and fifty feet higher than the elevation with which we started in theory—buried in the stratified sands, clays, and gravels that mark the wash of those streams into and along that old lake-beach—are found the tusks, teeth, and bones of the land animals of that period, marking at once the height at which these waters stood and the life record of the times. A recent visit to this locality, in company with an eminent geologist, Professor Joseph LeConte, gives remarkably fresh vividness to the recollection of the facts and figures that define the position of its fossils.

"A ride of four or five miles from The Dalles brings us to where three of the creeks referred to join their streams and empty together into the Columbia. The surrounding hills are composed largely of soft volcanic tufa, and through this these streams have worn deep ravines in their descent. The ravines were worn to their present depth long before the period we are describing, and when subsequently the waters rose here, backed up from the ocean, they filled these ravines, converting them into deep bays, and thus forming so many sheltered nooks into which the streams washed and in which they buried whatever the winds or floods committed to their keeping. On entering one of these ravines, we come suddenly

to the edge of a newer and deeper excavation in its mid-channel. A sudden melting of snows on the neighboring hills, a few winters since, had caused these newer excavations. Scores of them were opened here within a circuit of twenty miles. The one we entered is a large one, though not the largest. It is more than a mile in length, is in some places two hundred feet wide, and twenty-five to thirty deep. Along the freshly fallen sides of these new excavations one can see the distinct and horizontally stratified deposits we are seeking. The record at Shoalwater Bay is the latest there; the record among these ravines is the latest here. The height of water proved to have existed so recently there, must necessarily have made its mark here. And now, inasmuch as these ravine sediments are the latest traces of high waters here, their elevation necessarily gives the height of those waters. And the figures that mark the height of these fossils above the present level of the river are the figures we need to complete the theory with which we started from the capes of the Columbia.

"Nor is there any room for mistake here; for while this fossil sediment extends through a vertical range of more than one hundred and fifty feet, the least total altitude that will meet the conditions of the problem must take in the highest portion of this fossil bed. Stating this at two

hundred and fifty feet above the present level of the river is placing it at its lowest, and even then with the understanding that we are dealing with sediment and not with surface lines. Nor yet will it do to set these facts to the credit of that system of river terraces known to exist throughout the northern portion of our continent. These from Frazer River were described by Chief Justice Begbie, of British Columbia, and years ago Professor Dana described those in Oregon and California. Still later the American Journal of Science designated them as part of a system of terraces that covers a large part of North America north of the Ohio, and existing on all streams, as far as examined, nearly to their heads in the mountains.

"Now our facts and these—exclusively inland facts—refuse to be classed together. The system of old shore-lines we are tracing belongs primarily to the sea shore. These other terraces run inland, high among the mountains. The facts upon which our theory was based were gathered at Shoalwater Bay, were controlled entirely by the level of the Pacific Ocean, and scarcely affected by flood levels in the river, and still less by any extended lake system of the interior.

"And now, with our amended theory in mind, as a measuring rod, let us retrace our steps to the lower country—the Willamette Sound of the

olden time. Let the fall of the Columbia River, from this lake-shore east of the Cascade Mountains to the mouth of the Willamette River, be stated at eighty feet. Our fossil remains on this lake-shore are two hundred and fifty feet above the present level of its waters, making a total of three hundred and thirty feet as the depth of those waters above the present surface at the mouth of the Willamette River. How naturally one looks to the currents of such a vast body of water as the agency competent to the heaping up of that long sandy ridge one hundred feet high, through which the river has cut its way at Swan Island, north of Portland. But let us follow it still farther inland. Over where Portland now stands, these waters were three hundred and twenty-five feet deep; over Salem one hundred and sixty-five feet; over Albany one hundred and fifteen feet; over Tualatin Plains one hundred and forty-five feet; over LaFayette one hundred and seventy feet. A narrow strait, over the present valley of the Tualatin River, ten or twelve miles in length, opened westward upon a broad, beautiful bay, extending over the present sites of Hillsboro and Forest Grove, to Gale's Peak, among the foot-hills of the Coast Range. The subsoil of the fine farms of that rich agricultural region is itself the muddy sediment of that bay. Farther south over the central portion of the pres-

ent valley, and lying obliquely across the widest part of the Willamette Sound, there arose above those waters an elevated island. It extended from a point south of LaFayette to one near Salem, and must have formed a fine central object in the scene. Three or four volcanic islands extended, in an irregular semicircle, where Linn County now is; and the islands of those waters are the Buttes of today—Knox's, Peterson's and Ward's. One standing on the summit of either of these Buttes, with the suggestions of these pages before him, could so easily and vividly imagine those waters recalled, as to almost persuade himself he heard the murmuring of their ripples at his feet—so sea-like, the extended plain around him—so shore-like, that line of hills from Mary's Peak, on the west, to Spencer's Butte, on the south, and only lost on the east among the intricate windings of extended slopes among the foothills of the Cascades. How natural would seem to him this restoration of one of geology's yesterdays!

"The shores of that fine old Willamette Sound teemed with the life of the period. It is marvelous that so few excavations in the Willamette Valley have failed to uncover some of these relics of the past. Bones, teeth, and tusks, providing a wide range of animal life, are often found in ditches, mill-races, crumbling cliffs, and other exposures

of the sediments of these waters, and often within a few feet of the surface. Did man, too, live there then? We need not point out the evidences of increasing interest the world feels in facts that tend to solve the doubts that cluster around this natural inquiry. A few more mill-races dug, a few more excavations of winter floods, more careful search where mountain streams washed their trophies to their burial under still waters, and this question may be set at rest, as it regards the Willamette Sound. Oregon does not answer it yet."

In the summer of 1871 Mr. Condon had an able helper in his oldest son, Edward Gerald Condon, who had been attending college at Forest Grove but was obliged to drop his studies in the early spring on account of trouble with his eyes. He spent a part of May and the month of June on a surveying trip in the Blue Mountain Country and by the middle of July was ready for fossil hunting.

There lived at the old stage station of Cottonwood on the John Day River, a rancher, Mr. S. H. Snook, who had long been one of Mr. Condon's best and most helpful friends in this region, and he was now ready and able, on account of his experience and kindly disposition, to train the son as he had helped the father. Although only

seventeen, this boy was a son of whom any father might well be proud. He had a pleasing personality with decidedly scholarly tastes, and a real love for out-door sports, especially hunting, fishing and skating; so he threw himself into the new game of fossil hunting with all the ardor and enthusiasm of youth, and proved himself a real success in the work. After several weeks' experience in the field he writes home as follows:

COTTONWOOD, September 3, 1871.

DEAR FATHER:

Tomorrow we start for "The Cove.". . .That package of paper came by last stage. Mr. Snook was down the river after he was in The Dalles in July and found the fossil bearing rocks all the way down as far as he went below "The Cove." Yesterday we did some cattle driving. Tomorrow shall start. I shall be very glad indeed to get home although the trip has thus far been remarkably successful. I have plenty of money. Love to all. E. G. CONDON.

P. S. Turtle Cove can only be commenced on, at this time. Send me some more paper by stage please, wrapping paper, lots of it. This morning we are off, just Mr. Snook and I. E. G. C.

Thursday, September 7, 1871.

DEAR FATHER:

Just came out from "The Cove" with a load of fossils. We find that we can but commence the work. It is far greater than any conception which you have formed of it. I left Mr. Snook at South Gallery where

we have been at work since Monday. Several heads, lots of teeth, and some fine bones are the result thus far. I need a great deal more paper than I have of the softer sort. Can you find some soft brown wrapping paper at The Dalles and send by next stage?

Yours truly,
E. G. CONDON.

In answer his father wrote immediately:

THE DALLES, September 10, 1871.

DEAR SON:

Yours of Thursday was received last evening. You have certainly struck the lead at last. I wish heartily I were with you this week. I can only say in regard to your work: Your present position and opportunity is a very rare one. Appreciate this yourself. Let me urge, do not close your work hastily: Do it up: Do it well. Take the time for it. Use the money necessary. Do not pack up hastily when you leave. Avoid it, you will need time to do this well. Write freely of your wants. I have sent this time four quires of fine brown packing paper and a small quantity of very tough soft Chinese paper for extra fine work. Tell Mr. Snook that I shall consider myself indebted to him for every day he spends in the work.

I have received since I last wrote you, a line from Prof. Marsh. His party will be ready to take stage passage from Salt Lake to Canyon City about the first of October, and there I have promised to meet him.

THOS. CONDON.

During this busy summer of 1871, a Portland minister called at Mr. Condon's home accom-

panied by a representative of one of the great eastern colleges who wished to purchase the Geological Cabinet; but he found the Oregon Collection was not for sale. The offer was liberal and the callers persistent, but neither gold nor persuasive eloquence could influence the owner to consider the proposition. Finally the Portland gentleman became impatient at what seemed the folly of an enthusiast. "Why, Mr. Condon!" said he, "how can you refuse? Here you are a poor minister with a family to educate, and your wealth centered in this great collection crowded into a common wooden house. Don't you know a fire at any time may destroy it all?" But even threatened disaster could not prevail and the discouraged callers finally took their leave.

The day so full of care was over and the night was gladly welcomed for its quiet hours of rest and thought. The offer for his cabinet had been so unexpected, and so persistently urged, that he had found himself taking the defensive without stopping to analyze his decision; and now in the quiet night, he asked himself whether he had been hasty, whether there was more sentiment than reason in his determination not to sell. As he reviewed the history of his geological work, its relation to his family and society, he found his judgment fully sustained his decision. In the emergency he had acted from an intuitive con-

viction, itself the result of years of quiet, half-unconscious thought. Yes, he had cold financial reason on his side, but it was always warmed and uplifted by the enthusiasm of his love. Besides to part with the collection would seem almost like shattering his own personality, of which it had become a part. Did not each specimen have its own identity, its own personal story known only to himself?—and yet, after all, the caller was right; a fire might destroy it any day. Then the thought of fire so took posession of his tired nerves that he could not rest. Finally he grew indignant at his own useless worry; he resolved to plan for the danger and then put all thought of it aside. He remembered a large tank of water beside the hydrant, some discarded carpets, boards, and timbers within reach. He planned what to do if a fire should break out down town, with the summer wind from the west. Finally, when every detail had been thought out, the tired minister fell asleep.

A few days later, while the family were at their noonday meal, the fire bell rang, and Mr. Condon saw a column of black smoke pouring from the old "Globe Hotel" several blocks away. There was a stiff breeze from the west, and remembering his midnight plans, he immediately began work upon the scaffolding. It was barely finished and he was spreading the carpet upon the roof when he

turned to find the flames sweeping through the next block. The fire had fanned the breeze into a gale, everything had melted before the fierce heat, cinders were already falling around him and a wall of flames was surely, swiftly coming on. In a moment twenty men were running to his help. And how they worked! The roof took fire, one man fell prostrate from the heat; but the heroic work, the vacant lot on the west, tall trees close to the house on the east, and thorough preparation—all helped; and those who had time to note the progress of the fire saw it burn almost everything near, even the tall factory beyond, and yet the little house of wood stood unharmed in its setting of charred and blackened trees. When it was all over everything was found in confusion, many things had been carried out only to be burned, and worse than all, the shelves that held the cabinet were almost bare. Most of the choicest specimens were gone.

Late in the day, when the scattered people had again gathered at their homes and the homeless ones were sheltered, Mr. Condon began holding a reception which lasted many days. First came a sturdy blacksmith carrying a fine oreodon head. "Well, Mr. Condon," said he, "I am awful glad you were not burned out.—Yes, I lost everything, house, shop, and all. My little boy heard your house was on fire, so he rushed in and got this

stone head. I don't see how he ever got away with it for it's awful heavy. He said he was bound to save something for you and he always liked this head with its fierce looking corner teeth. Once he stepped on a cinder and most dropped it but I guess it's all right." Then a young man called to leave a box of horse and rhinoceros bones and teeth that he had saved. Still later came a little blue-eyed girl with her gingham apron full of beautiful sea shells. She said: "I could not bear to have them burned up, so I just took those I liked best and carried them in my apron for you." Finally, just at dark, came a small boy bringing home the head of a fossil dog. "You know, Mr. Condon, you showed me your rocks one day and I liked this because it's a dog. So I just saved it for you." Day after day they came until nothing seemed missing except a little cube of amber in which insects were entombed and after weeks had passed even this was found in the street.* It is not strange that this tribute of affection made a new and tenderer tie between him and his people.

* It is a historic fact that most of the finest specimens were carried away,—many of them by children, and that they were carefully returned within a few days. These particular stories are perfectly true to the spirit of similar incidents whose details have been lost.

CHAPTER X

Religions and Scientific Truth

We have seen that the year 1871 was crowded full of interesting life and activity. But a few weeks after the beginning of the new year a great sorrow cast its dark shadow over the Condon home: the son, Edward, was stricken with pneumonia, from the effects of which he died in February. The grief of the family was too deep for words and there were those who said that the father, as they knew him around the camp fire in the wilderness, was never so full of joyous, light-hearted youth again. And yet, he had enjoyed the companionship of this choice spirit, with his eager, inquiring mind, just long enough to make him appreciate the questioning of all earnest college boys about religious and scientific truth; and he realized even more than before the responsibility of religious teachers in guiding young people through the tangle of conflicting opinions and beliefs. For to him, the spiritual was just as real and of far more vital importance than the material side of life. This extract from a letter to a friend during his Dalles pastorate gives one a glimpse of his deep interest in the spiritual growth of his people. He had been writing of the results of a series of religious meetings and adds:

"I gave notice that I would meet in the church parlor those who had recently been led to cherish a hope, with any others who were interested in the subject of religion. At the appointed time twelve came and after some preliminary religious exercises and a brief talk, I asked those of them who had decided to serve Christ to rise. Several, I was afraid, would not. In doubt and fear I closed my eyes a moment, and when I opened them again, my heart jumped with joy; they were all on their feet but one, a noble, quiet expression of purpose on every face. These were all young people between fourteen and eighteen."

Mr. Condon was a pioneer by nature. It gave him great pleasure to work with rough, unpolished human character, and to discover the glint of gold hidden under the rough exterior. The book of nature was indeed fascinating, but did not appeal to him as did the work with men. He had the artist's eye for seeing the beautiful in character and the enthusiasm of a Christian Phidias for shaping rough, faulty human nature until its beauty reflected the Divine. To many minds these two lines of interest, the development of character and the study of nature, would seem incongruous, but to him they were both God's truth—the one the preparation, the other the culmination of God's work. And yet strange and unusual as is this combination of a geological

minister, it seemed exactly what was needed to equip one for usefulness over fifty years ago. The storm, foreseen by our minister at the stone quarry, was already brewing and these were years of great strife in the scientific and religious world, for the author of "The Origin of Species" and "The Descent of Man" had given his theory of evolution to the world. The grand truths developed by that galaxy of brilliant English writers—Spencer, Huxley, Tyndall, and others—had already been seized by German materialists, who were calling upon all thinkers to discard the Bible as out of date, because not in harmony with scientific thought. If Christian ministers had only been ready, these rash demands of materialists would have been quickly set aside. But Christian ministers were not scientists; and the principles of "higher criticism" if thought of at all, were considered dangerous heresies, against which to warn their people. To Mr. Condon the theory of evolution presented to the human mind a wider conception of God than the world had ever known before. It involved a plan of unthinkable grandeur, beginning with the smallest, simplest things, gradually unfolding into more complex life, often interrupted by some great upturning of nature; but never losing the continuity of purpose, the steady progress toward the culminating glory of all—the spiritual life of man. To have all of this

new wealth of spiritual vision seized upon and appropriated by materialists was a source of deepest sorrow. The storm starting on the intellectual heights of Europe was slowly traveling Westward; but our prophet of the stone quarry found all effort to prepare the churches vain. A little later the magazines were full of the subject, and materialism was creeping into college life with the claim that evolution was antagonistic to religion. The young men who studied science found no Christian leader to interpret the beautiful adaptation of evolution to the spiritual life. It was no wonder that college boys, studying geology, affected materialism, because to be a Christian was to be "behind the times." Our geological minister saw that the old ramparts erected by theologians were no longer a safe retreat; that the church must be defended by science herself, and he longed to help unfurl the Christian flag over this newly-discovered land of truth.

These thoughts, together with the urgent need for higher educational opportunities for his children, were drawing him irresistably into closer touch with college life and teaching, where he felt he could have a better opportunity as a Christian leader to help the boys and girls of Oregon.

But to leave The Dalles was not easy. The rough stirring life of mining days had long since passed away and The Dalles had become an at-

tractive home town full of energy, integrity, and growing culture. Then, too, the personal ties that bound him to his wide circle of loyal friends were mutual and very strong. One of The Dalles boys of this period became an editor of a newspaper in eastern Washington and in later years after a glad meeting with his old friend on the streets of Dayton wrote: "Thomas Condon is one of my boyhood's idols which time, the great iconoclast, has failed to obliterate."

The change would also mean moving still farther away from his especial field of research, the John Day Valley, but it seemed inevitable; and it was perhaps with the thought of leaving less unfinished field work that in the spring of 1872 Mr. Condon wrote the following letter to his friend and helper, Mr. Snook, of the John Day Valley.

DEAR FRIEND: DALLES, March 15, 1872.

You have doubtless learned before this of Eddy's death. Your letter was among the last things he read. He talked on his sick bed a good deal about his hope to go with you again next month to the Cove. There were few persons outside his own family Eddy thought more of than he did of you.

Since he was taken from us I have lost much interest in fossil hunting and yet I think I must try to finish the work he began with you last summer in the Cove. I have asked Mr. Edgar's permission to invite you to spend a month or so with me this spring and he is willing. I took this course because I did not want to

seem drawing your services away from him. I am just starting to deliver a lecture in Portland and shall be gone about a week. The winter closed the river against me and I have not lectured this season as usual. Eddy's sickness prevented after the river opened so this is to be my first for the season.

Write me a line by return mail and in it please tell me whether you can go with me for a month or more, and how soon it would do to start, and what supplies I should send up ahead of me. You know there is an occasional snow in that country in April and May and Mr. Edgar says he can spare us a tent.

My regards to your family,

Yours very truly,
THOS. CONDON.

This expedition was definitely arranged for April and Mr. Condon took with him his second son, Seymour, who will give from his own vivid recollections an account of this ill-starred trip.

We left The Dalles at a very early hour in the morning on the regular Canyon City Stage. It was a Concord Coach with six spirited horses and "Billy Bird," an experienced and most skillful driver, holding the lines. In the coach were two gentlemen, one of them weighing two hundred and fifty pounds, besides my father, four Chinese and myself. Soon after reaching the summit of the Deschutes grade and while making much better time on the Eastern slope the horses became frightened and the rest was a wild ride down that heavy mountain grade behind six frantic animals with the coach tipping and careering at each sharp turn and threatening disaster all the way. The down grade was three or four miles long, and do his best, the driver could only keep

the stage on the grade, he could not check the speed of the frightened horses. We inside passengers could see but little. I was seated on the Canyon side and well remember it was a long, long way to the bottom.

The extremely heavy passenger became frantic with fright and tried to jump thru the doors—first on one side, then on the other—but father held him back, for a jump on either side would have been fatal. The climax soon came, for at the foot of the grade where the road struck the level, the wheel horses plunged headlong to the ground and the coach turned somersault. Father struck the ground with the heavy man on top of him, resulting in many serious injuries. No one else was so badly hurt. The passengers were taken to a stage station nearby and help was summoned from The Dalles and the next day father was carried home.

When this slow tedious journey of thirty miles was over and Mr. Condon was at home again, it was found that his injuries, although serious, were not as dangerous as was at first supposed, and his recovery was only a question of several weeks of quiet convalescence.

The autumn before, Professor Marsh of Yale had left a package of small coins with the request that they be used for buying arrow-heads from the Indians. And it was while Mr. Condon was still confined to his bed that the Wasco Indians began coming with their little bundles of arrow-heads for Professor Marsh of Yale. Of course, some one had to appear at the side-yard of the Condon home and bargain with the Indians. At

this time refined families did not encourage their children, especially their daughters, in learning the Chinook language. But it was extremely interesting and most of us were delighted when we were privileged to listen to an expert linguist as he talked fluently to a group of Indians and to note their replies. The meaning of some words was so dependent upon modulations and accompanying gestures that the language had a primitive charm all its own. For instance, when Mr. J. said: "How far away did you find my horse?" if the Indian answered "Siah," in a quick staccato voice, he meant only a short distance, perhaps three or four miles. If he answered "Si—ah" it might mean ten miles or more. But if the tall Indian raised himself to his full height and threw back the bright blanket from his long outstretched arm and pointed his bony finger upward and beyond the distant mountains, and then said "Si—yah———", trailing the last syllable into vague infinity, then Mr. J. knew his horse had wandered very far from home. It was partly because of its appeal to the imagination that most young people needed no encouragement to acquire a speaking knowledge of this fascinating language and it fell to the lot of one of Mr. Condon's daughters to spend Professor Marsh's small coins in exchange for Indian arrow-heads of flint, obsidian, and tinted carnelian.

CHAPTER XI

Intercourse With California and Professor Joseph LeConte

The scientific intercourse between Oregon and California seems to have begun in 1870 when Mr. Condon received official notice that he had been elected a corresponding member of the California Academy of Science. The next spring a letter was received from C. D. Voy, asking for an exchange of Oregon and California specimens. Mr. Condon's answer was as follows:

DALLES CITY, OREGON, June 6, 1871.

DEAR SIR:

On my return from a trip into the wilderness lately, I found awaiting me your favor of April 15th. Your proposal to exchange fossils with me gives me unfeigned pleasure. I shall at once set aside a small box and as I find in looking over my duplicates a suitable specimen, shall lay it by for you, and when the box is full shall send it to you, notifying you by mail when it goes.

You speak of leaf impressions, I can send you some fine ones. I shall not stand on the order of sending but send when mine is ready. My protracted absence has left home work largely in arrears, and am compelled to leave home again for two or three weeks.

You write that you would like to visit the Bridge Creek locality yourself and you inquire about time and probable expense. The locality is about one hundred

miles from The Dalles and can be reached by stage in a day and a half at an expense of about twenty dollars. Should you find time I shall be glad on your arrival at The Dalles to furnish you a rough map of the region with its fossil localities marked.

I shall put in a few silicified bone fragments, when I send you those leaf impressions.

Very truly yours,
THOMAS CONDON.

Then Mr. Voy writes:

SAN FRANCISCO, August 2, 1871.

DEAR SIR:

Yours received a few days ago, but it had been waiting for me some time as I have just returned from a trip to the mountains. I will accept your offer and will put you up a box and try to send it by next steamer. I hope you will be pleased with it and would like to have you send me in return a collection of your fossil botany, more particularly impressions of ferns with particulars of how found, etc. I hope some time to make your section a visit.

Hoping you had a pleasant trip in the wilderness as you term it, and came back in good health, I remain,

Yours respectfully,
C. D. VOY.

Several months later Mr. Condon writes:

DALLES CITY, OREGON, February 20, 1872.

DEAR SIR:

I have just packed up your box of fossils with a very unsatisfactory feeling that it is not just what I intended to have it. I must try to supplement it at some further

opportunity. A word about the contents of this: 1. You will find a cinnamon colored shale rock with leaf impressions. These are all from Bridge Creek in the John Day Country. 2. A few with fern impressions in a drab colored compact argillaceous rock. These fern-leaf impressions are from Cherry Creek, twenty miles from Bridge Creek. 3. A light ashy, sedimentary rock with oak and other leaf impressions. These are all from the John Day Valley. 4. A course sandstone with leaf impressions, the leaf prints nearly black. These are the ones to which Prof. Le Conte referred; they are from the Cascades of the Columbia. 5. A fine vitreous porcelainite with leaf impressions—yew-like or taxodium; with these or near them in the box are several different colored specimens of this beautiful baked clay, all from the same locality. A lava current seems to have flowed over a bed of fine clay sediment baking it into porcelainite. 6. Some fossil bones, all from the John Day Valley. 7. A few fossil fragments of jaws and teeth—from the John Day Valley also.

Let me know please as soon as you receive them. I send them by Wells Fargo and Co. Express. To make them equal in value to yours I shall try again sometime.

Very truly yours,
THOMAS CONDON.

The following letter was written by Prof. Joseph Le Conte of the University of California.

OAKLAND, CAL., June 15, 1873.

DEAR SIR:

In connection with Mr. Voy I wrote about six weeks or two months ago, to hasten the sending of fossils from your vicinity. For myself I was particularly anxious to

get leaves or any other fossils from the sublava deposit at the Cascades. I must have them before the vacation, which commences about the middle of July. My object as I think I told you in my previous letter, is to write something on the Cascade Range. Won't you help me?

I should have told you that Mr. Voy's cabinet has been purchased by Mrs. Mills and presented to the University. All exchanges therefore are betwixt yourself and the University. Nevertheless I shall employ Mr. Voy to make the exchanges and therefore you can send to him as heretofore.

It is barely possible I may stroll up your way again this summer. There are many things I want to examine. If I should I would make a longer stay and do more work than I did last time. Will you be at home? If I should come you would be of infinite service to me, in fact I could hardly get along without you.

Now, my dear sir, I know you are busy about many things, but let me entreat you again to send what you can, especially the sublava leaves, as many specimens and as good specimens and as many species as you can spare.

Kind remembrances to your good Lady.

Sincerely your friend,

JOS. LE CONTE.

Again he writes:

OAKLAND, CAL., June 21, 1873.

DEAR SIR:

I wrote to you two or three days ago in relation to fossil leaves from the sublava deposit of the Cascades and also sent you two articles of mine. I also stated that I *might possibly* wander to Oregon this summer. I have been thinking more on this last point lately. I

cannot tell yet what I will do but if I should go to Oregon I should be much disappointed if I should find that you were not at home. I now write again therefore to ask you if you will be at home about the last of July or the first of August; and if so, if you would *like* to take a trip to any locality you think best. I don't want to inconvenience you in any way, I only want to know your own pleasure in the matter. It is yet very doubtful what I will do.

Please write me as soon as possible and oblige,

Yours very truly,

JOS. LE CONTE.

Mr. Condon answers as follows:

THE DALLES, OREGON, July 10, 1873.

DEAR SIR:

Yours of the 15th and 21 ult. I found awaiting me last week on my return from a mountain trip. A good deal of hesitancy in my plans is my plea for several days' delay in answering you. I shall not leave home again on any lengthened trip till after the first of August, and shall be glad to welcome you here at or about that time, or as much earlier as your arrangements will admit. When you come we will plan work for your time of remaining with us. The waters of the Columbia will by that time be low enough to enable us to visit the leaf locality of the Cascades and we may be able to visit some other localities. I wish you could bring with you a good paleontologist to help me.

Very truly yours,

THOS. CONDON.

Professor Le Conte replies:

DEAR SIR:

I have concluded to go to Oregon. I will start on the 2nd of August and will arrive in Portland on the *J. L. Stephens* about the 6th and will go up to The Dalles almost immediately. Many thanks for your kind offers of assistance.

Very sincerely yours,
JOS. LE CONTE.

Professor Le Conte's letter written just after reaching home from his visit to The Dalles is as follows:

OAKLAND, CAL., September 8, 1873.

MY DEAR FRIEND:

I reached here on the 2nd inst. My specimens are also safely arrived. I came overland and made what observation I could on the way. I wish to draw your attention to Rogue River Valley. It seems to have been a tertiary lake basin like Bridge Creek. Fine leaf impressions have been found in great abundance in a finely fissile shale. Mammalian remains also have been found. I have not seen these things but I have it from an intelligent man with whom I travelled from Jacksonville. This gentleman told me of a large head discovered by him and now in the possession of Dr. Dowle of Jacksonville. From his description of the size of the teeth I think it is probably a rhinoceros. He says moreover that Dr. Dowle has quite a collection from that vicinity.

I send you according to promise, some leaves of the live oak, Quercus agrifolia. My dear sir, I cannot easily forget your kind attentions during my delightful stay

in Oregon. Please remember me very kindly to your good wife and children. Sincerely your friend,

JOS. LE CONTE.

We suppose these friends visited the Cascades of the Columbia and that Professor Le Conte collected freely of the sub-lava leaves for which he had been so anxious. The leaves were the same as those Mr. Condon sent to Dr. J. S. Newberry in 1869. They also had a trip together into the John Day region at least as far as Bridge Creek, where Mr. Condon was called home by the serious illness of one of his children.

Professor Le Conte wrote of his two previous trips to Oregon as follows:*

In August 1871 under the guidance of Mr. Condon I first examined the magnificent section of the Cascade Mountains made by the Columbia River at this point. During the past summer (1873) I made a geological tour through portions of central and eastern Oregon, the principal object of which was to examine the great lava flood which covers this region, and more especially to study the structure and determine the age of the Cascade Mountains. In this tour I was accompanied and greatly assisted by Rev. Mr. Condon of The Dalles, a man widely known and greatly honored no less for his disinterested courtesy than for his extensive knowledge of this portion of the state. Two years before, I went over nearly the same ground, and also extended my observa-

* The American Journal of Science, Vol. 107, P. 170-364, Jan. and June, 1874.

tions into Washington and British Columbia. The purpose of my last visit was to solve if possible some of the questions started in the first visit.

And on Page 364 Professor Le Conte continues:

In an admirable article published in the Overland Monthly for November 1871 and entitled "The Willamette Sound" Mr. Condon traces an old sea and sound level some three hundred feet above the present sea level, from the ocean up the Columbia River around the great valley of the Willamette and then up the Columbia River to The Dalles. Much of the evidence of this was shown me by Mr. Condon on my recent visit to Oregon. Here there is undoubted evidenced depression and re-elevation.

CHAPTER XII

Geology and the Oregon Legislature

We have noted the eager response Mr. Condon gave to Dr. Newberry's early request for fossil leaves in 1869, and how cordially he promised to *lend* Professor Marsh of Yale all fossils from the Upper Valley that would stand transportation. His hopes were then high that his fossils would soon be identified by experts. But as time passed very little help had come from either Columbia College or Yale. It would have been quite different, no doubt, if his dealings had been confined to the Smithsonian, for nothing could have been more satisfactory than the prompt and able help obtained from Joseph Henry, Professor Baird, and Dr. Leidy. But Professor Newberry had been caught in the rising tide of geological research; for beside his duties at Columbia College, he was spending part of each year as State Geologist of Ohio and his days were more than full; so that he found no time to apply his expert knowledge of paleobotany to determine Oregon's ancient forest trees. Then, too, experience had demonstrated the risk of serious crumbling and breakage by transportation, making it of doubtful expediency even to send specimens to Dr. Leidy through the Smithsonian.

The State of Oregon was also waking up to the possibility of doing something to develop her own geological wealth. An effort was made to create the office of State Geologist for Mr. Condon and a bill was introduced in the Legislature of 1872 creating the office with a salary of $2,000.00 per year; but before its passage by the Legislature, the bill was amended to carry a salary of $1,000 instead of $2,000, which so crippled the work of a much needed state office as to render it of little value. In fact, the sponsors of the bill stated distinctly that with this small salary Mr. Condon was only expected to continue the state work he had been doing without state aid for so many years. The bill was approved by the governor on October 24th, 1872.

The question of creating an Oregon State University was also up before the same session of the Legislature. A letter from Forest Grove indicates that active effort was made to locate the new State University in that attractive college town and great hopes were felt that this plan would be realized. This was the situation in the autumn of 1872 when the following letter was written by Mr. Condon to Professor G. H. Collier of Pacific University, Forest Grove.

DALLES CITY, OREGON, September 15, 1872.

DEAR FRIEND:

Your favor of the 12th inst. I have just received.

In answer to your kind inquiries therein, in regard to my relation to any geological work the legislature may make provisions for, and any views I may have in regard to the extent and direction of the work, I would say:

You are quite right in your insight into the effect of Eddy's death on my interest in geological studies but, other influences operate just now upon me beside scientific zeal. Three more of my children need to go away to school, and this fact and my inability have combined to make my family quite restless. The force and direction of this restlessness you can well imagine.

But another thought. There has accumulated upon my hands a large amount of geological material which I now see plainly cannot be worked up and published by Eastern interests. It must be done by ourselves, if at all. I cannot myself incur the outlay. These motives just now have a strong steady government over me and any plan embracing suitable aid and opportunity would meet my cordial acceptance.

Legislature action ought to provide for a *Fire Proof Building* for a permanent state cabinet. It might for the present be in connection with the State Library Building. It need not be large nor expensive but ought to be safe. Second, *State Provision for expense and assistance* in collecting and transporting specimens. Third, *State Provision for the publication of at least one volume of reports.* This aside from the ordinary annual report of work done during the year.

The grounds upon which this suggestion is made are these. The materials already on hand are scientifically very valuable to the world. The last summer has doubled them in amount and interest. A reasonable fee would induce any one of our first class paleon-

tologists not otherwise engaged to assist me in working up the materials for publication. This done and a volume of great value and interest could be given to the world in a few months.

This letter and the developments that prompted it, prepare one for understanding the changed attitude shown in the letter to O. C. Marsh of Yale, written some months later, which undoubtedly helped Marsh to decide upon his second visit to Oregon, as is shown in the following letters.

DEAR FRIEND: THE DALLES, May 13, 1873.

Your kind letter of the 16th ult. I found awaiting my return from a recent trip to Puget Sound. I like most thoroughly the forbearance your letter evinces towards what might so easily be made to seem as ranging all the way from vacillation to bad faith.

I have had no influence from abroad upon my mind; the facts that pressed a change of plan upon me are these: First, *The Long Absence of Specimens Lent East.* This I have been made to feel the more as my opportunities to use them here have increased. The consideration that I cannot have them specifically determined here, counts for less with me because in my lectures I only need the name of the family, at most that of the genus. Other information I can wait for better than I can a year or two for the specimens themselves.

Another consideration that weighs with me is *the increasingly large number of fragile specimens I could not think of sending away at all.* Another yet is *the prospect of my needing them here for another purpose than that of lecturing.*

I have of late received many repeated assurances that the Legislature at its next session will make provision for at least a volume of report. I would like this illustrated by at least good photographs from a wide selection of materials. I am aware that you can see many objections to a procedure so unscientific; so can I; but I do not aim at a scientific, but a popular result. And then it may be the only way in reach.

In all this there is no need, and I feel no disposition to choose, to withhold any fossils you may need to throw light on groups whose examination you have commenced. If you will let me know when you will be ready to work at Oregon fossils I will endeavor to send you what I can spare—as an experiment in this very direction. It will help me some if you will indicate what you would most value.

I will send you with this a late lecture of mine to show you by what means I am trying to awake an interest here.

Very sincerely yours,

THOMAS CONDON.

FT. MCPHERSON, NEB., June 17, 1873.

DEAR MR. CONDON:

I start today with a large party for the Neabrara Country, and hope to make some important discoveries before my return five weeks hence.

I hope this fall to reach California, and if so will come up and make a careful study of your collection. Please write me here so that I may hear from you on my return.

In haste, Yours very truly,

O. C. MARSH.

Later Professor Marsh again writes:

IN CAMP NEAR FORT BRIDGER,
August 25, 1873.

DEAR MR. CONDON:

I hope to get through with my present trip the first week in September and then shall be ready to start for Oregon, as I wrote you some time since. Mr. Harger will come with me and we shall be prepared to examine carefully and describe any fossils you may wish identified. We shall probably come via San Francisco but possibly by stage although we both dread that route.

We shall come directly to The Dalles and will stay until the work is done. If there is not a photographer in your town, please ascertain where one can best be obtained for a few days, say about the 20th of September, but may be delayed a little.

Please write me on receipt of this (directing to Townsend House, Salt Lake City) and inform me if you can be at home at the above time and if it will be convenient for you to have us come then.

Desiring a kind remembrance to your family, I remain in haste, Very truly yours,

O. C. MARSH.

The pleasant visit from Professor Joseph Le Conte filled a part of this August, 1873. And, as they planned to be in Forest Grove for the opening of the college year, the next month was occupied by Mr. Condon in seeing his family well settled in their new home. Then he returned to The Dalles and began the tedious labor of packing up his collection and making it ready for safe

storage in Portland. On September 20th Mr. Condon wrote to his home folks:

I have gotten a little tired of packing specimens and have just reached a box containing writing material, so shall report progress. Last evening I arrived here all right. The boat was late, and a party wanted to see the cabinet. And another wanted me to supper, so that the mail closed before I had leisure to write. Ina's asters are all in bloom and very beautiful. I got a box of peaches from Mr. Craton, which will go to you Monday. And I will pick a box of grapes and send you on Tuesday. My job of packing up is stupendous.

Affectionately,
THOMAS CONDON.

About this time Mr. Condon wrote the following note showing his appreciation of the rich fullness of the life he was about to leave for new fields:

For myself, I do not know what the Master may assign to my own future, but I feel confident of this: That no success of the future will ever blot from my memory the enthusiasm of these ten years of hopeful toil at The Dalles; nor for my judgement its confidence that God has accepted that toil as a permanent influence in Oregon's future. In the light of my judgement as well as my faith such outlays in the mad marts of commerce pay.

One of his Dalles boys later wrote:

Never was the loss of a pastor more keenly felt than when he left The Dalles for Forest Grove. There are

those in The Dalles today, after more than thirty years, who love him as a father and a brother.

The paleontologist from Yale arrived at The Dalles as planned and September 22nd Mr. Condon wrote: "Professor Marsh has been hard at work all day."

This distinguished scientist was a quiet, earnest, kindly gentleman, a great worker and full of enthusiasm for his beloved field of activity. It is true that fossils lent to him in 1871 and 1873 were kept year after year in spite of urgent letters asking for their return, but Professor Marsh was a great collector. He spent months with ample help in money and assistants in the Cretaceous of Kansas and the Tertiaries of the Rocky Mountain region, so that fossils were arriving at Yale literally by the ton; and Professor Marsh was so buried in the avalanche of specimens that it was impossible, with all his other arduous duties, even to begin serious expert work on Oregon fossils. This delay indicated no lack of interest in Oregon's geologist. He wrote many kindly letters and sent numerous scientific books of real value; but he had no time for expert examination; so that camels and horses and other animals from Oregon waited patiently for years at Yale without even learning their own names. It is also true that thirty-five years later, in 1906, the fossils all came home still unnamed, for Pro-

fessor Marsh gathered in new material much faster than the fossils could be studied and identified, and when Mr. Condon would ask for the return of his specimens, Professor Marsh would write a kindly letter and send some new and valuable publication but usually begged for more time in which to study the fossils. Perhaps his last letter was the following:

NEW HAVEN, CONN., March 2, 1895.

DEAR PROFESSOR CONDON:

I send you today, by registered mail, a copy of the new edition of Dana's Geology, just out, which I am sure you will fully appreciate. It is a grand work by a grand old man, eighty-two years of age, the Nestor of American geology.

I have been greatly disappointed during my recent visits to the far west, that I could not again visit Oregon, and talk over many matters of mutual interest with you. I tried to do so several times, but the fates were against me. My scientific and official duties have kept me a prisoner, or I should have seen you long before this.

A word about those fossils you kindly let me have long ago. Do you value them highly, or would you be willing to let me retain them for our museum, provided I could send you in exchange an equivalent in scientific books, other specimens, or money? The Oregon localities have proved so productive, that you have doubtless many more perfect specimens of all the kinds represented in those you sent me. Kindly let me know your wishes in this matter. Very truly yours,

O. C. MARSH.

Professor Marsh was undoubtedly so overwhelmed with scientific work that finally his health failed under the burden, and he died. A few years later came this letter from Professor Charles Beecher:

YALE UNIVERSITY MUSEUM,
NEW HAVEN, CONN., March 31, 1900.

DEAR SIR:

Since Professor Marsh's death I have attempted the overhauling and classification of the vast amount of material in our storage rooms. I have found some fossils received from you many years ago that were apparently sent to Professor Marsh as a loan. If this is so I am ready to make any disposition of them you may wish. Unless you especially desire to have them returned we would be very glad to incorporate them with our collections as a gift from you. Very truly yours,

CHAS. E. BEECHER.

This letter was soon answered, with a request that the fossils be returned; but ill health or some other cause intervened and Professor Beecher died. Finally, in 1906, Professor Schuchert wrote as follows:

YALE UNIVERSITY MUSEUM,
NEW HAVEN, CONN., June 5, 1906.

DEAR SIR:

Today I came across a letter of yours to the late Professor Beecher dated April 18, 1900, about fossils loaned by you to Professor Marsh.

The fossils asked for is material loaned by you Oct. 1

and Nov. 15, 1871. To these was added the type of *Oreodon superbus* Leidy from the Smithsonian Institution.

As you at the time wanted this material returned to you I now ask how and by what route we shall send it to you. As yet we have not gone over your list to select out the material but this will be done when I hear from you. Yours respectfully,

CHARLES SCHUCHERT.

A copy of Mr. Condon's list was immediately sent to him and very soon a box of specimens was received from Yale containing every one of the old fossils lent in 1871 and 1873. Mr. Condon wished they had been studied and named, but there was no evidence of this, for no names or information of any kind was attached to them except such as was already known when they were packed up in Oregon thirty-five years before. In a later letter Dr. Schuchert expressed deep regret that the Oregon fossils had been kept so long and he certainly did all in his power to make amends. It seemed that the box had passed most or all of those years in the storage rooms at Peabody Museum waiting, with tons of other material, to be studied by expert scientists, who were continually overwhelmed by material that they never found time to identify.

CHAPTER XIII

Forest Grove—The State Report

The close of this year, 1873, found Mr. Condon teaching at Forest Grove, where, it will be remembered, they had spent some time while the school was still in its infancy. During the twenty intervening years the college had prospered in spite of financial difficulties and had always stood for thorough scholarship and high ideals in character. The town itself reminded many of a typical New England village, but it was distinctly Oregonian in its surroundings. It was a rolling pleasant country with a background of distant hills and clear mountain streams. There were also delightful woods of fir and cedar, rich in Oregon shrubs and wild flowers, and the broad campus was made beautiful by many great spreading oak trees.

A unique element was added to the student body by the presence of several young men sent over by Japan in response to the invitation of the U. S. Government at the time of Admiral Perry's invasion. The young men, belonging to the higher ranks at home, were fine students and perfect gentlemen, commanding the thorough respect of everyone.

In February of this winter of '73 and '74 Mr. Condon gave six lectures in Salem and of this course he writes: "Last night I delivered my third lecture to a crowded house, many having gone away for want of room. The interest was intense for *Human Antiquity* was the subject. Saturday evening I give another lecture, and then I can have Monday and Tuesday evenings in which to close."

At Forest Grove Mr. Condon spent two or three years teaching geology and lecturing, but as he had already promised to accept a chair in the University of Oregon when it could be organized, he considered life at Forest Grove a pleasant and profitable period of waiting. It was also a transition between the life of a devoted pastor and that of an enthusiastic teacher.

As the office of State Geologist was created in the autumn of 1872, the Biennial Report which follows was prepared for the autumn of '74, and again he was disappointed that the Oregon Legislature did not appropriate funds for publishing a volume of State Geological report.

To L. F. Grover, Governor of the State of Oregon:
DEAR SIR:

In obedience to the requirement of the Act of the Legislative Assembly of Oregon, to which I owe the office of State Geologist, I have the honor to submit to you the following preliminary report:

The Act I find as follows:

"Be it enacted by the Legislative Assembly of the State of Oregon:

"Section 1. That Rev. Thomas Condon is hereby appointed State Geologist. He shall hold his office for the term of two years, and until his successor is duly appointed and qualified; provided, that in case of vacancy in said office at any time, either by death or resignation, the Governor is hereby authorized to fill said vacancy.

"Section 2. It shall be the duty of the State Geologist to make geological examination of different parts of the State from time to time. He shall make biennial reports to the Governor of the results of his explorations and surveys, accompanied with such maps and drawings as may be necessary and proper, to exemplify and elucidate the same.

"Section 3. The compensation of said State Geologist shall be one thousand dollars per annum, payable quarterly, in gold coin; and the Secretary of State is hereby authorized and directed to draw his warrant for such compensation upon any funds in the treasury not otherwise appropriated.

"Section 4. Inasmuch as there is urgent necessity for the immediate appointment of such officer this Act shall take effect and be in force from and after its approval by the Governor."

Approved October 24, 1872.

The work, to which this Act called me, seemed then what it has since proved in practice, a difficult task. It at least seemed to require that the State Geologist attempt to earn one-half the salary necessary to support

his family by traveling in the mountains, and the other half by staying at home.

There were then extensive regions of the State I had never seen, the barest outline of whose geological features I could not give; mines and mining regions I had not visited, and of whose working I could therefore not report; vast bodies of coal and iron, whose localities and geological surroundings I was incapable of giving; collections of fossils, kindred in many things to ours, in a neighboring State, with which I ought to have been able to compare our own, of whose aid I must remain deprived.

Yet, some few things seemed plainly within my reach. I had, for years, been gathering facts from sections of Oregon I had visited and examined; these lay crudely in my mind, and needed bringing into systematic agreement with the latest researches of the times. This I could attempt.

There had, too, accumulated on my shelves, a large collection of Oregon fossil specimens, very many of which were new to science, and important in their bearing on some of the most interesting problems of human thought.

The record of geological history these fossils were capable of opening to the public mind seemed to me so important that the world had a right to expect it, of the State of Oregon, that descriptions of them be suitably published, illustrated by good engravings or photographs.

The best stimulus might be hoped for from this to our own schools and colleges—our own young people would have their interest in scientific studies greatly quickened, if added motives were needed to urge to so manifest a public service.

THOMAS CONDON AT 50 YEARS OF AGE

Descriptions of these fossils, with suitable illustrations, of engravings or photographs, ought then, it seemed to me, to be published without delay; but this could not be done properly till their true relation to science be determined.

Here then was work that might be attempted.

These facts practically defined the work within my reach, and, furthermore, may now explain why, in this report, so little is said of mines and mining industry, while so large a share of attention is drawn to the subjects of general geology, and palaeontology. But, besides this, I had another reason for omitting, for the present, all attempts to offer a report on our mining industry.

The general government published, only four years ago, a very full and very carefully prepared report of "Mining Statistics West of the Rocky Mountains," by Commissioner Raymond. (See Report of Mining Statistics, 1870.) This has given the mining industry of Oregon a wide publication, and a full and favorable report.

On the other hand, Oregon's wonderful contribution to geological history has never been suitably, or adequately published.

Permit me to prepare the way for what I have to say on the geology of Oregon by a brief outline of

RELATED GEOGRAPHICAL FACTS.

Oregon, as we approach it from the sea, seems literally rock bound. So continuous is the line of mountains along the coast, so short and narrow the four or five inlet openings by which it is pierced, that the mountain range defines the coast.

On reaching the Columbia river, however, an estuary of six or seven miles in width opens a fine view of the

interior, showing the snow-capped peaks of the Cascade Mountains in the distance.

As one enters the Columbia and advances up the river, the passage through the mountain barrier is scarcely perceived, so scattered here are its ridges, and so wide the passage the river has worn through them. Farther inland we reach the mouth of the Willamette, and find the confusion of a broken country slowly giving way to a well defined arrangement of hills and mountains into two great groups extending north and south, parallel with each other and the coast, about seventy miles apart.

The outer group, that of the Coast Range of Mountains, whose lines we have just passed, indicates, even in the lesser altitude it reaches, its comparatively younger record and subordinate position. The inner and greater group, that of the Cascade Range, rising to the height of six to eight thousand feet above the sea, and at almost regular intervals surmounted by snow-capped peaks rising to nearly double that altitude, like watch-towers upon a wall.

From among these elevated watch-towers of the mountains, let us choose one from whose summit we may get an outlook over the land, that we may take in its framework. Either Mt. Hood or Mt. Jefferson will answer our purpose.

Now if from our elevated place of lookout we turn to the west, there, about seventy miles distant, we shall see the irregular summit line of the Coast Range Mountains, with here and there a glimpse of the ocean beyond. This distant summit line and much of the broad base on which it rests are covered with a dense growth of evergreen timber, giving them at all seasons a blue color, the distance alone varying the tint.

This will be the distant background. The nearer middle ground of the view will appear in great patches of gray and drab, interlaced with belts of blue and green, extending from the line of the Columbia River, on our right, to the foothills of the Calapooya Mountains, on our left, nearly one hundred and fifty miles, with an irregular, winding line of bluish green through its whole length, that marks the course of the Willamette River. These stretches of gray and drab mark the prairie regions; the streaks and patches of blue and green are belts of timber that run down from the foothills or mark the course of some meandering stream in its passage from the mountains, on either side of the valley, toward the great central line of drainage.

It is instructive to consider how many of the greater human interests are suggested by something of either want or supply, in such a view as this.

For the lover of that which is great and beautiful in landscape, here is certainly a wealth of mental food. To the thought of the mechanic and artisan, that vast area of distant blue is not a mere patch of landscape coloring. His thought instantly analyzes it into millions of tall, graceful timbers, awaiting the hand of industry, and the application of capital, to appear in the marts of commerce, as the long, graceful spars of naval architecture, the massive beams for bridges, and building frames; for which, and a thousand kindred purposes, calling for the greatest length and strength to a given weight, Oregon's red and yellow fir are unrivalled. He has heard, too, rumors of coal and iron, found in outcroppings of those foothills. He knows the meaning of such signs, and their bearing on the future of any people.

To the agriculturist, also, this grand outlook of wood and prairie has its voice of promise.

He knows that nearly 8,000 square miles of land stand surveyed in that Willamette Valley alone, an area greater than that of the State of Massachusetts; and that a very large part of that surveyed portion is already acknowledged to be one of the great wheat fields of the world.

To the geologist, that mountain range set against the western horizon is a belt of sea beach elevated into land. Here and there he sees it interrupted, or to a limited extent covered by outflows of trap—otherwise he finds it to be made of the mud banks of an ancient sea, hardened into rock. The whole range, from Astoria to Port Orford, abounds in the evidences of this.

Sea shells filled with spar or chalcedony, crustacean, and fish skeletons, lie enclosed in its rocky ledges, telling plainly of other conditions, and other times.

To the geologist, too, the broad stretch of drab colored middle-ground of the picture tells its story. He sees in it the almost unchanged bed of a more recent inland sea, whose very sediment of blue clay underlies the farms of today, occasionally revealing, where excavated, well preserved remains of the elephant and the mastodon, the horse and ox, that made part of the prehistoric life of its shores.

Clear and distinct are the traces of these great changes over that landscape; the more ancient records graven in tablets of stone, the more recent in equally legible letters, though written in sand and clay.

The view we have been describing, so suggestive of widely varying interests, so full of prophesy of future wealth and enterprise is that of

WESTERN OREGON.

Let us not forget that other things are visible to our elevated outlook. How earnestly one's eye takes in that

grand view, for our very standpoint is in the meridian of its wonders—the Three Sisters, Mt. Jefferson and several smaller peaks to the south; and if we look northward, Mt. Adams, Mt. St. Helens and Mt. Rainier, a peerless line of mountain peaks, all in sight, and almost in line, at least in the line of the grand mountain range they so nobly crown. Manifestly, the Cascade Range, on which we are standing, is, geographically, as well as geologically, the key to Oregon's whole framework.

Let us look to the eastward. At about the same distance eastward that the Coast Range is west of our stand-point, we may see distinctly another range of mountains, that of the Blue Mountains—covered like the Coast Range, to the summit, with evergreen timber. As in our western view, so here, between our elevated observatory and that distant background, there is a broad, irregular space of drab colored surface that indicates the grass covered plains of the interior, of more broken surface and irregular outline than the like space of the Willamette Valley and far more extensive.

These more prominent and distinct portions of that eastern background are not like the western one in well defined position across our line of vision; they are rather the nearer spurs of receding lines of timbered ridges with great bays of lower country between them. These deep bays are indicated in our landscape by those distant faint strips of drab colored surface among the blue spurs.

In these bays, among those Blue Mountain spurs, some of the most wonderful geological records of the continent are legibly written. One group of facts strewn with lavish, even wasteful profusion, upon elevated terraces of these mountain spurs, tells of times when the

ocean was there too. Another group tells in equally legible record, of a later period, in which the ocean waters were no longer there but in their place a wide extent of fresh land-locked waters. Another tells of a still later period, in which narrower, though yet deep lake depressions, surrounded by wooded slopes, gave character to the landscape. These were the days of the fullness of animal life in Central Oregon. The country abounded in these lakes; their shores were covered with a rich and varied flora, in strange contrast to its appearance today. The famous bunch-grass, its only covering now, makes it eminently a region of flocks and herds. Its climate is a fine one, the soil is abundant, uniform in quality, and well distributed, even to the hill-tops. Its one drawback is, that it is not a country of summer showers.

More than out of sight from even the elevated spot chosen for our geographical outlook, among the central ridges or along the southern, southeastern, eastern and northeastern declivities of these mountains lies one of Oregon's gold fields.

From one town of that region, Canyon City, ten years ago, there was shipped an average of $20,000 worth of gold dust a week. There is still a good deal of gold dug there. Baker City, east of the mountains, is still the center of important mining interests.

This whole field of Eastern Oregon has been but partially examined, for it is only within five or six years that prospecting here has been safe. Parties compelled to examine a country in the face of powerful hostile Indians, such as the Snakes have always been, did the work at great risk and large expense. A day is doubtless near when all its resources will be better understood.

If now we turn toward the southwest the eye will rest, in the distant background, upon the elevated ridge of the Calapooya. Beyond that horizon and westward even to the beach sands of the ocean, is another gold field, one that in past years was productive, and may at any time rise to importance again, with the introduction of improved processes for working, for the gold is confessedly there.

This cursory outline of related geographical facts seemed needed, as an introduction to the different groups of geological facts which follow.

By way of indicating the sources of evidence upon which Oregon's geological records rest, I hereby submit two brief papers:

One on the testimony as drawn from our mountain ranges.

The other on the testimony as drawn from old lake depressions.

First, then:

TESTIMONY OF OUR MOUNTAIN RANGES

THE CASCADE RANGE

Where the Columbia River has cut its way through the Cascade Mountains, the work of the great torrent is so complete that while the ocean tides are often perceived at the lower landing of the Cascades, there are but 27 feet of fall between this and the lake-like level above, which continues unbroken to The Dalles, forty-five or fifty miles. At this lower landing, and directly in the axial line of the Cascade Range, there is a fine exposure of fossil wood and leaves in large botanical variety, and in a fine state of preservation.

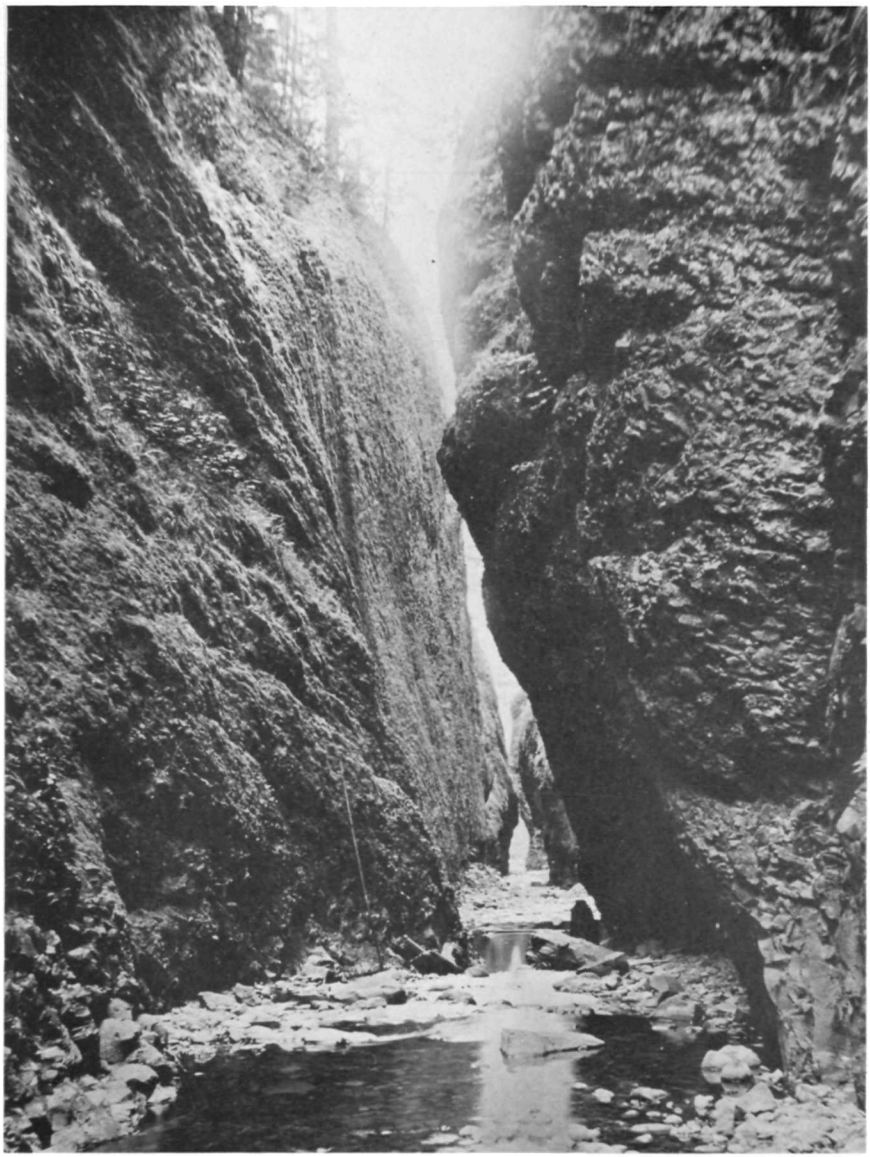
Large trees protrude from beds of sandstone and conglomerate, and the leaves of forest trees are finely preserved in the finer layers.

In places where the current has undermined these fossil beds, one may stand under the spreading roots of large stumps of trees, evidently standing where they grew. All these are changed to stone—the wood is generally silicified, occasionally changed to coal; but so little altered that the distinctive character of the wood is often plainly visible.

The relation of these beds of sandstone and conglomerate to the 4,000 feet of mountain mass overlying them, may be seen by examination of the lateral ravines of small streams close by. In these the fossil beds are seen extending back till their dip is lost to the eye, but sufficient to prove that they underlie the mass of the mountain, and could not have been a trough deposit in the river bed.

From this it would seem plain that these beds of fossil wood hold the true record of the age of the Cascade Mountains. They are down at the water's edge, they are in the axial line of the range, they underlie the mass of the mountain. The summit overlying this fossil bed measures 2,700 feet from the water. On the other side of the river, the summit is farther back, yet a better indication of the former level of the whole, which is now here 4,500 feet above the water. Here then we have an exposure of successive outflows of eruptive rock, over 4,000 feet in vertical thickness, overlying a bed of well-preserved fossils.

Of these eruptive rocks the porphyries were poured out first. Some fine exposures may be seen along the side canyons above alluded to, and the enclosed boulders



—Photo by A. M. Prentiss, Portland, Oregon

ONEONTA GORGE AS IT OPENS INTO THE COLUMBIA RIVER

of the fossil beds are chiefly from these older porphyritic rocks. Trachyte is higher in the series, and may be seen underlying the basalt in the face of the mountain; north of the river dense, dark basalt crowns the whole.

One is struck with the evidence of the great length of time covered by these changes, as indicated by the old look of the eroded surfaces of the underlying strata, where their lines of contact are seen.

It is so with the sandstone and conglomerate at the water's edge. They were evidently deeply eroded into a varied surface, when overflowed by these floods of later lavas. So, too, of the porphyries, and in a still more distinctly visible form, the gray trachytes of the north mountain are seen to have been worn into hills, with deep intervening canyons, before that overlying dark massive basalt covered up all inequalities and formed a new horizontal surface 4,000 feet above yonder fossil bed.

The characteristic tendency of basalt to vertical fracture, especially as in this case when overlying a softer rock, renders the portions of these mountains that overhang the river bank liable to a good deal of crumbling. That this friability is deep, and not a mere surface movement of debris, is proved by a general but slow movement of both banks towards the river. I have the information from Mr. John Brazee, the able engineer of the O. S. N. Co., that this slow, glacier-like movement of the mountain points toward the river, and is such as to necessitate frequent readjustments of the railroad lines of the company on both sides of the river.

One readily sees how this pressure of foothills towards the bank may be unequally resisted, or accel-

erated, by the rate of erosion over the river bed, or the setting of the current towards one bank rather than to the other.

One sees, too, how any violent disturbance, such as that of an earthquake, would greatly increase this streamward movement, even to the extent of obstructing the channel, and retarding the current, so as to cause the river above the Cascades to rise above its former level. That something has occurred here, to raise the Columbia River above the Cascades, within a century, or so, is almost certain; for submerged groves of trees occur along both sides of the river, above, for a distance of 12 to 15 miles.

These submerged forest trees are not petrified, as sometimes stated, but trees in slow process of decay, in positions to which land slides could not have brought them, and in a depth of water in which they could not grow. They are now, in the lowest stages of water, standing in a depth of 15 to 20 feet.

It is, therefore, almost certain that when these groves of trees were living, the Columbia River, between the Upper Cascades and The Dalles, was more than twenty feet lower than it is now. How was it raised to its present level?

A violent earthquake, within a century or so, might have caused the change by greatly and suddenly increasing what is now continually going on, at a slower rate, the settling toward the river, from both sides of the mountain masses of both banks. Thus would, until the river had time to so re-excavate to its former width, the whole of the obstructing mass raise the river above the Cascades. Several separate lines of evidence unite to render it probable that such a thing did occur here, whatever the measure of its results.

There is an Indian tradition to the effect that, many years ago, Mt. Hood and Mt. St. Helens had a quarrel during which these mountains threw out fire and smoke and hurled great rocks at each other; that such was the violence of the contest that the ground shook for miles around, and in this commotion a bridge that had long existed at the Cascades was broken down; that the ruin of this bridge so obstructed the river as to dam up the water above, and so far as to change the height of the falls beyond The Dalles sufficient to enable the salmon to pass those falls, which they have continued to do ever since, but which was never before known to occur. They add, that whereas the Indians of the upper country, before that great event, always came to The Dalles to exchange buffalo robes for salmon, that since then that trade has never been resumed.

The fact of the slow movement referred to being so well established, and the added fact of the submerged forest, unite in suggesting that there may underlie this exaggerated tradition a rude record of a fact sufficient at least to account for the submerged forest.

THE TESTIMONY AS DRAWN FROM THE OLD LAKE DEPRESSIONS OF THE INTERIOR

The recognition of numerous extensive old sea beaches throughout the interior, and especially along the slopes of the Blue Mountains, carries the mind back to the time when nearly all that is now known as Oregon was covered by the Pacific Ocean. That it was so as late as the close of the Cretaceous period, is proved by the presence of Cretaceous marine shells, in elevated places throughout the interior. That fossiliferous limestones and slates of an older period are found in the Blue Mountains, uncovered by any later deposits, while belts

of Cretaceous and Tertiary rocks lie in an apparent shore line around them, would seem to indicate that most of what is now known as the Blue Mountain region must long have existed above the waters, while the real shore line of the continent ranged far to the eastward.

Still later, a low line of islands must have appeared to the westward, along the present line of the Cascade Mountains. As this new barrier to the sea became a continuous belt of land, that portion of the waters which it separated from the rest, became an inland sea enclosing the whole Blue Mountain region.

Once separated from the ocean, these land-locked waters must have received the streams from the mainland. This, while the salt water from the ocean was shut off, must have slowly changed those great bodies of inland waters from salt, though brackish, to fresh water.

Another, and a later one of these upfolds of the sea bed, must have occurred still further to the westward. It is now what is known as the Coast Range of Mountains, in Oregon; the Olympic Range of Washington Territory; farther north, it exists now as a range of islands from Vancouver to Sitka.

Measured by its general results, this latest upfold must be regarded as a feebler application of the same force that raised, first, that upon which the Rocky Mountains were built; and second, that on which the Cascade Mountains were elevated; now applied to a third belt, this one of the Coast Mountains.

The trough, too, which is enclosed between these Coast Mountains and the Cascades, possessed general characters like those formed farther east.

But this one had noticeable special features. It was

narrower. It evidently retained for a longer time, its connection with the ocean. Its northern dip is such, that north of Vancouver Island, this ocean connection is still kept up through a multitude of straits.

Three great stages of the progressive elevation of these successive belts of old sea bed into land, and of the drainage of the intervening troughs, are doubtless now presented in the respective conditions of the Willamette Valley, Puget Sound, and Queen Charlotte's Sound; although these, in their present condition, are perhaps less stages of progress than exhibitions of the results of different degrees of force, which is now plainly seen to have been greater over against the wider part of the ocean, and feebler opposite the narrower to the north. The Oregon portion of the trough is

THE WILLAMETTE VALLEY.

But let us return to the interior. As already stated, the great depressions of this newly added portion of the continent remained covered with water, till by the continued results of increased elevation, the deeper erosion of the drainage of outlet streams, the large amount of sediment washed into them, and the drying off by evaporation of those that were unsupplied by streams from the mountains, the greater part of them became drained into dry land.

Many of the deeper ones still continued receiving the streams from the mountains, and became permanent lakes. How many and how extensive these were, remains yet to be ascertained. Only occasional glimpses of a few of their remains can be had, and these only in places where streams have exposed them by washing the later coverings of rock by which they were concealed.

That they extend far under existing lava beds is cer-

tain, and were numerous enough to make the Oregon of the Middle or Miocene Tertiary period a beautiful country, is equally so.

In many places it seems to have occurred that depressions, such as lake beds, and river valleys, were, during the later Tertiary times, filled with lava, which became so much harder than the hills that made its mould, that subsequent wearings of time eroded these surroundings, leaving the once depressed lavas to form the present mountain ridges, 1,500 to 2,000 feet above the valleys.

The neighboring declivities of the Blue Mountains became in early Tertiary times a favored region. It was surrounded by these inland waters. The fossil foliage and other remains of those times indicate great floral beauty, and variety in the vegetable world; and later, an equally great variety of animal life, in its higher forms.

Death, then as now, would come, and as floods would occasionally overflow stream banks, whatever of animal or vegetable remains lay strewn there would often get washed down into the lake, and covered there among its sediments. Occasionally, too, a whole carcass would wash there, and after floating awhile would lose its flesh, and one by one, its bones get buried deep in the soft ooze of the lake bed; the bones to be laid away, perfectly preserved, as part of the records of the times.

If now to this we add the probability that this lake depression continued to be such throughout the whole Tertiary Age, and that the whole lake bed, bones, leaf impressions, sediments and all were by some natural process changed into stone, we shall have in theory just what the John Day and Crooked River Valleys now

present as facts. As if to make the agreement still more full, we further suppose those lake beds afterwards drained off and left with only the ravines of the streams running along their center lines, and lateral streams, from each side, running into their central lines of drainage, wearing in their course broad ravines, through the old lake sediments, then will our theory of the Tertiary Age be changed into a landscape of today.

The one of these lake depressions that occupied what is now the John Day Valley was, even as late as the Middle Tertiary period, 1,500 to 2,000 feet in depth. It retained this depth for a long time and only lost it through the combined results of gradual wearing down of the bed of its outlet streams and the equally slow elevation of the lake-bed itself through the deposition of sediment.

But the fact of deepest interest to us is that during this whole time it continued to receive into its waters, and through them into its sediments, the remains of forest and field, burying them up safely in its profoundest depths, and thus securing them from decay. The perfection of this mode of preservation is well nigh complete. The minutest vein of the leaf, the insect that fastened to its surface, the seed-pod or capsule of the plant, the pores of the wood, the sutures of the animal skull, the epiphysis of the bones, enabling one to tell at a glance whether those belonged to the young or to the old; the minutest lines of age or of accident on a tooth—all preserved with marvelous faithfulness to the life-type of the period—so that no family of plants or of animals are likely to have lived on the borders of that lake during that long stretch of time, covering hundreds of thousands of years, without sharing in the record of its fossil history.

It is from such archives that materials have been collected for a geological record of Oregon's past.

SPECIAL GEOLOGICAL VALUE OF THE FOSSILS OF THE COLUMBIA BASIN

That which now constitutes the water-shed of the Columbia River has gone through a long progressive series of changes.

In its earlier stages, what is now the river was only a chain of connecting links between extensive lakes that covered the interior.

As the elevation of these above the sea increased, the outlet drainage would also slowly increase, until what was in the earlier period a simple outlet, extended itself upward through the portion of the lake-bed laid dry. Two results would follow: First, the slow development of an extensive river system; and, second, the equally slow laying bare of a vast extent of old lake-bed surface.

But, as we have seen, those old lake-beds were more or less filled with sediments, and these sediments generally contained the buried remains of the life of the period both vegetable and animal.

This system of lakes was continued here far beyond the natural operation of these causes alone, for three mountain chains were successively elevated, in such relation to this whole system of drainage as to make so many great dams across it until worn through again. The Blue Mountains, the Cascade Mountains, and the Coast Mountains were so made to vary the number, extent, and depth of these waters they separated.

But further, the Columbia River began to develop itself from these lake outlets and drained lake-beds almost at the beginning of the period of mammalian

—Photo by B. C. Markham

CELILO FALLS, ON THE COLUMBIA RIVER, NEAR THE DALLES

life in the world and has never since been without a lake—very many of its earliest ones continuing such until recent times.

It is indeed very doubtful whether anywhere else on the American continent the agencies of lakes, rivers, and mountain chains have, to anything like an equal extent, combined to record and preserve the history of the past.

When one considers the interesting geological period to which the facts relate, the length of time over which their record stretches, the varied condition of life it reveals, or the number of scientific questions needing the information it gives, one has no hesitancy in urging the duty of the State to authorize the collection and publication of, at least, that which is already ascertained.

Should the Legislature deem it best to publish, suitably, these facts to the world, it may be stated that enough materials are already collected to make one volume of Geological Reports a valuable work. It might contain:

First—A section on General Geology of Oregon.

Second—A section on Ancient Life in Oregon.

Third—A section on Minerals of Oregon.

The section on General Geology would be accompanied by a suitable geological map, colored to show the distribution of the rocks of the several geological periods, with such diagrams as might explain special features or facts needing such mode of explanation.

The section on Ancient Life would be accompanied by engravings of heads, bones, or teeth of the animals described. This feature would be of great value, for these fossils are very strange and very beautiful. This section would contain a historical portion of wide interest to the world.

The section on Minerals of Oregon would attempt a description of our gold, silver, copper, lead, and such other minerals as may call for notice; with special attention to coal and iron, and an added chapter on those rocks that have an economical value, such as lime, marble, and other building stone, with their distribution.

Very respectfully,

Your humble servant,

THOMAS CONDON.

CHAPTER XIV

The University of Oregon

The plan to create an Oregon State University was still far from complete, but some of its official friends had already asked Mr. Condon whether, if the State University were established, he would accept a place on its faculty. And this suggestion so appealed to him that he did not wish to make any plans that would later make its acceptance an impossibility.

There were, of course, some rival claims, but the coveted State University was finally to be located at Eugene provided the county furnished the location and the first building, which was to cost $50,000. The county extended from the crest of the Cascade Mountains to the Pacific Ocean and included a section of the Coast Range with its vast but undeveloped wealth in timber; but at this time it was only a sparsely settled, agricultural region with an unknown future. The town of Eugene was quite small, but beautifully situated at the southern end of the Willamette Valley, where the two ranges of mountains were apparently united by their lower foothills.

Lane County was very anxious for the University, but found it so hard to raise the funds for the first building that the farmers sometimes

brought to Eugene a colt or a cow or a load of hay or some other product of the farm; and Mr. Hendricks, a merchant and a member of the Board of Regents, would receive their gifts with thanks and turn them into cash for the University building. But in spite of all effort there was left quite a debt to be assumed by Eugene merchants and others in order that the building could be turned over to the state.

The president chosen was J. W. Johnson, a native Oregonian who had graduated at Yale College, and from Mr. Condon we find the following letter written in the spring of 1876 to Judge J. J. Walton, Secretary of the Board of Regents:

FOREST GROVE, April 7, 1876.

DEAR SIR:

Yours of the 4th inst. was received last evening, informing me that the Board of Regents had elected me to the chair of Natural Science of the State University. It gives me great pleasure to assure you that I cordially accept the post you thus tender me.

I am glad, too, of the band of real workers you have made my associates in the faculty and cherish high hopes of our success in the great work to which you have called us.

Sincerely yours,

THOMAS CONDON.

So it happened that early July of this Centennial summer found the Condon's pleasantly

located in Eugene, ready for another rich chapter of life.

The reader will note in Mr. Condon's letter of acceptance that he had to fill the chair of Natural Science. This would be a stupendous task in 1925, and even in 1876 it was far too wide a field. But the sciences had only a very small place in the curriculum of most well established colleges fifty years ago and Oregon had patterned after Yale and Oxford and other colleges of the time, with especial emphasis on the classical course.

Within the first year or two Mr. Condon had introduced a new study which he called Physical Features of the Earth. It dealt with the scientific side of geography, the earth's motions, its winds and tides and many other natural problems connected with the earth's surface. There was no text book on the subject but it was soon a popular lecture course and we find "Physical Features of the Earth" listed in the University Catalogue for 1877 as a sophomore study.

During the first year in Eugene Mr. Condon took his family to the coast for a summer outing. It was a beautiful trip through the valley and over a winding mountain road through the Coast Mountains to the sea. The camping places under the white-barked alders along Mary's River, Yaquina River, and Elk Creek were full of charm. There was the bright campfire, the sound of rip-

pling water from the nearby stream, the contented munching as the tired horses enjoyed their evening meal; and, as the twilight deepened, the sweet plaintive call of a distant bird. Sleep was refreshing beneath that canopy of stars.

Sometimes they camped near a small farmhouse nestled in a deep valley among the mountains; and the farmer's wife was glad to sell them eggs or milk or Red June apples, or even to bake a fresh tin of biscuit to accommodate the campers.

Having reached the ocean, they made a permanent camp at the mouth of Nye Brook near the unused cabin of a miner whom Mr. Condon met a few days later collecting and sluicing the glistening black sand stranded in many localities along the beach. There was plenty of sand all containing gold, but the problem was how to separate and save the gold.

This trip to the ocean near Yaquina Bay opened to Mr. Condon not only a pleasure ground but a new geological field of research. He soon owned a small cabin there and when the University closed about the middle of June, the camping trip through the mountains and the following weeks spent in the cabin by the sea became an annual event. Soon a cluster of small cottages near became known as Nye Brook. And when the "Condon Cabin" had been improved by adding more rooms and a front porch, it too was called

"a cottage." As Nye Brook grew the Condons found themselves surrounded by many old friends; for the charm of beach life in summer time had drawn families from Albany, Salem, and Eugene, and all over the valley. There were a few stores and many tent houses besides the sightly new cottages perched on the bluff above the sea beach.

From this summer home Mr. Condon explored up and down the coast of Oregon, finding long miles of Miocene sandstone full of fossil shells of great variety and perfection such as Arcas, Nuculas, and Glycimeris. This Miocene beach line was interrupted occasionally by a high promontory of dark basalt with its precipitous rocky front always worn by dashing surf into detached and fantastic crags.

Besides these two formations there was the Pleistocene unconformably capping the Miocene sandstone, and above all the shifting sand dunes of the surface hills. The Pliocene was, with one or two exceptions in Yaquina Bay, quite left out, for, owing to changes of level along the coast, Pliocene life might be found far out at sea.

Some rare mammalian fossils have also been found along this Miocene ocean beach. The whale, the sea cow, and the seal are all believed to have been originally mammals that deserted the land life and "went down to sea." And, of course, the

older the fossils found of these aquatic forms, the more light is thrown on their early relationship to land life. The past history of these animals is extremely interesting, for the new environment involved many changes not only in external appearance, but also in internal structure; so that it is a difficult problem to trace one of these aquatic mammals back through time and to know him as he was perhaps in the early Eocene, before he left his land home.

Oregon has been very fortunate in finding rare Miocene specimens of all three branches of these aquatic mammals: The seal, the whale, and the sea cow, and nearly all of these fossils were found on the ocean beach near Yaquina Bay.

We have seen that, while living at The Dalles, Mr. Condon's scientific friends were largely connected with the great Universities and the Smithsonian. But about the time of his leaving eastern Oregon the U. S. Geological Survey became interested in the geology of the coast and began sending men to do systematic work in their respective special fields of research. During a part of the time that the rhinoceros and oreodons and camel and three-toed horse lived in eastern Oregon, the ocean still covered the Willamette Valley, flowing unhindered between the extended islands of the future "Coast Range" much as it does today over the "Inside Passage" to Alaska.

And now on both sides of the valley there are many stone quarries which are remnants of this ocean period. Some of these quarries contain sharks' teeth and all are full of beautifully preserved fossil shells speaking of abundant life. But land life, such as is found all over eastern Oregon, is unknown west of the Cascade Mountains before the Pleistocene. So it came to pass that not only Mr. Condon's original research was partially diverted from mammalian life; but the men sent out by the U. S. Geological Survey were apt to be experts in invertebrate life and its important lessons in the upbuilding of continents.

In this way Mr. Condon met many thoroughly equipped and gifted men, with whom he exchanged facts and conclusions. Early in 1877 the following letter was received from F. V. Hayden, the head of the U. S. Geological Survey:

WASHINGTON, January 20, 1877.

MY DEAR SIR:

I write to ask if you will inform me if there is any one within the limits of your knowledge who is investigating the history, habits, customs, or languages of our American Indians. If so, could you put me in communication with them or secure for me their manuscripts. I am publishing a bulletin in which I put all such matter, short articles or long. They are distributed all over the world. Could you give me a paper on any of the tribes of Indians or on some prehistoric or geological subject? I will publish anything you may prepare.

Please inform me what you can do on your coast for matters of interest in a scientific way. If there are any books from this locality that I can send you, please inform me. Wishing you all good things, I remain,

Yours sincerely,

F. V. HAYDEN.

In answer Mr. Condon wrote:

EUGENE CITY, OREGON, February 10, 1877.

DEAR SIR:

Yours of January 20th is just received. You ask whether I can name any one to you who is scientifically inquiring into the history, customs, or languages of our Indians. I am sorry to be compelled to say, in answer, that I know of no one in Oregon who gives attention enough to the subject to be able to give you much information. I have tried to get hold of all the Indian stone implements I could and have a good range of specimens. Some of these I will try to describe to you if I can have them photographed. Of one of these I will try to write you something in a few days.

You also include geological subjects. I will think over my available material and write you more on this subject. But under this head I would like to ask whether you have time to look over a handsome lot of fossil Helix Shells from the John Day Miocene which have never yet been examined? I would like to send them to you at my expense by express for determination and description, after which I would expect them returned carefully by express at my expense. These cover at least a range of five to seven species.

You kindly speak of sending me books. Yes, my Dear Sir, I covet a whole set of your reports with your auto-

graph in each one. And for anything else within your reach giving me information within the range of Natural Science I should be equally grateful.

I worked myself in debt some by spending so much time in the Blue Mountains and hiring so much help, and was compelled to quit the field except in vacations. I am now teaching in the Department of Natural History and Geology in the State University of Oregon at Eugene. Anything that would help me in Geology, Mineralogy, and Natural History—for I am compelled to try to cover this wide range—would be gratefully welcomed from you. THOMAS CONDON.

The following letter was written in answer to one received from Mr. Condon's old Dalles friend, J. H. Kloos, who had drifted back to the Fatherland:

EUGENE CITY, OREGON, Sept. 16, 1877.

DEAR SIR:

Your letter of August 8th I have just received. I am real glad to have the opportunity this gives me of opening again a correspondence with you. I have been moving about from place to place for three or four years past without a fixed home. My cabinet was boxed up in a warehouse in Portland. I am now located again and opening my boxes of fossils to reassort them for use. I am very glad to be able to set aside a suite of specimens for you.

Without waiting for your answer to the inquiries I now make in regard to transportation to Germany, I shall at once send a small package by express at my own expense for an experiment. I shall begin by sending you a good specimen of the foot of a Tertiary Horse well

preserved. Meantime, please give me a careful outline of transportation for a heavier package.

You know pretty well the scope of our geology here. Please indicate what else, besides Mammalian Tertiary fossils, would interest you.

For myself you will the better understand the scope of my wants when I tell you a little about the change that has taken place in my work, and this will give you also a reply to your inquiry in regard to published reports, etc.

I found the legislature of Oregon unwilling to publish a volume on paleontology, and that I must waste my time and their money to retain the office of State Geologist with so little ability as I had in developing mining interests; so I resigned my office of Geologist and accepted that of a teacher of Geology and Natural History in our new State University here. Now I am trying to fill the chair of Professor of Geology, Mineralogy, and Natural History. You see what a wide scope of illustrative specimens I shall need.

I have lately made a very successful trip into the wilderness after fossils of which I shall be glad to share with you.

Very truly,

THOMAS CONDON.

The letter shows that the collection had been withdrawn from storage and was ready for the University where it was freely used in teaching; but lack of room made it impossible to spread it out for full inspection. So groups were placed in shallow wooden boxes of uniform size and these were later covered by oak-grained wallpaper with

a card across one end marked Eocene or Miocene or Pleistocene, as the contents called for, and these were stacked in groups so as to make a convenient substitute for cases.

There is an isolated volcanic cone about six miles south of Eugene, called Spencer's Butte; and from the old files of the Eugene City Guard we have this item for May 12th, 1877. "Last Saturday, Professor Condon accompanied by his University class started for the top of Spencer's Butte, and quite a large number of our citizens, in buggies, hacks, wagons, on horseback and on foot followed in procession." Leaving all conveyances at the foot of the mountain, the company gaily climbed the long steep trail to the summit, which was over a thousand feet above the valley. Here, perched on the jagged rocks, they enjoyed the wonderful panorama spread out before them and listened to a short lecture on the geological history of their surroundings. The picnic lunch was eaten under the trees at the base of the mountain and helped to round out a most delightful day.

This picnic to Spencer's Butte was the beginning of geological picnics but usually only the class were expected to attend. For these occasions Mr. Condon bought a large coffee-pot holding several gallons, white granite cups, and many teaspoons—all dedicated to the geology class; and

as the girls were always well represented these picnics were of social as well as scientific interest.

That Mr. Condon was enjoying his new field of work is shown from his answer to an old friend who was trying to entice him into another position. He wrote in April, 1877:

> I would answer gratefully, yet very decidedly, by assuring you that I have thoroughly enlisted in this work at Eugene. It is opening to me a fine field of usefulness with which I am entirely satisfied. No consideration likely to occur would induce me to desert the State University now. They pay me enough to live on and give me a hearty welcome.

But in spite of the steady growth of the student body and of teaching efficiency, the financial interests of the University were a source of great anxiety in these first years. Deady Hall, the only building on the campus, had never been fully paid for by the county, although the indebtedness had been assumed by a few public spirited citizens of Eugene. The first enthusiasm had waned and but little effort was being made to raise the money.

The Oregon Legislature also failed to make adequate appropriation for the maintenance of the University, so that it was necessary to ask the professors, who had been promised a salary of two thousand dollars, to accept fifteen hundred; and this trying reduction was continued several years.

The fact that the Legislature failed in adequate appropriations only reflected public sentiment toward the State University. This does not mean that there was no interest in higher education, for Oregon was largely settled by descendants of the best of American ancestry who had brought with them a devotion to the ideals of higher education. But state universities were a new venture, many of them a failure; and the great schools of the United States, such as Harvard, Yale, Princeton, Oberlin, Williams, and many others had been founded and maintained by religious denominations. The pioneers of Oregon had been thoroughly imbued with this idea of religious colleges and had established many in their new home. It has been said that in pioneer days there was a college almost every twenty miles throughout the Willamette Valley. Of course, these institutions were far too numerous, for the population of the state was very small and more preparatory schools were badly needed; but for their colleges the people had made great sacrifices, and these institutions were bravely struggling for their existence under many difficulties.

When the University was five years old and had just graduated a fine class of twenty, a serious crisis arose. Some of the long suffering creditors demanded immediate payment of their delinquent claims. It was at this time that Mr. Con-

don, who was spending the summer vacation with his family at their cabin by the sea, received this letter from President Johnson of the University.

President Johnson writes:

Thinking you would like to hear concerning efforts to raise the funds with which to raise the debt against the University now in the form of judgments, I send you these lines by Mr. Bean. A writ of execution is now in the hands of the sheriff against the grounds and University building. We are liable to be sold out before September if the creditors are not satisfied that the money will be raised to pay off the liens.

We had a meeting of the citizens of Eugene last Saturday evening and raised three thousand four hundred. The exact amount of the debt is $7,606. Mr. Hendricks gave $600. Prof. Baily $400. Prof. Collier $300. Prof. Straub $300. Prof. Spiller $300. I gave $600. Other parties $100 each to make up the amount of $3,400. We would like very much if you will advise Dr. Geary by return mail what sum you are willing to contribute. We are anxious to raise all we can so as to publish to friends throughout Oregon and particularly our old students, and others who intend to come, that the debt is provided for or substantially so inside of two weeks. Our attendance next year will be largely affected, if we fail to show the people of Oregon a determination to pay and that soon.

I am confident the money will be raised and the debt, which has rested like a nightmare over the University, will be paid. Then our success will be established. In haste,

Yours truly,

J. W. JOHNSON.

This letter was followed by a period of deep depression. Even the most optimistic almost lost hope for the future of the young University. For in spite of heroic efforts, the property was advertised for sale.

The State University of Washington was then without a president for A. J. Anderson had resigned to become president of Whitman College, and Mr. Condon was asked to become president of the University of Washington. That he seriously considered the new opening is shown by the following letter from his friend, the retiring president.

WALLA WALLA, WASHINGTON TERRITORY,
June 8, 1882.

FRIEND CONDON:

I congratulate you on your selection to the presidency of the University of Washington. I learn by the Oregonian that you were elected on Monday of this week. . . .

A. J. ANDERSON,
President of Whitman College and Seminary.

But for some reason Mr. Condon remained at Oregon. Perhaps it was the invigorating interest shown by Henry Villard that gave the University a fresh impulse of courage. In appreciation of Mr. Villard's timely help, Mr. Condon wrote as follows:

There are two attributes of the Almighty that men of elevated culture are permitted to imitate, and often

to develop into great permanent forces of character. One of these on its human side may become a passionate love of creating for the public some force or system of forces in the newer forms of industry.

To the culture of this creative attribute, Mr. Villard gave many of the best years of his eventful life. In the light of his creative dream the possible wheat fields, orchards, mines of the precious metals, and vast timber industries of the whole Northwest needed only a system of railroads to organize them into empire. This system of railroads he created and lived to witness its complete success. This was Henry Villard's creation and gift to Oregon.

The other attribute of the Almighty that Mr. Villard was so strongly impelled to imitate was that of a providence over this newly created empire. It was the exercise of this providential care that brought the life of Mr. Villard in touch with the University of Oregon. The dream of years had through his enlarged power become a fact in history; and then came the kindred desire to watch over and strengthen the feeble forces of this new community. So the other imitation of a divine attribute had grown into life within his fertile brain.

He entered his office one morning and found on his desk the Portland Oregonian. He saw among its Oregon items some reference to a legal notice that the buildings and other property of the Oregon State University would in the near future have to be sold at public auction to satisfy its indebtedness. It struck him at once that here was a direct menace to his newly created system of public interests in Oregon. He telegraphed Judge Deady of Portland: "Please ascertain and send

me amount of indebtedness of your State University and obtain stay of legal proceedings till you hear from me."

Judge Deady promptly responded and in a few days received Mr. Villard's personal check for the whole amount. He also wrote Judge Deady that in the near future he would visit the University and ascertain what else he could do to help the University into new life and efficiency.

I have an abiding conviction, Mr. President, that it comports with the eternal fitness of things, that the Almighty, desiring to bestow on Oregon a great commercial uplift, looked into the brain of this broad-minded man, and chose the channel of its working through which to pour this new favor of God into history, the Villard Railroad System of the Columbia Basin. And I have an abiding conviction that the Almighty, desiring to enlarge and enhance the scope of higher education in Oregon, looked into the workings of the brain of Henry Villard and saw there a fitting channel for His Providential help to a higher plane of culture for the youth of Oregon.

CHAPTER XV

Fossil Lake

In 1876 Governor Whiteaker, while on a camping trip in central Oregon, found many fossil bones, black and glistening, resting upon the dry sands of Lake County. The next summer, by furnishing his own team, he made it possible for Mr. Condon to enjoy a most valuable exploring trip across the Cascade Mountains and down into southeastern Oregon. His guide and assistant was the Governor's son, Charles Whiteaker, who was one of the ablest and most deeply interested students in the geology class of the new University. While on this camping trip Mr. Condon spent his evenings writing notes of the day's experience and we have the following record:

July 26, 1877. We reached Governor Whiteaker's home twelve miles southeast from Eugene, and Friday, the 27th, we started on our trip, passing through a fine timber country. There were the Douglass spruce and cedars of both kinds, here called smooth and rough barked cedars—(Thuja and Librocedros). Ceanothus shrubs began to abound and toward night we passed some chinquapin trees, while near our camping place were fine bushes of rhododendron. The military road which we traveled follows the valley of the Middle fork of the Willamette River. It is getting out of repair, but shows that in its original construction a good amount of labor was well laid out.

Saturday, the 28th, we continued to ascend and found sugar pines—Pinus lambertiana—along the road. Mr. Hill showed me some sugar pine timber which he classes very high. In camp there were troublesome gnats and the weather was threatening. Sunday we camped on or near the summit (of the Cascade Mountains) and it rained on our exposed encampment.

Monday, 30th, we had a fine view of Diamond Peak behind us, which the clouds hindered our seeing while near it. The timber is hemlock, and two kinds of spruce, Menzies and Douglass. We also saw some handsome Noble firs (Picea nobilis) and sugar pines. There were dwarf species of flowers and ponds were frequent. Summit Lake and Crescent Lake are very pretty bodies of water. I could see no life on their margins though I am told fine trout abound in the latter lake. Walker Range looms up athwart the eastern horizon and at 6 P. M. we reached the east branch of the Deschutes, a small stream where we prepared to camp.

At eight or ten miles from the summit going eastward, the whole surface soil seems changed by a covering of yellowish dust growing thicker as one approaches the summit. On the eastern descent the depth of this surface addition is greatly increased though just a little concealed below the surface. However, the roots of every fallen tree expose it and its true character is plainly seen to be volcanic ashes. While carefully exploring for evidence of its thickness at its deepest, I became satisfied that it could hardly be less than twenty-five or thirty feet. It was distributed evenly as a fresh snow in still weather. Where it was at its greatest depth, the whole country was covered with a growth of forest trees and all the trees were growing naturally from the

surface of this ash bank. The trees of largest size were yellow pine (Pinus ponderosa), some of them three or four feet in diameter and in good healthy condition. All this forest growth was on the surface of a sheet of volcanic ashes.

Evidently this heavy timber came from a replanting that occurred long after the volcanic eruption. For aught that appears there, several successive generations of trees may have come and gone since that shower of ashes fell. This deposit of ashes lay lightly for a time; but rains and snows falling on it settled it down with the help of its own gravity. Where it is now twenty feet deep, it must have at first stood expanded to forty or fifty feet, a depth inconsistent with the probability of survival of any forest tree on which it fell.

After a good deal of search for some exposure of the old surface upon which all this spent-fire material had fallen, I was fortunate enough to find one. At a place undermined by the Deschutes River, I found a fine section of the bank with about ten feet of the condensed volcanic ash covering seven feet of dark rich soil with traces of other times.

But this work of covering the hillsides with showers of soil capable of sustaining forest of pine was not the only notable result by which these showers of ashes may be traced. This recent eruption furnishes an impressive lesson in geology, showing as it does the extent to which such volcanic products were capable of modifying the sediments of the waters. The prevailing winds were westerly, hence the drift of the ashes was to the eastward; and this being a country of many lakes in the times we are describing, much of this volcanic ash would fall on these lake surfaces and become an evenly dis-

tributed sediment, covering up and so preserving the remains of bird and beast in stratified volcanic ashes.

Tuesday, July 31. We left the military road and while crossing a southern spur of Walker's Range we had a good view of Klamath Marsh, which is included in the Indian Reservation. This southern spur or foothill of the range is covered with fine specimens of sugar pine, and other spurs abound in yellow pine (Pinus ponderosa). We also saw some fine silver firs. Finally we reached water (at Jackass Gulch), where we camped.

Wednesday, August 1st. We crossed some old lake-beds eastward of Walker's Range and later in the day reached successively three streams—Buck Creek, Bridge Creek, and Silver Creek, vocal with bird life. We passed down these streams and by five o'clock reached Silver Lake, where we stopped at Duncan's ranch on the lake shore. Here we found a hospitable welcome, good food and bed, and intense sympathy with the object of our visit.

There is a view of Silver Lake from Mr. Duncan's, which is a positively fine landscape with a lake two to four miles across and extending six or seven miles in length, with a background of mountains. The lake water is used by cattle, has in it plenty of good fish, and abounds in water-fowl. It is only a small remnant of a once extensive body of water. The old gravel-covered elevated beach lines may be easily traced, extending over a wider area. Mr. Duncan has a good garden, his corn looks well and other vegetables equally so.

Thursday, August 2nd. We crossed a divide of eight or ten miles to Summer Lake, another remnant of a formerly much more extensive body of water. It is now about 22 miles in length and six or seven wide. Its ele-

vated old beach-lines indicate a height of 40 or 50 feet above its present level, which would make a grand body of water of the Summer Lake of the past. I have seen enough of its outline to class its history with that of Harney Lake.

The more I see of these old lake-beds with mere ponds of brackish water now occupying some low spot in their areas and the extensive alkali flats stretching away for miles—showing what a few feet of elevation would do now for their waters, the wider thoughts I have of Oregon's old lake system.

These small lakes still existing here are evidently the scattered remnants of a once wider body of water formerly taking in Silver Lake and all the stretch of country between that place and this for about thirty miles. As these waters were lowered to the present level by evaporation in excess of streams, the mineral left behind accumulated in the process until it covers the face of the ground like snow.

These waters varied in extent at different periods. From the spot in which I write these notes, I can mark an extent of not less than sixty miles from east to west and fifteen to twenty from north to south, with a variation of surface scarcely reaching what an ordinary eye would call thirty feet. This whole extent was water-covered during the life of the elephant as proved by his remains, and the portions of this extensive lake-bed which remained latest caught most of the bones buried in their muddy sediments.

I only query what part of this cold we experience here in the night is due to the extreme dryness of the atmosphere rather than to elevation. And if these extensive lake-beds were again filled, one queries whether

eastern Oregon would not soon become a land of summer showers in spite of the Cascade Range of Mountains.

Friday, August 3rd. We started early and first traveled back to Silver Lake and along its eastern shore for about fifteen miles to its northeast corner; thence eighteen miles a little north of east through a dead level covered with sage, and finally reached Button's ranch on the shore of one of those strange alkali lakes, whose flats at this season are covered with a thick efflorescence of alkali—I suppose, carbonate of soda.

We camped at Button's ranch and Saturday morning, August 4, left our wagon and started on horseback for the "Fossil Beds."

From the slight elevation of a sand dune about eight miles from Button's ranch, they pointed out an apparently circular depression four or five miles across, with some grass and tules in its lowest portions and in the middle a small pond or lake. To the leeward of this lowest portion and perhaps two miles away, the depression is bordered with a line of sand dunes formed unquestionably from sands blown from the bed of the lake that once occupied the whole of this basin. It is the blowing out of this sandy sediment which exposes the fossils in its depth.

We staked our horses and went to work. We found the remains of elephants, camels, and horses among mammals; a good many bird bones; and some specimens of fossil fish. After a search of six or seven hours we packed up our specimens and returned to Button's and on Monday we started home.

Later Mr. Condon wrote of this trip as follows:

The fossils of these Silver Lake beds were found often lying on the surface, bare of any covering. The sands

and dust that had covered them were blown to the leeward and now lay in extended dunes; and this uncovering and drifting process was still visibly going on. Among these fossils we found many arrow-heads of obsidian, such as were used by recent Indians. We found, too, lying among them, many fresh-water shells of species now living in the waters of Klamath Marsh. Shells and arrow-heads were, like the fossil bones, entirely uncovered and lying upon the surface of the ground. If the sands, the fossils, the arrow points, and the fresh-water shells were all of the same period and the fossil bones were early Pleistocene, then the arrow points were fashioned before the Glacial age and men inhabited the surrounding hills in the early Pleistocene period. But the mixture of these facts may be due entirely to the simple law of gravitation for both the arrow points and the recent shells may have settled down among the fossils as the dust and sand upon which they rested were gradually blown away.

The rarest and most valuable fossils collected on this expedition were the eighty bird-bones which were unusually perfect and in a fine state of preservation.

It seems from the following letter that Mr. Duncan of Silver Lake joined this exploring party when they left his ranch home and later sent some fossil teeth to Professor Cope, the paleontologist in Philadelphia. The letter also refers to correspondence between Cope and Mr. Condon concerning this new field.

EUGENE CITY, OREGON, December 5, 1877.

DEAR SIR:

I have just received yours of the 22nd ult. I had written you last week in answer to your former letter when your assistant, Mr. Sternberg, called on me and informed me that he had been to Silver Lake and had sent you a large collection of its fossils. This information led me to change my plan of sending you a box of these fossils from my lot which I thought would now be of but small value to you. Your recent letter reassures me on this head so I will at once put you up a case or package and send them on to you as loaned specimens.

Let me repeat the request I wrote you a week ago in stating to you that it was Governor John Whiteaker who ought to have the honor of having his name given to the new Equus which you will find among these fossils. Oblige me to this extent. Mr. Duncan, who sent you these teeth, joined Governor Whiteaker's party and continued with us.

I will write you again in a few days.

Very respectfully,
THOMAS CONDON.

In the fall of 1877 C. H. Sternberg, then collecting for Professor Cope, began working at Fossil Lake only a few weeks after Mr. Condon's party had left.

In 1879 Cope himself visited Oregon and was a guest in the Condon home. He also collected at Fossil Lake and in the Crooked River country and undoubtedly in the John Day Valley.

That Mr. Condon was expecting Professor Cope is shown by this fragment of a letter to one of his family:

I am not kept so busy this fall as I was last, or had been before; the reinforcement we have received in our faculty has made a change in this respect. It has made my range of work narrower and made its limited routine more perceptible. A little ripple seemed within reach two weeks ago by a letter from Prof. Cope, who was then just leaving San Francisco for Oregon and promising to visit me in a few days. I was glad of this for I needed to look over my cabinet and do some more needed labeling. His plan, he wrote, was to visit me, then go into the Interior with such help as I could give him in planning. On his way north he was persuaded to go to eastern Oregon by Klamath Lake, whence he wrote me he was coming back by Eugene. Two weeks have passed and he does not come yet. I am afraid somebody has given him the good advice to get back to civilization by way of The Dalles. There is so much of naming of specimens I expected of him that I shall count it a loss to fail to see him here. I cannot think of sending much more material to the East to be named. A week longer will determine whether he goes back without calling here.

This doubt was soon solved by a letter from one of Mr. Condon's University boys, which gives a pleasant picture of the meeting of old friends in the wilderness. The Jake Wortman referred to is J. L. Wortman, another student of the first

geology class taught at the Oregon State University. He was for some years an assistant collector for Professor Cope.

PRINEVILLE, WASCO COUNTY, OREGON,
KIND AND RESPECTED PROF.: October 6, 1879.

Returning from a ride in the country last Thursday, whom should I meet near camp but Charley Whiteaker in company with Prof. Cope. After a few moments spent in pleasant conversation, we all lunched, then walked over to the Ochoco River and obtained a number of specimen fishes for the professor and spent a very pleasant afternoon. We all camped together that night and the two younger members of the trio were highly amused and instructed with a rehearsal of the professor's travels, etc. Friday morning Prof. Cope went up to the Silver Wells to see Jake Wortman and will probably return tomorrow. He will then take the stage for The Dalles, from there to Portland, thence to Eugene, where he will probably stop one day with you, and will then take the speediest route for the Atlantic States. He will probably be in Eugene about the 12th inst.

I have had many favors shown me here. Prof. Condon seems to have many acquaintances in and around this place, and is held in high esteem. With the kindest regards to yourself and family, I am,

Your friend and pupil,
T. CY. JUDKINS.

As we have seen, Sternberg worked at Fossil Lake for weeks and later Cope himself had collected there, so that Cope possessed a large number of rare bird bones of his own; and later, Mr.

Condon loaned his small but choice collection to be studied and identified. After ten years more or less had passed the Oregon scientist became anxious for their return and growing impatient at the long delay wrote the following letter:

EUGENE, OREGON, November 10, 1890.

DEAR SIR:

I write to ask you to let me bear the expense of having my fossils sent back to Oregon by express. I do this because of the heavy unrequited expenses under which you have labored. I need these fossils in my work. Please note for me as you have them packed up any name specific or even generic that might help me, and not hinder you.

Please be careful to send the bird bones and add any small gift of yours such as those few pretty fossil jaws you sent when you returned my John Day fossils.

Very respectfully,
THOMAS CONDON.

Cope, realizing the necessity for help, asked a bird expert from the Smithsonian at Washington to study and report on all the Fossil Lake birds. The following letter from Dr. Shufeldt shows that Mr. Condon had accepted this plan:

WASHINGTON, D. C., March 20, 1891.

MY DEAR SIR:

It gives me pleasure to thank you for your kind letter of the 13th inst. and your permission to describe your collection of fossil birds from Silver Lake, along with Prof. Cope's. There seem to be fully 80 specimens

belonging to you, and I keep them quite distinct, and will return them to Prof. Cope when my labours are completed. When I said "a few more of your own," it was by way of comparison only, as there must be upwards of 1,500 specimens in the Cope collection, obtained at Fossil Lake. Your specimens are nicely stowed away in cotton in separate boxes and *marked*. They will receive the greatest consideration in my hands.

With best wishes, Very truly yours,

R. W. SHUFELDT.

In the meantime, Cope had published in his American Naturalist for November, 1889, an interesting paper on "The Silver Lake of Oregon and Its Region," and other papers, and later Mr. Condon received a copy of Shufeldt's Memoirs, "A Study of the Fossil Avifauna of the Equus Beds of the Oregon Desert," which was a valuable and most interesting contribution to Oregon paleontology. In this publication he reports that the "Fossil Lake of 1877 was now a lake only in name, for its former waters have long since dried up, but by digging, water may yet be obtained at a depth of two or three feet from the surface of the ground."

CHAPTER XVI

Many Problems

Although Mr. Condon had resigned the office of state geologist, no one else had been appointed and he continued to receive such letters as are usually sent to this official. Some of the writers sent samples of rock to be determined, some asked about coal, black sand, gold, limestone, kaolin, graphite, asbestos, gypsum, platinum, quicksilver, talc, diatomaceous earth, nickel, jade, building stone, railroad tunnels and artesian wells. The personal research required to answer these questions properly took much valuable time, but it was also enriching his own education and preparing him for the diverse lines of teaching then required in all small colleges.

In 1877 this letter was received from G. M. Dawson, the Canadian geologist:

MONTREAL, May 14, 1877.

DEAR SIR:

I mail with this a copy of a note of mine on changes of elevation of the Coast, recently published. I should very much like to receive copies of any of your publications on the geology of the West Coast, and shall be glad to reciprocate from time to time as occasion may offer.

I am, sir, Yours truly,

GEORGE M. DAWSON.

And later James D. Dana wrote as follows:

NEW HAVEN, CONN., June 4, 1879.

MY DEAR SIR:

Wishing to obtain a more correct idea than I have of your region of igneous rocks, I take the liberty of asking you two or three questions; and I shall be greatly obliged if you can give me an early reply.

1st. Are the basaltic rocks of the Cascade region continuous with those of the base of Mt. Adams and Mt. St. Helens?

2nd. Mt. Hood was one of the great volcanic centers of Oregon and the fissure eruptions at the Cascades may be viewed as connected with this center. How far do these basaltic eruptions continue up the Columbia before you reach a break in them or a point where, beyond which, they are evidently connected with some other center of eruption?

3rd. What part of the Cascade range between Mt. Hood and Mt. Shasta is covered with eruptive rocks?

I will ask also whether, should it seem best, I may publish your statements? Your reply will be esteemed a great favor by,

Yours truly,

JAMES D. DANA.

When Mr. Condon first visited the Oregon seacoast near Yaquina Bay in 1876 or 77 he found a miner there who was sluicing black sand. Perhaps gold was his first objective, but he had also succeeded in separating a quantity of platinum, some of which he sold to Mr. Condon for eight dollars an ounce while its outside market value

was only twelve dollars an ounce.* A year or two later the young inventor, Thomas Edison, needed platinum and some of this package was sent to him. The writer of the following letter was an old friend and a Portland banker and Edison's platinum was sent through Mr. Steel.

PORTLAND, OREGON, August 16, 1879.

DEAR FRIEND:

I enclose a letter from Mr. T. A. Edison acknowledging receipt of the sample of platinum which I sent him as coming from *you*.

After you are through with the letter please return to me. Yours truly,

JAMES STEEL.

The next we know of the package of Oregon platinum it had been lost and found; and a letter had been received from Ferrier, the lithologist of the Geological Survey of Canada, asking for the rare mineral, not for the value of the platinum itself, but because he wanted the still rarer mineral laurite, which he could separate from the platinum.

OTTAWA, December 11, 1890.

DEAR SIR:

In February last I received a letter from you, whilst I was on the New Jersey Survey, replying to one which I had written you in May, 1889. In it you said you had just found your package of platinum ore, containing

* During the great war the price for platinum was about $140.00 per ounce and that price still holds true.

the *Laurite* which I wished to obtain, and you very kindly offered to send me some if I was still desirous of getting it. I at once replied that I would be delighted to obtain it, but my letter must have miscarried for I have not heard from you since.

If convenient I would much like to get some of the ore now, as I have taken up the investigation again, since coming here, in connection with similar material from British Columbia. Will gladly send you good exchange in minerals. Have you any special desiderata in that line?

Hoping to hear favorably from you before long, believe me, Yours very truly,

W. F. FERRIER,
Lithologist, Geological Survey of Canada.

In the next letter Ferrier had received the platinum and in return Mr. Condon was very glad to obtain the eight specimens referred to for they represented some of the oldest rocks of which we have any knowledge on the earth's surface.

OTTAWA, November 2, 1891.

DEAR SIR:

I was delighted to hear from you again, and to receive the package of platinum minerals. I did not intend, however, that you should be at any expense in the matter, and will take it as a favor if you will kindly let me have the Express a/c that I may remit you the amount.

You are exceedingly kind to offer to let me have additional material, but I think what you sent will be ample.

I will have the separation of what laurite there may be in it, proceeded with at once.

What can I send you in return? If you will let me know, I will be most happy to help you to anything I can from this part of the country. Again thanking you,

Yours very truly,
W. F. FERRIER.

DEAR SIR: OTTAWA, October 30, 1896.

I have sent you today by Canadian Express Co., with the permission of the director, eight specimens of our Laurentian and Huronian rocks, and hope that they will answer your purpose. I have no specimen showing graphite, such as you ask for, by me at present, but will get one in the course of a day or two and send it by 5th class mail which will only cost a few cents.

With kind regards, believe me,

Yours very truly,
W. F. FERRIER,
Lithologist, Geological Survey, Canada.

The Territory of Washington, whose geological work was still unorganized also, turned to Oregon for official help, and asked Professor Condon to write its geological report. As he had always embraced every opportunity for exploration north of the Columbia River, he was almost as familiar with the general geological features of Washington as with those of his own state, and as there was no one else on whom the governor might call, he deserved the following thanks from Governor Squire:

OLYMPIA, October 29, 1884.

DEAR SIR:

Your valued report on the Geology of Washington Territory has been received. I shall be pleased to make the proper remittance at a later date. Please accept my thanks for your courtesy in the matter.

Very respectfully,
WATSON C. SQUIRE,
Governor.

About this time there seems to have been a period lasting ten years or more of especial interest in the subject of artesian wells in the Oregon country. In 1884 Professor Condon received this letter from W. S. Ladd, the pioneer banker of Portland, who owned a large tract of land covering a part of what is now East Portland and who wanted artesian water for his fine stock farm. This old historic well was near the present intersection of East 39th and Glisan streets, in the center of what is now Laurelhurst.

PORTLAND, OREGON, March 11, 1884.

DEAR SIR:

Sometime since I undertook to have an artesian well bored on my farm in East Portland about two miles from the river, a little north and east of Mt. Tabor.

The well has passed thru the top soil and gravel and is now in sand 182 feet below the surface. The first contractor has abandoned the work; no new man will undertake the work unless he knows what he has got to go through.

I cannot find anything printed here about the strata or dip of the rock, etc., and so write to you to ascertain if you can enlighten me any. Begging pardon for troubling you in this matter and thanking you in anticipation, I remain,

Yours very respectfully,
W. S. LADD.

In answer Professor Condon wrote:

EUGENE, March 21, 1884.

DEAR SIR:

Your note of the 11th inst. was duly received. The delay in my answer comes from hesitancy of judgment in the natural difficulty of the subject. After thinking the matter over I find it takes the following shape in my mind:

First, in regard to the sand in which your work is now. It is certainly safe to say to any contractor that that sand won't last long enough to give him trouble.

Second, in regard to what may be expected to be found below this sand. I am inclined to the conviction that below this sand you may expect to find a drab colored soft rock of no great difficulty in boring. My reason for expecting to hear of your finding this next is this: I am credibly informed that this drab colored rock with fossils in it was a few years ago found on the bank of the Willamette a little above East Portland. I know it exists below towards Scappoose. I know it underlies the hills west of Portland and out to Tualatin Plains. As to the dip of this rock if found, this could be ascertained from its outcrop along the Willamette above East Portland.

The sole difficulty a contractor might encounter

would be from meeting a bed of hard basalt so frequent in streaks in Oregon. If the contract bound a workman to drill till he found flowing water then another hardship might be in store for him. The underlying rocks of Oregon have been so broken up and bent and folded that an enclosed sheet of water with its head in rocks of a higher level must be rather rare and I would dislike to take the chances of striking this exceptional success.

This higher level or head would be either eastward, towards the Cascade Mountains or westward in the highlands of Tualatin Plains; in either case, an unbroken sheet of rock holding the water down would be essential to the success of an artesian boring, but it is this very continuity of the rock below the surface and above the water that rests in doubt. Yours very truly,

THOMAS CONDON.

And Mr. Ladd responded:

PORTLAND, OREGON, March 26, 1884.

DEAR SIR:

Your esteemed favor of the 21st at hand and I desire to sincerely thank you for your information, which I had not been able to obtain elsewhere. I believe now that I shall undertake the well and if I have success, all right; if not the experiment has been made and the people will know what can be depended upon in this section. We will keep measurements of different strata and let you know the result. Yours truly,

W. S. LADD.

So the work went on and they bored through about 1,300 feet of valley-fill, all of which was soft. Then came the old Tertiary rocks, in which

fossil shells and ferns were found, and at about 1,700 feet they struck igneous rock, through which they drilled until a depth of 2,000 feet had been reached. There they found a log or some such obstruction and gave it up without artesian water.

Professor Condon, who was much interested in the well, believed that the Columbia River, during the Glacial Period, occupied a deep gorge which extended far out beyond its present mouth, as the coast was then much higher than now. Later, in the period of depression, the land sank and the gorge was filled to a great depth with lighter drift and wear; and it was through this filling material that the first 1,300 feet of Ladd's artesian well was drilled.

Then in 1887 the U. S. Government determined to try for an artesian well at Fort Vancouver, twelve miles east of Portland on the north side of the Columbia River. After going down 285 feet Colonel Anderson appealed to Professor Condon for advice.

VANCOUVER BARRACKS, W. S.,
October 25, 1887.

DEAR SIR:

The Government is having an artesian well bored on this reservation for the purpose of supplying this Post now under my command with water. The bore has now gone down 285 feet or 45 feet below the level of low water mark in the Columbia River one mile away. For

about 50 feet the bore has gone through a loose broken strata of lava.

We are authorized and have money to go only 1,000 feet. Now I wish to ask you what in your opinion is our chance of getting artesian water as the well-men call it, within that depth? Where are we likely to strike sedimentary rock in this apparently endless drift? Mr. Corbet, who is boring for us, bored Ladd's well for over 1,800 feet. Very respectfully,

THOMAS M. ANDERSON.

After the recent experience with the Ladd well it is highly probable that his advice was not encouraging; at least, the Vancouver well seems to have been given up by the Government.

A few years later this letter was received from southern Oregon and the writer was referred to more expert authority upon the Rogue River Valley.

MEDFORD, August 30, 1889.

MY DEAR SIR:

There are some attempts—not yet organized—towards the sinking of artesion wells in this valley and particularly in the neighborhood of Medford, Oregon. In partial opposition to these attempts, there is a current rumor that you have given it as your professional opinion to the public, at some time, that the probabilities are against the finding of artesian water here in consequence of some conditions of the strata which forbid the existence of the peculiar geological strata in which artesian supplies are found. Will you kindly advise me if you have ever publicly or privately given such an

opinion, and, if so, your reasons therefor? Such an opinion—or rather an opinion of yours—for or against the attempts to find artesian water would be of special benefit to myself, and of general and great benefit to the citizens of this portion of the state, residing in the valley of Rogue River; and if you so desire and will so permit will be given due publicity. Very truly,

HENRY KLIPPEL.

DEAR SIR: EUGENE, September 4, 1889.

Yours of the 30th ult. asking for information in regard to professional opinions of the success of artesion wells in Oregon is received. In answer to written inquiries sent me in years past, I have expressed doubts of the success of artesion borings about Portland and vicinity. Beyond which I dislike to be quoted as discouraging such search for real wealth.

In regard to Rogue River Valley I would rather refer to more competent authority and would respectfully name Capt. Dutton, who has thoroughly studied the Rogue River Valley and its mountains. He would be authority. I would not. His address would be Capt. C. E. Dutton, U. S. Geol. Survey, Washington, D. C.

Very respectfully,

THOMAS CONDON.

Again, in 1894, Mr. Condon received a letter from James Lawrence, the editor of the Salem Democrat, and in answer wrote:

DEAR SIR: EUGENE, January 13, 1894.

Your favor of the 11th inst. is received. In answer I would say: Two essential conditions to success in artesian borings for water are:

1st. The confined waters must be higher than your borings.

2nd. The confined waters must be held in confinement between two sheets of rock, in unbroken condition. If broken, the waters have other escape than *your* boring. Have we such unbroken sheets along the west side of the Cascade Mountains?

My doubts all rush in between my wish and my answer to this question. My observation furnishes me with no means of laying these doubts. There may be local causes that would partially suspend these conditions and which experiment alone would set aside, *but this costs.*

Very respectfully,

THOMAS CONDON.

We have seen that in building the Northern Pacific R. R. on the Columbia in the early seventies the engineers were glad to avail themselves of any help Mr. Condon's knowledge of the geology of the region could furnish them and similar assistance was sought and obtained when the time came for extending the Oregon and California R. R. System. In answer to such a request for information, Mr. Condon wrote as follows:

EUGENE, February 11, 1882.

DEAR SIR:

Enclosed please find brief answers to the questions of your note of the 9th inst. You further inquire whether if you should make a short stay at Eugene, on your way over the road next week I might add anything on the subject verbally. Should anything else occur to me on the subject I will note it and be glad

to tender it. For this purpose I shall be glad to meet you at the depot if informed of the time of your coming.

I am under many obligations to your company and shall only be too glad if any of my studies shall enable me to make small return.

In the accompanying notes I have used the term "altered." I use it in the sense of the old geological term "metamorphic." I find in our mountains so much of this that is changed from its old sedimentary form into metamorphic rock, according to the greater or less degree of heat and mountain pressure it has undergone; the same deposit appearing in one locality as serpentine, in another as hard schist, and in another as crumbling shale.

Very truly yours,
THOMAS CONDON.

Several years later this letter was written in answer to Mr. Koehler's request for a name for one of their stations:

NEWPORT, OREGON, July 30, 1891.

DEAR SIR:

Your favor of the 22nd has just reached me. Delay due to my changes of locality. In answer to your inquiry for a name for your new station, I would respectfully suggest these:

First, Natron. If your proposed new station is, as I suppose it is, in sight of Mt. Pisgah, east of Springfield. The trap rock of this mountain has in it an abundance of fine specimens of the mineral Natrolite; the principal root of the name Natrolite is Natron-Soda. Natron is a short pleasant name, and as far as I know, new.

Second, Montville. If your proposed station is near, or among mountains.

Third, Cascades. If your proposed station should be near the foothills of the Cascade Mountains. I suppose the names Lower and Upper Cascades of the Columbia Gorge, are only general designations of regions; not towns.

Very respectfully,
THOMAS CONDON.

The name Natron was accepted and passed into modern history as the town of Natron on the "Natron Cut-Off," the newly finished railroad that has pierced the crest of the Cascade Mountains by means of a long tunnel near Lake Odell.

The mounds of "Mound Prairie" in western Washington have been considered by some as the work of human builders. This letter to the Oregonian gives the result of Mr. Condon's research into the subject:

MOUND PRAIRIE OF WASHINGTON TERRITORY.

TO THE OREGONIAN:

In your issue of Tuesday was published an interesting paper on the Mound Prairie of Washington Territory. Having after careful study of these mounds reached a conclusion opposite to that of the writer of that paper and believing that many of your readers would be interested in having before them both sides of the argument, I venture to give my reasons for believing them to be entirely results of atmospheric carving or rather nature's etchings.

They are composed of loose earthy materials that plainly once existed here uncarved and unbroken over the region. The proof of this exists in the fact that remnants of this stratum may be seen not carved into

symmetrical mounds at all; and the connected fact that throughout the carved and uncarved, may be seen proofs of unity. In all alike the top soil has, as usual in all native soils, most of the dark vegetable mold; the middle portion, the loam or sandy loam; the base, sand or clay.

One might as well attempt to fill a grave dug through three grades of soil so that no one could detect its outlines as to heap up a mound so that vegetable mold would grade into loam and loam into clay. No shoveling could imitate the natural adjustings of soil that mark not only the physical forces but the chemistry of ages. In many places near Tenino one may see extensive patches of the original surface not carved into mounds but remnants of the whole cloth from which these mounds were cut. And in these uncarved portions the vegetable mould is at the surface grading into loam, the loam grading into clay, the whole interspersed with pebbles or sand precisely like that of the neighboring mound, giving what seems strong evidence that the mound was not heaped up from the surrounding materials but separated from them by some carving or etching process. These irregular patches are of all magnitudes and shapes and yet so intimately connected, in structure and materials, with the mounds, that no explanation of the existence of the one inconsistent with a like explanation of the other can at all satisfy the mind.

There is also a fixed relation between the height of the mounds of any locality and the thickness of the strata in the uncarved portion. Small mounds are carved out of thin strata, large high mounds are carved from thicker strata. This I saw repeated in several widely separated places.

There is yet another direction in which a group of kindred facts help the solution of our problem. The mounds of Mound Prairie are quite similar to those of the hillsides of Wasco County, Oregon, and these last are so distributed as to preclude the idea of human work. They uniformly occupy the northern slope of the hills from which the forests have retreated. The road from The Dalles to Canyon City, Oregon, passes through a mound region only a few miles east of The Dalles. These Oregon mounds differ from those of Tenino in several of their features, but these differences are all plainly assignable to different soil or surface, while in their great essential features they answer to those of Tenino, fact to fact. The differences carry with them as much of proof as the correspondences. The Tenino Mounds have their interspaces filled with stones. In this respect those of Oregon found on Deschutes Hill answer perfectly to those of Tenino, while those of Five Mile and Eight Mile Creeks have no stones in their interspaces, simply because the soil out of which these last were carved is stoneless.

The Oregon mounds are divided into two well-marked groups. The one nearest The Dalles is the more remarkable as the mounds are confined to the northern slopes of the hills. This and other facts point to a connection between their formation and the slow retreat of the timber belt from the Deschutes toward the foothills of the Cascades. In short, these mounds are the graves of the rear guard of the timber fallen before the advance of the increasing drought of the interior. The timber that formed this rear guard was the oak (Quercus garryana) and its last sullen protest against the advancing dryness took the form of bunches of oak

grubs growing thickly around the decaying roots of their sires. These clumps of oak preserved small portions of the original surface against the wearing of the atmosphere while atmospheric forces etched away the portion not so protected.

To apply this reasoning to the Tenino Mounds, suppose bushes or clumps of bushes scattered over the region to begin the work. The finer materials would rapidly disappear from the interspaces until they would cease to shelter any growth of herbs. The double effect of this barrenness of the interspaces and the drainage of surface waters would surely produce such results as we now see there. Whether this explanation satisfies all the conditions of the question or not, it is certain that no explanation of the phenomena at Tenino will answer that does not equally explain the mounds of Oregon.

CHAPTER XVII

The Development Theory of Evolution

The question of Evolution was still a live issue in the early eighties. The following lecture was given in Portland, and published in the Portland Oregonian in 1883.

"The doctrine of theistic evolution: that is, the doctrine that declares evolution to be God's process of creation, is now taught by all the higher colleges of our country. Among its teachers it enrolls the names of Dr. McCosh, of Princeton University, to represent the Presbyterians; Professor Dana, of Yale, to represent the Congregationalists; Professor Packard, of Brown University, to represent the Baptists. It claims among its seats of learning Harvard, Dartmouth, Cornell, Michigan University, University of California, and many colleges of lesser note.

"Although it has this standing among religious teachers, two classes of thinkers still persist in lecturing and sermonizing the public into the belief that the doctrine itself is essentially atheistic. The two classes are the atheists and the faithful among the theologians. That an atheist should want to usurp this doctrine is not surprising: that an orthodox theologian should help him to suc-

ceed is a matter of surprise and deep regret. If it concerned the atheist or the theologian alone the evil would be less than it is. As it is, the real harm is done to thousands of young people who read enough to know that science accepts some sort of evolution and who hear from Sabbath sermons that evolution and godliness are not only inconsistent, but destructive of each other. If these things are stated with anything like fairness to the facts, it ought to be a service to the cause of truth to spread before the public the evidence of the extent to which the development theory has already passed into general acceptance; and also to attempt to show that this acceptance, where accomplished through intelligent weighing of its truth, has in it no tendency to atheism.

"Such is the aim of these pages. No effort will be made to defend or to condemn accepted views; only to record them and their results.

"But a few years ago, light, heat, electricity, chemical reactions, and mechanical motion were supposed to be due to entirely separate acts of creation. It is now clearly seen that these and other physical forces are only separate links of one chain of underlying natural force. It is demonstrated that nothing of this underlying force is ever wasted. The motion of a mill, of an arm, of a steam engine, occurs because heat, or some other link of the chain, is changed into

motion. The motion thus created expends itself by becoming again heat or electricity, or some other form of the same chain of forces. Nothing of all this is now made or destroyed, not even wasted.

"These things are now the commonplace facts of science. The natural effect of them on human thought would be that, whereas we once thought God created light alone, we now know he must have created a wider fact of which light is only a part. And with scientific Christians, this was the only effect the change produced. Would that it had been left to this.

"How this view of the truth could lessen anyone's adoring reverence of the Infinite Source of all this wider force, and profounder power, it is difficult to understand; that it should carry with it a tendency to atheism is incredible, for somewhere in that long chain of sequences the Creator's power must come in. The normal effect upon our belief would be expressed by such a statement as this: 'I once believed God created a small fact; I now see he must have created a whole system of facts at once.'

"This tendency to wider, more generalized facts is the one characteristic of recent scientific experiments. Our thoughts must be adjusted to this current of things if we would keep our theology a working power among men.

"Still more plainly is this wider generalization marked in the domain of chemistry. In chemistry, as in other departments of science, experiments continually reveal other and wider facts and forces underlying those which are already evident. The discoveries of late years through the use of the spectroscope have added greatly to this conviction. These show that the distant stars are composed of chemical elements like those of our own earth. This certainly gives one a sufficiently generalized idea of the nature of the materials out of which sun, moon, and planets are made. If we consider these materials as we find them in the rocks around us we shall find evidence enough of development from simple elements to complex combinations.

"As a surface fact, nothing can be more simple than a piece of chalk; yet if you examine it closely you will find its simplicity to vanish and in the place of that simplicity a most complex combination of chemistry, history, and mineralogy. It tells of the lowly life of a company of animals existing in the deep regions of the ocean, millenniums ago, extracting the carbonate of lime from the waters around them and through the wonderful chemical forces of life, converting this lime carbonate into bony skeletons, which, on the death of the animals, were consigned to the deep oozy bed of the ocean to become chalk. It tells of a sub-

sequent elevation of this ancient chalk bed into a mountain mass of a neighboring continent. How far from simple, either in time, in place, or in chemistry, is this strange mixture of rock and of history.

"Yet you may say of this piece of chalk, 'God created it.' So he did, but how? Evidently by a long process of development from simpler elements of time, of force, and of material to what you now find it.

"A piece of granite from the hills, no more than those hills themselves, can now be regarded as a thing created in its present form by an instantaneous exercise of divine power. If you examine it closely you will find it to be a combination of three other combinations. It is made up of quartz, feldspar, and mica: the quartz is a combination of silicon and oxygen; the feldspar is a combination of silicic acid and aluminum, with either lime, potash, or soda; the mica is a combination of silica and alumina, and for a third element, either potash, magnesia, lime or even iron. Surely here is development in its most marked form; development through combinations complex and varied to present results. And this without at all carrying the argument to the molecules of a stage anterior to these, or to the atoms of a still more remote stage; and yet the changes this material underwent in these preceding stages are as truly

a part of the creation of your piece of granite as the combination of its quartz, feldspar and mica. How plainly then is it true that the creation of a piece of limestone or of granite consists in such a combination of atoms and forces in nature as shall secure these resulting masses, and that time, and often a good deal of it, enters into such combinations, making their existence itself a history of changes.

"Let it be remembered that the object here is not to impress the hearer with a fact in chemistry or in mineralogy, but with the fact of a creation through development accepted throughout Christendom for the last hundred years or more, by the religious of all parties, and without any known tendency to atheism. It is not easy to see why the wider act of creation should have less need of a creator than the narrower one, or that these general systems of nature should have any less need of a plan and a designer than the more special ones of our older thought. There is in both the same need of a creator. The wider systems as well as the narrower ones will show their missing links. What matters it where these missing links occur?

" 'From nature's chain whatever link you strike,
Tenth or ten-thousandths breaks the chain alike.'

"If the power and wisdom of a creating God stands behind that missing link, it makes no dif-

ference where it occurs, whether in the creation of a piece of granite itself, or of the atoms of which it is composed. And yet one might say in passing, of these missing links in all systems, that there is no obvious gain in making the argument from design to hang rather on the absent than upon the present link, as if a broken link in a chain should be made to commend the skill of the mechanic more than if it were unbroken.

"Several years ago the astronomer, LaPlace, published an hypothesis of development applied to the solar system, in which the claim was made that the sun, moon, and planets were not created one by one from nothing by divine power; but that the matter of which they are composed once existed diffused through space; that this matter was drawn together by the mutual attraction of its particles; was condensed into such position as to give play to its chemical forces; that this condensation developed motion in the whole mass, causing it to revolve around its center of gravity; that the increase of this motion resulted in the casting off of its outer portion into space, which outcast mass would in time become planets and moons circulating around the central mass; and that our present sun is the great central residue of all this.

"With the great mass of the world's educated thinkers this explanation of God's mode of creat-

ing the solar system has passed from the domain of hypothesis to that of accepted theory; one capable of explaining facts in its connection not capable of explanation on any other theory. No one now thinks of objecting to it on the ground of its giving a substitute, in its explanation, for the power of God and thus promoting atheism, although this was often done when the hypothesis was first published. You need not be reminded that this nebular hypothesis is one of development as applied to the solar system.

"But the field of scientific work which of all others shows the most marked change in the use of the word 'create' is that of geology. But a little while ago it was generally believed that mountains were created as such and from nothing.

"It is now clearly seen that the mountain's mass once existed in different form, perhaps extended over a plain or sea-bed, occupying the very place now occupied by the mountain; and that at an earlier period the materials that now constitute its rocky mass existed as a plastic mass of mud carried to this very place by neighboring rivers.

"Or if we take for our illustration a still more specific case: It is strictly correct to say God created this mountain west of Portland just where it is. But what do we mean by created here? Let us inquire. In a careful examination of the moun-

tain itself we find at least four different kinds of materials entering into its structure. Its surface to the depth of several feet is covered with a rich bed of soil; under this surface-soil is a series of beds of boulder clay; under this a varying mass of basaltic lava evidently the remains of not one, but many successive lava floods, and underlying all these a continuous mass of shales and sandstones reaching back under the mountain to Tualatin Plains in one direction, to Scappoose and the Lower Columbia in another, and to Eugene and the upper Willamette in still another. And so connected are all these parts that no portion can be separated from the others in the part it took in this one act of creating power which we call the creation of this mountain.

"Each of these portions of this mountain has a history of its own—the whole a common stretch of history. If we turn to the first—the surface layer—and ask it of its record, we shall be informed of ground-up material, of freezings and thawings, of oxidations and deoxidations, of additions from decaying leaves and logs, by all of which means this surface soil was brought to its present condition of usefulness. If we examine the layer underlying this surface one, that of the boulder clay, we shall find a like stretch of history to mark its preparation for its place. The drift of the glacier that brought its heavy boulder masses

to their present place, the history of the occasional piece of granite that seems so far out of place among porphyries and basalts as to suggest an iceberg journey from some northern shore—all these fragments of story unavoidably come into our conception of the creation of the boulder drift that constitutes the second layer of our Portland mountain. Then we shall find ourselves in the presence of the basaltic layers of what were once, without doubt, great lava flows over level causeways long since eroded by deep valleys or narrow ravines until the direction of their outflow seems now almost incredible.

"We now reach the basement sedimentary rock upon which all this upbuilding has been erected. You will find it in a few places cropping out in the river bank at low water. It extends back under the mountain to Tualatin Plains; it forms the foothills around the plains, it borders the valley forming its foothills through South Tualatin, Wapato Lake, Amity, Albany, Eugene and back down the valley on the east to Portland again. It is an old sea bed. Throughout its extent its fossil remains are well marked, and definitely fix the time in which its sea shells, its star-fishes, and its sharks lived at home in its waters. The materials of sand and mud, out of which these sandstones and shales were made, were brought here from higher lands, so that at the very foundation of

our mountain base we find ourselves looking back to an earlier period for a part of the agencies that make up the history of our mountain mass. Such, in brief, is the natural history of this mountain west of Portland.

"Now, if we say, as we have an undoubted right to say, 'God created this mountain,' I am compelled by the facts of the case to define 'created,' as developed through a long continued series of changes in which heat and frost, sea and land, stream and flood and tide, all did their share.

"We reach a like conclusion if the object of our study be the natural history of some river channel. Look, for illustration, at our own Columbia. Of this, too, we may say, and say properly, 'God created it, the whole of it.' But what does this act of creation imply? Let us see: The long winding stream of water we call the Columbia River is a vast thread that binds into geographical oneness regions wide apart and strangely varied, but united in this one tie of an extended water course.

"Similar to this is its place in time: here, too, it becomes a thread that ties together widely dissimilar chapters of geological history. Let us try to recall two or three of these.

"That we may get a glimpse of the first of these restorations of past history, it is requisite that we imagine the stream of time rolled back one hundred thousand years or more.

"This done and we shall find the water shed of the Columbia River of that period occupying in the main, the same region it does now, and yet, along its whole course it will seem wondrously changed. It was then in its lower or western portion a broad, winding strait, bearing the same relation to the interior that Fuca Straits do now to Puget Sound. A broad beautiful bay extended southward from this strait to where Eugene now stands, fringed with deep inlets, into which mountain streams poured from the same valleys these streams now occupy. This broad stretch of inland water, let us call the Willamette Sound.

"Another and far greater extension of the Columbia River, stretched from where Walla Walla now stands to the Yakima Valley, making here, too, an extensive inland sea.

"Still another extension reached from Snake River to the westward to and including the present Klamath Marsh. No facts in the natural history of the country are plainer than the evidences of these former extensions of this great water course.

"Nor was this the beginning; far from it. If now we take another step into the great past we shall find still the same Columbia River, but now only as a connecting series of links between frequent lakes large and small: a river whose banks were covered with palms, whose lakes and streams

were frequented by the rhinoceros, the wild horse, dwarfed and giant, the tapir, the camel, and many stranger forms long since passed away.

"At the time of this earlier chapter the present Willamette Valley was through many broad, open straits, in communication with the sea.

"If now, with this extended view of its past history, each epoch of which helped to form the succeeding one, we say God created the Columbia River Valley, we of necessity are held to imply a long development of forms and materials and forces like these now at work around us; that among these were the heat of internal fires, the frosts of unnumbered winters, changes of level and changes in living forms—which, of course, amounts to an acknowledgement that we regard the development theory as defining God's process of creating the Columbia River. What is here said of mountain mass or of river channel, applies with like force to the creation of a whole continent.

"The perception of a great geological system of plants as well as of animals, long since suggested to Professor Agassiz what was known as his system of evolution, an essentially embryonic one, and therefore not dependent on surroundings.

"The other type of evolution is that of variations, promoted by surroundings, and is best represented by the Darwinian system. Neither of

these attempt to account for the origin of life itself. They are both content to ascribe this to God.

"The scripture texts that relate to the introduction of life into the world are the following:

"1. 'And God said, let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind.'

"2. 'And God said, let the waters bring forth abundantly the moving creature that hath life.'

"3. 'And God said, let the earth bring forth the living creature after his kind, cattle and creeping thing, and beast of the earth after his kind.'

"If these passages simply assure us that our Heavenly Father created life upon earth and in the waters around the earth by starting its streams from a germ which He caused the waters or the land to bring forth, then the believer in special creations and the theistic evolutionist have here a common ground.

"Beyond this their views separate, the evolutionist claiming that God created the possibility of the whole system in its first germ of life, and so consigned it to the development of the natural world. To him, then, these passages from Genesis open a vast stream of life, beginning millions of years ago in the dawn of the Paleozoic, increasing naturally as it flowed on through the successive additions to the continent, rapidly enlarging as it

flowed through the early Tertiary, till the extending continents were overspread with life in the wonderful variety of its higher forms with which the later Tertiary prepared the world for its present.

"If these passages of Genesis open to us in vision this grand procession of the life of the past, our thought of God will certainly kindle no less honor to Him, while it will be more true to the facts.

"Man's place in this vast stream of life, the theistic evolutionist finds no difficulty in defining. His flesh is of the earth earthy: his animal life belongs with the broad current above described. But God assures us that He created another system, in this wider life stream, even a spiritual one; for it is written, of man, that 'God breathed into his nostrils the breath of life, and man became a living soul.'

"Here the Christian evolutionist finds the latest and highest creative work of all—that to which all rightly tends; that to which all else was intended to be tributary—the evolution of the religious destiny of mankind.

"Suppose now the question were asked, what effect will the development theory have on faith of Christendom? It might be presumptive to attempt to give a direct answer to so grave an inquiry, but if we consult history for parallels from the

past, these may help us form a judgment. About three hundred years ago a new hypothesis of the solar system was published by the astronomer, Copernicus. His theory was adopted by Galileo and demonstrated by the help of his newly invented telescope. But the church was alarmed and asked the question: 'What will become of the faith of Christendom if these unscriptural views of the sun and the earth be generally accepted?' The poor astronomer of the telescope was condemned for heresy and compelled to retract his published convictions on pain of the penalty due to heresy. The heresy triumphed. Europe accepted the new views, but did not give up the faith of Christendom. This is certainly a case in point and ought to have its moral for us. Years passed and a new scientific heresy was published—that of the great antiquity of the earth—six thousand years would not cover the scope of history geologists saw in the rocks. The theological cry was again raised and in almost the same inquiry: 'What will become of the faith of Christendom if these views are accepted?' Well, time passed, the longer chronology was generally accepted and the faith of Christendom seemed rather to improve under the change.

"But yet another strain was in store for the relation between theology and science. The evidence of several lines of scientific inquiry seemed

to point to a longer human antiquity than the received one. Again the old cry was raised of atheism and infidelity against the innovators, and again the newer views prevailed without much apparent change in the faith of Christendom. That these periodic conflicts between theology and science have been entirely harmless, no well informed person will claim. The church cannot put herself in a position of chronic antagonism to science without harm.

"But in opening out this subject, so that we may see how much of evolution we ourselves believe; and also in enumerating the evidences that our colleges are already teaching it to our youth without taint of atheism, I have done the work proposed by these pages. That the wise and good of the nineteenth century are about to let these doctrines make atheists or even infidels of the rising generation, I cannot believe; that they are necessarily destructive of faith I believe as little. That the American church may, through their help, be able to cast aside a good deal of worthless teaching, and rise to a higher plane of working power, is far more legitimate to the signs of the times."

CHAPTER XVIII

Intercourse With the American Museum of Natural History

In 1880 the following letter was received from one of the officers of the American Museum of Natural History, New York. This wonderful institution, which we all enjoy today, was then almost in its infancy and was eagerly seeking expansion.

NEW YORK, October 12, 1880.

MY DEAR SIR:

Several gentlemen visiting our Museum from the Pacific Coast while examining our collection of fossils have spoken to us of your specimens and I therefore take the liberty to address you this note to ask if you would like to sell it at a moderate price to this Institution where it would be forever preserved and exhibited to the thousands of our visitors from all parts of our country and from all lands?

If so, it is barely possible we might interest some one of our friends in purchasing it for us and we would be obliged if you will give us a general statement of the whole collection, adding as much detailed information as may indicate its scientific nature and forward it to us *at once* with the lowest *cash* price you would take for it.

Very truly yours,

ALBERT S. BICKMORE.

Of course Professor Condon did not seriously consider selling his collection, for it was a vital

part of his equipment as a teacher. Besides, he was constantly filling out its deficiencies by further research in Oregon and also through exchanges from the Atlantic Coast and the Middle West, where Paleozoic fossils were abundant; for the more ancient forms of life are rarely found on the Pacific Coast.

A few months later another line of interest between the American Museum and Oregon began with this letter from the archaeologist, James Terry:

NEW YORK, January 7, 1881.

MY DEAR SIR:

I contemplate a trip to Oregon and Washington Territory to supplement and complete my archæological work commenced in California and I desire to acquaint myself with the field for research on the Willamette River, and between there and the Coast, and would esteem it a favor if you can give me any information on the subject and also how early in the spring is the weather suitable for field work. What I desire more particularly to know is the mounds(if any) and burial places of the early native races.

Believe me with respect and esteem,

Very truly yours,
JAMES TERRY,
Archæologist.

This was followed by other letters and several visits scattered over a period of ten years or more. They were short, interesting, almost boyish letters full of life and enthusiasm for his own

special line of research, but he was always responsive and sympathetic, with real interest in the work of his friend in Oregon. He seemed to flit from place to place, at one time writing from Vermont that he was "giving the Champlain Valley a going over"; then reporting a beautiful Indian Olla found near Santa Barbara; again gloating over a wonderful pebble of jade found in a pile of gold-bearing gravel in southern Oregon.

But there were two specimens in Mr. Condon's collection in which Terry was especially interested. Of one of these he writes:

NEW YORK, March 30, 1887.

ESTEEMED SIR:

Can I prevail upon you to let me have the greenstone chisel, which I wanted so much when I was at Eugene City some four years ago? Now when I say I am ready to make you a satisfactory offer for the same I mean exactly what I say, that I am willing to give you your own terms, for I believe *you* to be a strictly honorable man and would only do justice in the matter. Now what say you? How much in money or exchange?

I remember my visit to you with interest and should be pleased to hear from you regarding matters of an archæological interest. With assurances of regard, I am,

Very truly yours,

JAMES TERRY.

This specimen is undoubtedly No. 40 in the collection of Indian implements and came from

Goldendale Valley, Washington, which is just east of the Cascade Mountains and a few miles north of the Columbia River. Again Terry writes in December of the same year asking to borrow the chisel:

NEW YORK CITY, December 6, 1887.

MY ESTEEMED SIR:

When in southern Oregon after leaving you at Yaquina I was fortunate to find a jade pebble weighing some 50 pounds which had been found in the auriferous gravel pits of that section. It is a most superb specimen. It has been contended by Prof. Mayer of Berlin, also Dawson of Canada, that the mineral nephrite or jadeite or jade (synonymous terms) of which the Indians of our Northwest Coast fashioned many of their implements was native in its origin. My pebble goes far to substantiate this theory. I am going to publish it with some other specimens of a like material which I obtained in Alaska, and also the *green pestle* which you gave me and I would like to illustrate with it your *nephrite** chisel if you are willing. Of course, I am well aware your experience with eastern specialists is not such as to give you any satisfaction in loaning any more of your material and I shall not blame you if you refuse me. I can only say I will put up a cash deposit as security and promptly return it as soon as I can get a plate of it. I want all the chronology of the piece you can furnish, as well also as of the *green pestle.*

With an assurance of my regard and remembrance to your family, I am, Very truly yours,

JAMES TERRY.

* "Nephrite or Jade," Dana.

We are still asking: "Where did the Indians of our North Pacific Coast and Alaska secure the jade found occasionally among their implements? Was it native to our coast? Or were these implements brought by still earlier races migrating from Asia where jade is so highly prized by the Chinese?"

The other most interesting specimen to the archaeologist in the Oregon collection was a crude sculpture of the head of an Anthropoid ape found near the mouth of the Deschutes in eastern Oregon, a specimen Mr. Condon had owned since 1868 or '69. Terry himself had found a similar specimen on the John Day River in 1882 and Prof. O. C. Marsh had a third ape carving found in 1871 or '73. Of this Marsh writes in an address in Nashville, Tennessee, in 1877: "On the Columbia River I have found evidence of the former existence of inhabitants much superior to the Indians at present there and of which no tradition remains. Among many stone carvings which I saw there were a number of heads which so strongly resembled those of apes, that the likeness at once suggests itself. Whence came these sculptures and by whom were they made?"

Mr. Terry's plan was to use all three of these carvings in a monograph, bringing out their relation to the present Indians of the Columbia River Valley or, as he believed, to an older race which

belonged to prehistoric times. His request and the progress of his plan is revealed in the next few letters.

NEW YORK CITY, October 21, 1890.

MY DEAR SIR:

I am about to ask a favor at your hands and I do most sincerely ask you to give me your kind consideration. I have a monograph prepared on my *anthropoid head* from the John Day Valley which will be illustrated with two views. You have a head and Prof. Marsh has a head both from the same locality. I saw Prof. Marsh last Saturday and he promised and allowed me to illustrate his head, and now I want you to do the same with yours. The great desirableness of having all three of these sculptures brought out together from a scientific standpoint is too apparent to need any urging at my hands. I will be at all expense in the matter and will give you a dozen copies of the work as soon as issued and any notes you may add shall receive full and due credit.

If you can consent to this proposition will you take your head to the photographer in your town and have two negatives made *half size:* one, a *full face* view; the other, a profile. Have the support concealed with a white background and send me the negatives.

Be pleased to let me hear from you on the subject, and believe me with respect and esteem,

Very truly yours,

JAMES TERRY.

NEW YORK CITY, November 10, 1890.

MY DEAR PROFESSOR:

I am in receipt of your kind letter of the 1st stating you will carry out my desires relative to the head. I

am exceedingly obliged to you for your kindness and when you send the negative by express *very carefully packed,* send your bill of expense and I will send N. Y. draft. Now, my Dear Sir, please send any notes or information you may have regarding it and you shall receive full credit for the same; anything about finding, whether surface or from a grave; the date of finding as near as possible; is the material of which it is made of the dark, pumiceous basalt as the others? And does the same material occur plenty in the John Day Valley? Is it sculptured all over or does it show a natural surface in parts, and where? Please give me what detail you can on these lines, and believe me as ever,

Sincerely yours,
JAMES TERRY.

November 15, 1890.

DEAR SIR:

I have just filled my promise of a week ago by consigning to the care of Wells Fargo & Co.'s Express those two negatives you asked for. . . . I asked the artist to tilt it forward a little so as to show the small mortar-like cavities of the summit. Many minute mortars are found in Oregon with cavities like these, and I once asked an old Indian what they made of them. His answer was . . . . "We make medicine (in those) for sick eyes." Starting from this suggestion I thought it probable that this head was owned by an Indian doctor; and he used the sacredness he attached, and perhaps his patients attached, to this head as adding to the efficiency of his treatment. In regard to the gorilla likeness and the inquiry where the Indians got it, I would say: I have drifted into the conviction that

some Malay Proa with a wooden figure head like this may have been wrecked on our Coast. The Indians would think it a Godsend and give this permanent form in stone.

Truly yours,
THOMAS CONDON.

NEW YORK CITY, November 25, 1890.

MY DEAR PROFESSOR CONDON:

I have this moment received your negatives and will take them down to Bierstadt as soon as I finish this letter, and I may telegraph you from down town as to another negative. Now as to details. I cannot clearly make out from your negative but I judge your specimen represents the *teeth. If so, how many?* My specimen does not, but Prof. Marsh's does. I have always understood your specimen came from the John Day River the same as the other two. Am I correct? What year was yours found and under what circumstances? I can hardly agree with your theory of the Malay Proa but with your permission I would like to print your letter in a foot note as worthy of consideration. What is the title of the pamphlet and where can I get one of the list of shipwrecks of Proas, of junks on the Pacific Coast? I will get a P. O. Money Order and send you today. I ask you to give a prompt answer for I should like to get the paper out by January, 1891.

Cordially yours,
JAMES TERRY.

EUGENE, December 17, 1890.

DEAR FRIEND TERRY:

Yesterday the negative you asked for was delivered to the Express of Wells-Fargo & Co. directed to you.

In answer to your inquiries I would say further:

There are no marks answering to teeth on mine, no apparent effort to represent teeth. The dimensions are: 1st, Extreme height, measured through back part of head, 9 inches. 2nd, Extreme length on line of lower lip, 9 inches. 3rd, Extreme breadth, 6 inches.

My specimen came from the Deschutes River, only twenty miles from the John Day River. My specimen was brought me by an Indian woman in 1868 or '69. I did not get much information from her as to the precise condition in which it was found. The cup-like depressions, I am confident, from information I gathered from old Indians, were used as mortars in which their doctors compounded eye medicine.

I cannot now recall the title of that pamphlet but think it was "Chinese and Japanese Shipwrecks on Our Northwestern Coast" or to that effect. I cannot lay my hands on it but it has no definite, perhaps no mention at all of Malay Proas although naturally suggesting this.

Very respectfully,
THOMAS CONDON.

The pamphlet to which he refers gave a record of the many wooden carvings which had drifted ashore attached as figure heads to the proas of wrecked vessels from China and Japan. Professor Condon thought the Columbia Indians might have used one of the shipwrecked figure heads as a copy for their ape head carving especially as the stone used—a dark porous basalt—was very abundant around them.

Terry's monograph entitled "Sculptured Anthropoid Ape Heads" was published in 1891 and

was indeed a fine piece of work and a valuable contribution to American archaeology.

As a sequel to these "Three Sculptured Heads" Professor Condon received a letter in 1901 from L. H. Wells of Portland, Oregon. Mr. Wells had promised to lecture on archaeology and wrote: "I shall have occasion to refer to the stone images of baboons found in Oregon. I have two stone images well defined of baboons found near the Columbia River. If it is not asking too much, may I ask what is your idea concerning them.— Very respectfully, L. H. Wells." So it seems that at least five sculptured ape heads have been found near the Columbia River and so far as we know the question of their origin still remains an unsolved problem.

CHAPTER XIX

Research in Western Oregon—Astoria—The United States Geological Survey

Astoria

Owing to its location at the mouth of the Columbia River, perhaps the earliest fossils collected in Oregon were found at Astoria. For after about three years cruising in the South Seas, the United States exploring expedition, under Lieutenant Wilks, reached the Oregon Country in 1841 with James D. Dana (who later became the great American geologist) as official mineralogist of the expedition. After their ship, the Peacock, was wrecked at the Columbia Bar, Dana and his companions made their way in a life boat to Astoria, where he collected fossils and made valuable geological notes for his expedition. These fossils were finally turned over to Conrad, the conchologist, for identification.

In 1856 and 1863 Dr. Philip Carpenter also made reports to the British Association for the Advancement of Science "On the present state of our knowledge of the Mollusca of the northwest coast of America." Dr. William Dall of the Smithsonian commends these English reports

very highly for helpful knowledge and accuracy.

Mr. Condon spent the summer of 1868 at Astoria, and although it was not his first visit it was perhaps his best opportunity for exploration. At this time the steep hills came down abruptly to the narrow beach on which the business houses were located. And the wear and tear of winter storms often loosened calcareous boulders of various shapes, which fell from their steep shaley matrix upon the tideland beach below. Many of these were gathered and burned for their lime. But Mr. Condon soon realized that they were a treasure mine. For within these concretions he found many beautiful shells and other forms of sea life.

He believed that when the shell first drifted into the soft mud of long ago, the lime of the shell was absorbed by its immediate surroundings with the result that the coiled shells became enclosed in spherical concretions, and the pectens and other flat shells had circular boulders with only an inch or two of thickness. Thus the shape of the shell with its own contribution of lime had largely determined the shape of the concretion. Often the whole structure of shell or crab or fish had been absorbed, leaving only a calcareous boulder with no trace of the story it had once contained.

Walking on the Astoria beach in the old days with his geologist's pick and hammer, Mr. Con-

don sometimes broke open a hundred boulders before he found a gem. He here collected shells from two formations. The lower, containing the Nautilus-like Atturia now known as Oligocene, he called Eocene and the shells coming from a slightly higher altitude he called Miocene. As they both had fallen from the same hillside, some collectors found this mass of boulders rather confusing. Since then, the growth of the town with its piling, grading, business houses, and wharfage has almost spoiled this fossil field.

In 1890 Professor Condon received the following letter from Dr. Wm. Dall of the Smithsonian:

MY DEAR SIR:

Partly for health's sake and in larger part for the sake of getting scientific data about the Plio-Miocene fauna of the western slope, I hope to visit Oregon and California in August and September of this summer. I am interested only in the invertebrate fossils, especially the shells. Knowing you to be *facile princeps* in a knowledge of *localities,* etc., in Oregon I write to ask if you can suggest any particularly good places for observing and collecting in the Pacific Miocene or Pliocene, especially such as might be reached without any camp outfit or paraphernalia involving much expense—anything on the Columbia below Portland, or on the line between Portland and California, so situated that a person could reach them from some fairly comfortable headquarters. The material will eventually come to the Smithsonian and all aid furnished will be gratefully acknowledged. My strength is somewhat impaired by

long continued office work and I hope by the outing to get a certain renovation as well as paleontological data. Believe me, Very truly yours,

WM. H. DALL,
Cur. Dept. Mollusks, U. S. National Museum.

In carrying out his plan, Dall stopped at Seattle, then at Astoria and Portland, and finally reached Eugene early in September.

In writing of this trip Dr. Dall refers to Astoria as being a classical locality for Tertiary fossils on the Pacific Coast, but said: "The beach has been built over and entirely covered by dwellings and storehouses built on piles on account of the high and precipitous character of the river bank at Astoria and the supply of fossils has been virtually cut off. . . . . Fortunately, before this state of affairs had reached its present completeness, Dr. Thomas Condon had visited Astoria and made collections which are now preserved at the State University at Eugene, Oregon. In these collections the specimens from the Oligocene and Miocene horizons are carefully discriminated, and I had the privilege of examining them under the guidance of the professor himself. This evidence explains the discrepancy which was so long a subject of controversy."

This pleasant visit from Dr. Dall was a real help to Professor Condon, and it was probably at this time that they strolled together to the

banks of the Willamette River a mile or more east of the University, where Dr. Dall found a large and beautiful fossil Scalaria shell which he later named Scalaria Condoni.

The following letter was written by Dr. Condon to an absent member of his family in the autumn of 1884:

I am reminded that I have not yet told you anything of the results of my trip to the Siskiyou Mountains last vacation. It had in it some things that will interest you in the direction of geology. I was not aware till I made that trip of the great extent of southern Oregon rocks older than Cretaceous. My conviction that the Cascade Mountains made Oregon's Mud Sills and that these were elevated after the Cretaceous or during its later ages was all right, but I did not give enough space to the land that existed before this period.

I had known that the large island in the northeast that we now call the Blue Mountains had a shore line of Cretaceous rocks. I had not known that at the same time a like large island existed in the southwest in the region now occupied by the Siskiyous and this like the other was surrounded by its belt of Cretaceous rocks with their Trigonia shells so characteristic of the geological period. I found and brought home complete evidence of this. From each of these ancient islands the land extended progressively toward the other in increasingly shoaling sea-beds till land joined to land and Oregon was completed. The lower reaches at first filled with sea-water, then brackish water, then later fresh-water lakes; and after these drained off by the wearing down of their outlets, the country reached its present condition.

I found abundance of granite and a very extensive deposit of lime. We visited two extensive caves in the limestone and brought away some good stalactites, a gain our class in mineralogy will feel in wider knowledge of rocks. But the great gain will be to the class in geology; for in this direction my own information was greatly increased.

I have also had a visit this fall from two noted geologists that has helped me. They came looking for definite information and found it in my *boxes*. This gave me more exact knowledge when it was before vague. One of these men was director of the U. S. Geological Survey of the Pacific Coast and he engaged me to write a paper on Oregon geology for the annual report, with a colored geological map for publication. Should this be published I will send you a copy.

Affectionately,

THOMAS CONDON.

Soon after his trip to the Siskiyou Mountains the following letter was received from C. A. White, paleontologist of the U. S. Geological Survey:

SAN FRANCISCO, CAL., August 21, 1884.

DEAR SIR:

As paleontologist to the U. S. Geological Survey I have for the past three months been making some studies in the field in this state, and I propose to spend a few days in Oregon, on my return to Washington. I expect to be in Eugene City somewhere from the 10th to the 15th of September. Dr. G. F. Becker, in charge of the Pacific Division of the U. S. Geol. Survey, will accompany me then. We hope to find you at home, and with

your permission we shall have many questions to ask you as to geological matters in Oregon. I have no doubt you have knowledge of many matters pertaining to the geology of your state that you will willingly impart to us.

Very respectfully,
C. A. WHITE.

This welcome visit from White and Becker was the one of which Professor Condon wrote: "They came looking for definite information and found it in my boxes."

The following spring a letter was received from W. G. Steel, very kindly inviting him to visit Crater Lake, that wonder of the Cascade Mountains. In answer he wrote:

EUGENE, OREGON, May 14, 1885.

DEAR SIR:

I have received your letter in regard to a trip to Crater Lake during our coming vacation. I hesitated for a time and then forgot the subject till reminded of it lately. I would say now that I am thinking of a trip to the Coos Bay coast to complete investigations begun last summer. I have not yet decided even on this; my hesitancy comes of uncertainty as to how much of my time my family will need.

In the use of my summer vacations I give little attention to my pleasure. A trip to Crater Lake would be a real source of profitable pleasure but I am not ready for it. There are three or four trips ahead of it in my needs. I would be very glad of your company on whatever trip I may make.

I found a very extensive deposit of limestone and marble last summer in Josephine County. I need now to know how far this limestone extends along the coast line. A trip to Coos Bay and thence to Port Orford would satisfy this. Very respectfully,

THOMAS CONDON.

The plan for this trip was carried out during that summer of 1885 when Professor and Mrs. Condon combined pleasure and geological research in a trip to Coos Bay. This section of our coast can now be reached by rail in a few hours by way of the Siuslaw Bay, but in 1885 the Southern Pacific left our travelers at the village of Drain. After a night's rest they followed Elk Creek and the Umpqua River by stage through the Coast Mountains. From Mr. Condon's notebook we cull the following:

The Umpqua Valley, which the road follows below Elkton, is in many places open and interesting, in a few places beautiful, with apparently prosperous farms along the road. The rocks looked as if they needed a geologist's examination but I could only catch a hasty look at stray fragments along the road.

About sunset we reached Scottsburg and took our supper at a neat little hotel kept by intelligent and attractive people. From here we took a boat and after steaming with only twilight to see the grand old hills that lined both sides of our passage, we reached Gardiner about 10 o'clock. The village is a pretty one but business is languishing.

The last day of the journey they had a steamer ride of nine or ten miles down Winchester Bay, where they took seats in a waiting wagon and started on a beach ride of twenty miles to Coos Bay.

It was a bare desolate beach with but little of interest. A dead sea lion, a dead seal, a live mink looking for his dinner, several flocks of small birds, a few dead shells. We reached North Bend, now Empire, by small boat ferry about 3 o'clock. An hour later we took steamer for Judge Dyer's, near Marshfield, where hospitality of the best type made us feel at home.

From Judge Dyer's they made several excursions—one to the coal mines, one to Rocky Point, where the government was constructing a jetty for harbor improvement. Here they found "a rare and rich bed of fossils" of which 30 or 40 pounds were collected of forms largely unfamiliar, all finely preserved, and some of them beautiful.

Monday, August 10. I went to Marshfield and walked home examining strata along the winding road. Northward from Marshfield I found fossils and among them a large Cardita in imperfect condition.

Wednesday, August 12. We went with Judge and Mrs. Dyer to Cape Arago and found there some fine Cardita Shells in the rock in place. We spent the night at Cape Arago among landscape features of real grandeur.

Thursday, August 13. We stopped again on our way back, at Rocky Point and gathered more fossils from

that locality so rich in solid specimens of great variety and beauty. In the evening I lectured at Marshfield to a good audience.

Friday, August 14. We took boat for Bandon and intermediate points, and Saturday I took a walk with Cornelia on the Bandon beach, where we found some things of interest in several departments of study. There were rocks of metamorphic character—(serpentines in places, mica schists in others)—in immense masses of outlying remnants of crumpled mountain masses. I thought they were outlying layers from spurs of the Josephine County Siskiyou Mountains. I also found an elevated level deposit overlying the jagged points of these serpentines corresponding in some respects with Yaquina Champlain. Here were well-preserved shells of Saxidomus, Schizotherus, Glycimerus Buccinum and Macoma. Monday Mr. Tupper gave us a ride on the beach four or five miles south of Bandon. This outflanked the Bandon Metamorphic rocks and opened to us a tilted sandstone of well defined stratification. I went again to see the Champlain beds and found a well preserved brachiopod like Terebratula, which I put away with extreme care.

The same autumn Mr. Condon wrote the following letter to White, reporting his new discoveries at Coos.

EUGENE, October 6, 1885.

DEAR SIR:

I have just received and read Geological Bulletins 15 and 18 with deep interest and profit, especially the clear strong light in which you set the Cardita specimens from Oregon.

During the last summer's vacation I went among

the Coast Mountains for further information, and found among other things, a fine collection of fossil Cardita Shells. I found them near Cape Arago at the mouth of Coos Bay in a series of rocks tilted to almost vertical of which the cape consists. Shall I send you a suite of these specimens? Have you time to attend to them? They will range from the young an inch across to the hoary adult four and one-half inches across.

During the same trip and a few miles inland from Cape Arago, on the south shore of Coos Bay I found at Rocky Point a wonderful deposit of Marine Shells with no Cardita and yet not Miocene, as Oregon has thus far exposed the Miocene, but a more unfamiliar horizon of fine specimens which I wish I could show you.

In regard to all these can I trouble you to some such extent as this? I would like to send you, at my own expense, a suite of these specimens with duplicate catalogue so that you can insert against its numbers your generic, if not generic and specific names, or, if undetermined, this fact; so that I can at once profit by the information. The specimens do your pleasure with, the duplicate list return to me. I will delay sending these till I hear whether you can spare the time to look them over.

I would be glad to be able to add Cape Arago to my Oregon Eocene localities; the growing framework of Oregon in Early Tertiary times would find added illustration, quite helpful in teaching.

Very respectfully,
THOMAS CONDON.

The following summer Mr. Condon accompanied his son-in-law, Judge Robert S. Bean, on his annual pilgrimage to Cape Blanco, where the

judge presided over the district court, and the geologist studied the old beaches on the ocean border of Siskiyou Mountains further south than he had been before. Of this Cape Blanco trip he later wrote:

At Cape Blanco, near the lighthouse, one may see an old sea-beach elevated two hundred and ten feet above tide water, in which shells, for the most part like those now living in the neighboring bays, are covered in the sand and mud deposits in which they once lived. Among the most frequently occurring of these were Schizotherus (our large blue clam), Saxidomus nuttalli, and Mya truncata. This Mya does not inhabit our waters now, but is found in Alaska scarcely distinguishable from the fossil one of the elevated beach. Here would seem to be conclusive evidence that during the geological horizon to which these shells belong, the Pacific Ocean buried them along its beach line, two hundred and ten feet above its present reach.

An extensive belt of Eocene rock not covered by any later deposit may be seen reaching from Denmark, a few miles north of Cape Blanco, to a point near the mouth of the Coquille River, reappearing again south of the entrance to Coos Bay where fine exposures of fossils are found. Among these are well-preserved Cardita Planicosta, that may be seen near the lighthouse at Cape Arago in rock tilted to an angle of sixty degrees. The rock reappears at the mouth of the Umpqua and makes the line of picturesque bluffs along both banks of that river to Scottsburg and is again extensively exposed along Elk Creek to Drain.

Further north the Eocene reappears around Philomath and Corvallis, and here again one realizes the

great thickness of these Eocene beds; for in spite of the evidence these hills furnish of long continued deep weather wearing they present today a feature of striking magnitude. In several places among the Benton County hills, Cardita Planicosta attest the Eocene age of these rocks.

Another exposure of the fossils of this great belt of Eocene is found near Albany. A low range of hills tends eastward from a point north of Corvallis, compelling the Willamette to run eastward for ten miles or more and near Albany containing our characteristic Eocene shells in fine condition and goodly numbers. This range of hills between Corvallis and Albany is a mere offshoot of the main belt, which continues on unbroken to the Columbia River.

The magnitude of these Eocene deposits estimated in the light of what one sees along the coast line from Cape Blanco to the mouth of the Umpqua strikes one as very great; while the uniformity of these materials and the abundance of their fossil-remains alike speak of long-continued uniform history. Anyone may verify these convictions by examining the thickness, uniformity, and abundant life of these rocks on the North Umpqua twenty miles east of Roseburg: the thickness of deposits along both banks of the Umpqua and Elk Creek from Elkton to the ocean; and at Cape Arago where again they are richly fossiliferous.

The correspondence with Dr. White was resumed in January, 1887. Mr. Condon replies to Dr. White as follows:

DEAR SIR: EUGENE, OREGON, February 11, 1887.

Your letter of the 31st ult. and the accompanying franked envelopes and labels are received, for which

many thanks. These labels simplify my work very much. I have adopted your suggestion to use them for small packages by mail, and have just mailed my first package. I proceed to describe the locality in which the contents of this package were found.

Cape Arago is on the south side of the entrance to Coos Bay in southwestern Oregon. The rocks that make the Cape extend in upturned ledges, a mile or more from the shore, tilted to a nearly vertical position and running in lines parallel to the shore, their edges making rocky islets for some distance southward.

The rock is a compact sandstone, some of whose layers are quite coarse. I found in it but few fossils although I searched bed after bed, through an aggregate thickness of not less than 800 feet. But the few I found had among them these Cardita, which I send you with a few associated fossils.

You will find six of these supposed Cardita, representing what seems to be six stages of the growth of the same shell. A short distance from the bed of these Cardita was found a thin layer with a few fragments of Cardita and a large number of fragments of a well defined Turritella, specimens of which you will find in this package. There are also in this thin layer a small bivalve, one or two of which you will find. At low tide I went out to one of the islets and gathered out of its rocks some specimens of a small tuberculated gasteropod, two of which you will find. I did not follow these rocks to their terminus southward, along the coast. I did follow them inland along the bay and shall write you the result with my next package.

Respectfully,
THOMAS CONDON.

EUGENE, OREGON, February 14, 1887.

I send today another package by mail marked B. The following is a description of the locality in which these were found.

In my letter of February 11, I stated that the rocks of Cape Arago extended inland along the shores of the entrance to Coos Bay. I would add that they sink out of sight two miles back. But two or three miles further on, a rocky ledge appears above the surface known here as *Rocky Point,* the whole of which is out of conformity with the rock of the Cape. The rocks of Arago dip to the east; these dip to the west. The rocks at Arago are nearly vertical; these only dip twelve or fifteen degrees.

Within this rock at Rocky Point and filling up what looks like an excavated sluice-way an acre or two in extent and sixteen feet thick, is a mass of conglomerate whose pebbles are all fossil shells more or less worn. Many of these are still enveloped in their more ancient matrix and all washed clean as if brought here by a rush of waters, dropped into this excavated narrow place, and subsequently consolidated. This was certainly not their native bed. They were brought here long after they became rock. If asked where did they come from? I would be without even a guess, but would still remind the questioner that for fifty miles along the coast here and southward to Cape Blanco, enormous masses of sandstone are exposed with but few signs of fossils. So, too, to the northward as at the mouth of the Umpqua are enormous masses of sandstone almost bare of fossils, making in all a coast line of seventy miles in which the life period is hardly represented except here at Coos Bay. One sees among these shells at Rocky

Point so few things at all like our familiar Miocene fossils of Oregon, that the conviction is forced upon the mind that they must be Eocene of a higher horizon than those at the Cape.

In package B you will find several of these shells. Among them first, a handsome Venus-like shell which, if you find it an undescribed species, oblige me by giving the specific name of Coosensis. These shells are in great abundance and it was unlike anything Oregon had yet shown me.

Second, you will find a Mactra represented by different stages of growth. Third, a large Crepidula which looks like C. princeps. These Crepidulas make a conspicuous feature of the conglomerate; they are so numerous.

In answer, White writes:

WASHINGTON, February 21, 1887.

DEAR SIR:

Your letter of the 11th inst. together with the package of fossils marked "A" is just received. I have examined the latter casually and, while they no doubt come from the same horizon as that of the Cardita bed at Albany, I regard the strata which bear them as equivalent with the Tejon group of California. The specimens of *Cardita* have the general surface character of C. hornii of Gable, which I regard as only one of the numerous varieties of *C. planicosta.* Besides this the small collection you send contains two or three other species which I regard as identical with Tejon species. So far from this being a disappointment, I regard these discoveries of yours as fortunate and very interesting. You already know that I regard the Tejon Group as of

Eocene age, notwithstanding the fact that in California it is found to pass downward insensibly into the Cretaceous—that is, the Chico Group. Your discovery of this upper, or Eocene part of the Chico-Tejon series in Oregon is further interesting because we have not known of the existence of it in northern California, although the lower, or Chico part of the series has been found at numerous localities there. I shall hope to get fossils from the Chico portion of the series from your region also.

Very truly yours,
C. A. WHITE.

DEAR SIR: WASHINGTON, March 28, 1887.

I am now writing up the bulletin which will have reference to your discoveries of Eocene (Tejon) strata in Oregon, and if you have any more fossils to send from that horizon, I shall be glad to have them as soon as practicable.

I have some interesting facts to bring out with reference to the Chico-Tejon series in California, Oregon, and Washington Territory, besides quite a number of new forms to describe and illustrate. The fossils you have sent are of much interest, and I much desire to have others from the same horizon at other localities.

Very truly yours,
C. A. WHITE.

In spite of all of this geological activity, Mr. Condon received a letter from a subordinate official of the U. S. Geological Survey criticising him very sharply for not having sent State Geological Reports to Government Headquarters as requested. In answer he wrote:

EUGENE, OREGON, May 8, 1886.

DEAR SIR:

Yours of the 27th is received. It will help me in answering your inquiries to state: 1st. That Oregon has no provision for a geological survey. 2nd. That the State University of Oregon has no provision for a geological survey. 3rd. That there is no State Geologist of Oregon and that I am neither seeking nor receiving a dollar from the United States or the State of Oregon or the State University of Oregon nor from any private source, for the work I am trying to do in geology. So you see I can by no possibility be in the way of any plan or work the U. S. Geological Survey may have in view. . . .

Permit me to offer a word of explanation. After receiving the communication from your office a year ago and while I was hesitating what I could do in compliance, I received a letter from Dr. Becker, Superintendent of the U. S. Geological Survey for the Pacific Coast, and shortly after, a visit from Dr. Becker and Dr. White during which the outlines of our Oregon geology were verified by Dr. White's special skill in paleontology. Dr. Becker asked for and I prepared an outline of the geology of Oregon and Washington Territory and sent them to his address in San Francisco. This gave the U. S. Geological Survey the information asked for.

THOMAS CONDON.

This spirited letter of self defense was soon followed by full explanation and a very kindly apology for his brusque letter of rebuke.

About this time Professor Condon enjoyed a delightfully informal visit from Captain Dutton

of the U. S. Geological Survey, and in 1887 received the following letter:

WASHINGTON, June 14, 1887.

MY DEAR PROF. CONDON:

During the coming summer it is very questionable whether I shall be able to go into the field on account of the great pressure of office work. I have been flattering myself that you might be willing to take part in the geological field work of the Survey in Oregon this summer and I therefore venture with the advice and consent of the Director of the Survey to make the following proposition.

Our fiscal year begins on the 15th of July and funds for field work will then be available. I wish to gain as soon as possible a good idea of the extent and distribution of the Cretaceous and Tertiary formations of the region lying north of the Rogue River, west of the Cascade divide and south of Eugene City and as far westward as the ocean. I wish also to get from whatever knowledge may be readily accessible an idea of the amount of older rocks disclosed in the Cascade Platform —usually in the deep ravines of that range—between the latitude of Eugene and Medford.

I therefore propose that you spend July, August and September in the study of the distribution of the strata in that field. This Survey will furnish you with a suitable equipment of the means of transportation and subsistence and such hired help as may be necessary and pay you a salary of one hundred and fifty dollars per month.

My assistant, Mr. J. S. Diller, will start for Oregon about the last of June and I will instruct him to stop

at Eugene and confer with you. If you can see your way to undertaking this work he will explain to you more fully its scope and intent and will take you to Ashland with him where he will supply you with an outfit and a packer or driver and put you into relations with a disbursing officer. Very cordially yours,

C. E. DUTTON, Capt., etc.

Captain Dutton's call to field work was tempting, but Mr. Condon could not accept.

It will be seen that the field which Captain Dutton wished the Oregon geologist to take was the very one he had been quietly exploring for several years.

This letter also introduces the name of J. S. Diller, between whom and Mr. Condon there began a lifelong personal friendship as well as the most cordial cooperation and interest in each other's work.

Dr. Diller's first letter follows:

ASHLAND, OREGON, July 17, 1887.

MY DEAR SIR:

Your kind favor of July 11th was handed to me upon my arrival in Eugene City July 15th and I was very sorry to learn that you would not do field work for the Survey this summer. Your extensive knowledge of the region would give you very great advantage in the prosecution of geologic field work and I had looked forward with great pleasure to a conference with you concerning the distribution of the Mesozoic and Cenozoic strata in this region. Four years' field work in

northern California and a portion of Oregon have given me many facts and suggested a few working hypotheses for field study and I am sure it would have been greatly to my advantage if we could have discussed these matters together.

In 1883 I passed through Eugene City with a letter of introduction to you from your friend, Mrs. Ellen Barr, of Westfield, Mass., but unfortunately I could not call to see you. I hope, however, that I may yet have the pleasure of making your acquaintance.

Very respectfully yours,

Red Bluff, California. J. S. DILLER.

This is the same Diller who in the '80's and '90's did field work in the California and Oregon mountains and throughout western Oregon.

One of Dr. Diller's ablest assistants during a part of the time was Frank M. Anderson, an Oregon boy living at Ashland, and while he never attended the University of Oregon and received all of his degrees and honors in California, he was always one of Professor Condon's best-beloved boys.

In 1892 Anderson, who was as yet only an earnest, enthusiastic fossil hunter, wrote as follows:

PAISLEY, OREGON, Nov. 6, 1892.

MY DEAR FRIEND:

I have for a long time contemplated keeping my promise to you. While in Eugene last summer my interest in you and in your work I found to become much strengthened or deepened, and you were kind enough

to ask me to write to you when I should return to eastern Oregon, and it is not because I have forgotten you that I have been delayed so long.

From the Willamette I returned home to Rogue River Valley, and spent some time there gathering fossils from various parts of the country. I presume you are familiar with all that I found, but there were a few that I did not remember to have seen in your museum. One is a shell that I think may be Muscle from the sandstone on Griffin Creek a few miles east of Jacksonville. Its outline is marked on the margin of this page and it is nearly four inches in length. Another I took to be a Nautilus. It is a pretty little thing as large as a silver quarter. I found it in my uncle's mines west of Phoenix. I found a much larger one south of Ashland—as large as a saucer.

After I had returned to eastern Oregon I visited the "Boneyard" at Fossil Lake and found some things that interested me. One was the ulna and radius of an arm. I do not know that they are human bones though I at first hoped they were. But unfortunately I allowed them to get broken. Horse bones were abundant and some camel, elephant, bird, fish, and turtles were to be found, though I think they are not so numerous as they once were.

From Silver Lake I went to Klamath Agency, and while there visited Crater Lake and in company with Capt. O. C. Applegate made a pedestrian tour around the lake. It required two days to complete the circuit. We felt, however, well paid for the trouble in being the first to undertake it, and in making some discoveries that were interesting and curious. I very well remember that we suffered much from thirst and were unable

to descend to the lake or to reach the roaring torrents that we could see gurgling from the rocks into the water below. I should like, *not from mere curiosity,* to know your opinion of the history of this singular mountain lake. I can hear enough that sounds poetic, but I cannot feel satisfied that it is real. I am in earnest to have some intelligent opinion on the subject.

Yours very respectfully,
F. M. ANDERSON.

Anderson soon became one of the most successful collectors for throwing light on the geological history of the Oregon and California Siskiyou region. Unfortunately, his valuable collection, which was placed in the California Academy of Sciences, was destroyed in the great fire of 1906. But it had previously furnished him with material for his valuable work on the "Cretaceous Deposits of the Pacific Coast."

Dr. Diller had also become interested in the Cretaceous and Eocene of Oregon and wrote this letter:

DEAR SIR: SEATTLE, WASH., May 5, 1892.

For some time I have been greatly interested in the relation of rocks of the Chico group to those immediately above and below it.

In southern California there is a complete transition from the Chico into the Tejon or Eocene. In northern California the Tejon or Eocene appears to be absent, so also in southern and eastern Oregon. Your researches, however, have shown that it occurs at Albany and Coos

Bay. Does the Chico occur in the same neighborhood so that their relative position can be determined?

In a few days I expect to leave Washington and go down through Oregon on my way to California. I would like very much to stop in Eugene and see your collections and talk with you about these matters. You are more familiar with the facts than any one else and for any assistance you may be able to render me I shall not only be very grateful but more than willing to give you complete credit.

If it will be convenient for you to show me your collection will you please write me at Portland, Oregon? I will call at the office in Portland.

Very sincerely yours,
J. S. DILLER.

EUGENE, OREGON, May 7, 1892.

DEAR SIR:

Yours from Seattle of the 5th is received. Your inquiries in regard to the relations of our Oregon Eocene interest me very much, and as I have other and later facts than those of Albany and Coos Bay which you mention, I want to talk over the whole matter in presence of the fossils, and anticipate much help in looking them over with you fresh as you are from Chico and Tejon. A new locality has opened itself to me on the Umpqua River with plain Eocene characters and abundant fossils but with a sudden jump into apparent Cretaceous that I did not appreciate until I got home and began studying my materials.

I shall be at home and more than glad to see you.

Very respectfully,
THOMAS CONDON.

CHAPTER XX

As a Teacher

During the first years the teaching force of the University was quite small, and as the other professors had their time well filled with Greek, Latin, and Mathematics, it fell to Mr. Condon's lot during these years to teach Geology, Paleontology, Mineralogy, Botany, Rhetoric, Guizot's History of Civilization, Physical Features of the Earth, Mental Philosophy, International Law, Constitution of the United States and Ethnology. But the breadth of his scholarly tastes was such that all of these studies had long been of deep interest to him and this made their teaching a pleasure.

One of the early students wrote: "To students in the University of Oregon, Professor Condon always held an enchanter's wand. Coming as we did from high schools and small educational centers, we knew a little of the knowledge found in books and learned from observation, but Professor Condon led us out into a new world. Every object in nature had its meaning, its history, easy to read and understand when interpreted by an earnest explorer in the realm of science. . . . . Students were indeed filled with awe and wonder

when shown the rare specimens of ancient life by the ever-interested and inspiring teacher."

True to his promise, Mr. Villard, after he had cancelled all University indebtedness, soon returned to Oregon and made a pleasant visit to the University, and later he gave $50,000 as a permanent endowment fund, and $1,000 worth of books for the Library.

The state then erected the second building on the campus, which was finished in 1885, with the appropriate name of Villard Hall. A large sunny room in the southwest corner of the new "Villard Hall" was assigned to Mr. Condon and this was the room which he enjoyed for so many years. The following extract from a letter written to one of his family shows his appreciation of the change:

EUGENE, November 30, 1886.

DEAR DAUGHTER:

Some time since, I had my attention called to a volume entitled "Natural Law in the Spiritual World" by Drummond. I borrowed it to examine and found it so entirely good that I at once sent for a copy that I might send it to you all in turn for your reading. Let me ask whether you have read it. If not I want to send it to you as soon as I can.

My work in college is much more pleasant than ever before. It is better defined, I am more independent and I enjoy it. You would appreciate a look into my room in the new building. The room is larger than my old

one. An outer line of twelve glass cases is set against the light sides of the room. These cases contain, in the order of their geological succession, fossils of the different periods. Inside this outer line is a line of tables covered by minerals, and inside this inner line there is a semi-circle of benches neat and positively comfortable for my classes. In the focus of this semi-circle is my chair and behind me a long line of blackboard. Altogether a fine furnishing for practical teaching. I still have use for all my boxes to hold materials for which I cannot spare glass cases or even tables.

Those who were once familiar with this room will recall that "the long line of blackboard" was soon covered with outline maps of North America and then the old Laurentian was filled in with a selected color of crayon. After it the Paleozoic was added with uniform colors in each map and as the class progressed in knowledge the colored crayons told the story of the geological growth of North America down to recent times. And, as these maps represented the evolution of North America, they were naturally of slow growth and every one learned to respect the simple request written in a bold hand upon the board, *"Please do not erase."*

Every one had a "parlor" in those days and a "sitting-room." In the sitting-room was the fireplace with its cheerful blaze or glowing coals, the easiest chairs, the magazines and papers, the fruit and flowers—the things that spoke of home

and family life. In the parlor was "the lounge," the whatnot, the *best* chairs, the old fashioned organ or piano. Everyone loved the sitting-room, and it was hard to keep a genial house-guest in the parlor.

Mr. Condon was fond of music and one of his daughters learned, if she went into the parlor in the early evening and played some of the dear old-fashioned melodies that he loved, he soon slipped into the room and threw himself down upon the couch to listen. She always rewarded his interest by playing for a time, and then would turn suddenly and speak a few words, only a few; for when the heart is full to overflowing with the real or imagined troubles of youth it is always hard to talk, to explain in words. Perhaps a few tears would fall but he understood and with penetrating insight gave not only sympathy, but advice and understanding wisdom until the cloud-like burden lifted and the sun shone on life again and youth went singing on its way.

Many of his University boys and girls perceived this unusual power of penetrating sympathy and understanding, and took their troubles to him.

Of course, the cabinet was all open with admiring young folks trooping in and out, and yet it was remarkable how little damage it suffered. One such case is related by a University girl who

"always registered in Professor Condon's classes, whether she cared particularly for the subject or not." She said: "It was my birth stone and I loved it. I didn't feel that I was doing wrong when I broke off a little piece of the beautiful specimen of amethyst and I took it home with me, but when I began to think, I was ashamed and very sorry. Finally I took my grief to Professor Condon and told him all about it. He saw my distress and comforted me as he always did and then gave me his amethyst."

He enjoyed discovering signs of worth and talent in the awkward bashful students and loved to help them unfold and grow in ability and confidence. Some of the wayward, reckless boys were also very dear to him and he yearned to help them. Of one of these he said: "For some reason I have a wild uncontrollable love for that boy."

William J. Roberts, an able engineer who graduated at the University of Oregon and then took post-graduate work in the Boston School of Technology, wrote:

> I knew him in the University as a teacher of science —my first teacher in what is now styled "the laboratory method." He taught me how to use the pencil and lens, how to consult authorities on pronunciation and definition, and lavishly gave of his time in counsel and suggestion for public debates. We loved him because he seemed to get closer to us than others of the faculty.

We were always sure of one friend and a wise counsellor when in trouble or need. His ideals were always so high and his motives and aims so free from any self-achievement that it was good to have been with him and know him.

One of the later presidents of the University, a Johns Hopkins man, laughingly remarked:

When the boys and girls first come from the high school they are so full of life that I scheme to have them enter a class in Prof. Condon's room as soon as possible; for he seems to have an unusual power of leading them into quiet, gentle conduct.

The following letter is from a young lady who entered the University from eastern Oregon and after finishing her freshman year went to Columbia University, New York. A few years later she wrote Professor Condon:

I will confess that I have forgotten many of the historic facts you told me in ethnology. But I never can lose the deeper spiritual lessons you taught so unconsciously—the patience and comprehensive kindness of one who had long before reached his mastership in knowledge—extended so graciously to one who was just beginning.

This year I received a B.S. degree from Columbia University and a diploma for teaching English from Teachers College. Next year I shall be in the English department (Public Schools) of Ashbury Park, New Jersey. Of course I shall not stay long. I think no true westerner can be satisfied in the east. I want you to

know that I have not forgotten my freshman work with you and I shall always be proud to remember that I was once your pupil.

He loved to trust his students but his sense of honor was very high and woe to the student that cheated. The remarks were few but very scathing and must have been remembered. His preparations for written examination in his crowded room were sometimes cause for thought. One day he looked into the clear blue eyes of a young man with the remark: "Ray, you have an honest face. You may sit over behind that case of specimens." Of course the class all laughed and Ray never quite outgrew his new title.

At the close of one of the school years Mr. Condon said:

I have thoroughly enjoyed those two divisions of my geology class. Some of them have been behind through sickness or carelessness or indolence and missed lectures. I would say: "Sampson, you are behind; name a day and hour when you can let me give you that lecture"—and to give a lecture all over again to one person on account of carelessness or indolence is not the usual way but it has paid, and I now feel at parting with them that I have in them all a large body of friends. And that to me is the highest reward of teaching—money is nowhere, compared to it.

When speaking before the University Assembly and faculty, Mr. Condon once said:

There is yet enough of leisure afforded to allow a large amount of freedom. There is enough of opportunity, where there is an inclination to carry it out, to enable each member of the faculty to get rid of the drudgery of teaching, and to substitute in its place—as God intended he should—the glory and the beauty of the fine art which will enable the teacher to leave impressions on the life of the student.

To a young teacher he said:

Don't forget the advice of the old darkie minister, and "Hang de fodder low, brudder. Hang de fodder low."

The following extract from a letter was written by J. B. Winstanley, one of Mr. Condon's choice friends among the University boys:

Of the many pleasant memories of the class-room there is one that stands out clearly, that is often recalled. It was near the close of a recitation and the subject had been lost sight of in Dr. Condon's earnestness to impress students with the tremendous import of certain definite developments of the animal forms that were being discussed. After the class had been dismissed, I had occasion to linger for a word or two—such times were worth all the rest of the period, because of the intimacy they afforded—and I was asked in all seriousness how I thought the class was receiving the idea of the evolution of those forms; whether it was taken kindly or whether it differed so radically from their old religious conceptions as to be iconoclastic.

"Is there danger that the students will misinterpret my effort to show them the immanence of God?"

There was such solicitude about the religious statements he made before his classes. The mechanical facts of the study were secondary, and beneath his dignified earnestness to awaken a respectful interest in one of the most entrancing chapters in Nature's book there was a deeper concern that the underlying truths should be shown in such perspective that the student could, in some measure, get their significance.

An Oregon student, after he had become a minister, said:

If I had gone to Harvard after graduating at Oregon, without Professor Condon's preparation on the subject of evolution, I believe I should have gone all to pieces.

Several volumes of different books of the New Testament were noticed in different parts of his University room and in explanation he said: "I like to have two or three of them scattered in my room—for nothing at all but for their fragrance." And yet, many good Christian people were afraid of his religious teaching because he was an evolutionist.

He said:

The Holy Spirit is a scientific necessity, a constant emission from the Being of God affecting human character, just as the sun affects the crude starch of an unripe peach, transforming it into sugar, and making the rich, luscious, perfected peach. The human brain has been gradually evolved to prepare it to receive these

rays of divine light and the human spiritual life is but the crowning of preparation.

Sin is being behind in God's plan of progress—being like the tiger and the hog, when God wants all human beings to leave the animal nature behind.

God wants, commands you to use your own judgment in the light of his twentieth century, to tell you what is right and beautiful and true. I believe in inspiration as a living force *now*.

Dr. Joseph Schafer has written:

Professor Condon is widely known as a scientist, but he was more than a scientist. He was by endowment a poet. His mental powers, uncommon in other respects, owed much of their splendid efficiency to that strong yet delicate imagination which lent a charm to all he did or said. It was nearly impossible for him to be commonplace, even for a moment. His utterances fell naturally into a unique form, gentle fancy investing with poetic atmosphere even the things of every day. "Come in," he would say to his friend, "when your cup is effervescing, and let us enjoy the overflow."

By living habitually in the higher reaches of thought, his sensitive nature took on more and more attributes suggesting the sublime. He impressed one as not merely a scholar and poet, but a seer.

One of the University presidents wrote of him:

Professor Condon belonged to that rare type of teacher who takes the promising student into his heart and gives him to drink from the well springs of his soul and enchains his interest through the imagination, the perception of immanent law, and the mystic power

of character over mind. Absolutely sincere, simple in life and manner, gentle and alluring in speech, Professor Condon was nevertheless one of the most courageous of men . . . .

No visitor to the University in the days when Professor Condon was in the vigor of his beautiful old age can forget the enthusiasm with which he would conduct one from case to case in that wonderful room where he kept his fossils and taught his classes, lecturing, explaining, glowing with joy over the beauty and the truth of science. It was a privilege never to be forgotten to hear him describe his collections. He would take up one specimen after another and handle them with all the tenderness of a mother caressing her child. . . .

He taught with power and fruitfulness. Oregon is populated with his students who perpetuate in their lives the spirit of his deep earnestness and love of truth.

CHAPTER XXI

Outside Expeditions to Eastern Oregon

After leaving The Dalles, Mr. Condon never returned to his old fossil fields of eastern Oregon. This must have been a real source of regret, especially as he was so often reminded of the past by letters received from various institutions asking advice as to the best way of preparing for a fossil hunt in the John Day Valley. But his time was too full of new duties and explorations, and he had no financial resources upon which to call for so expensive a trip, although he sometimes received fossils from collectors or old friends.

After the Yale parties under Professor Marsh of 1871 and '73, perhaps the first scientist to collect there was Professor Cope of Philadelphia through his assistant, C. H. Sternberg, in 1878; but in 1879 Cope himself collected at Fossil Lake and in the Crooked River country and undoubtedly in the John Day Valley.

In 1881 Professor Condon received the following letter from Captain Bendire, who, with his company of cavalry, was stationed at old Fort Walla Walla in Washington Territory. Of course, an army officer must be prepared for detail in any line from commanding his cavalry com-

pany in Indian wars to hunting bird's eggs in intervals of peace. If he is not prepared, it is part of his duty to his country to prepare himself as best he can and bravely tackle his new line of work.

FORT WALLA WALLA, W. T., May 22, 1881.

DEAR SIR:

I received a request a few days ago from Professor Spencer F. Baird, Secretary of the National Museum at Washington, asking me to visit the John Day region and make a collection of fossils for the above institution. I have in former years made miscellaneous collections for the museum and U. S. Fish Commission, and am moderately well posted in such matters, but must confess that I am totally ignorant in geology. I expect to leave here about the end of June, if I go at all on this expedition, and this will depend greatly on the information I can obtain in regard to the John Day region and the prospects of being able to make at least a tolerable collection.

I am well aware that the region has been thoroughly explored by yourself as well as Professors Marsh and Cope. The latter gentleman I know personally and I have often seen portions of his extensive collection at his home in Philadelphia, a little over a year ago.

What I should particularly like to know is first, the character of the country for camping purposes as I expect to take a portion of my company of cavalry along, some 15 men or so. Can I find good grazing, water, and wood within a mile or so of the fossil grounds? Are the fossil remains found in cliffs or exposed on the surface of the country or buried in drifts

of sand, etc.? What kind of tools and implements will be wanted to get them out with, enough for a working party of six or eight men? Can the localities be approached with wagons, or will it be necessary to depend on pack animals as well? Are there any settlements about the fossil region, where forage for animals can be obtained?

I take the liberty in asking you for this information, knowing that you are thoroughly posted about these matters; and assure you that I am doing this, if I go at all, simply in the interests of science and to help the National Museum, whose fossil collections are very small and poor, and that I derive no pecuniary benefits therefrom whatsoever. As I said before, this is entirely out of my line but I am willing to undertake it if I see a reasonable chance for success. I believe the Silver Lake region on the Oregon desert would probably furnish a newer and better field for exploration, but the distance is a little too great.

I shall be extremely obliged to you for any hints and information you can give me in this matter and in the hope of hearing soon from you, I remain,

Respectfully yours,
CHAS. BENDIRE,
Capt. 1st Cavl. U. S. Army.

In carrying out this plan, Captain Bendire spent some time in the John Day Valley in July and August, 1881, and in September gave Mr. Condon an interesting sketch of his trip. He wrote in part: "If I should go on a similar expedition again I am satisfied that I would do reasonably well. Everything has to be learned and fossil-

hunting is one of these things. . . . . I had two large six-mule wagons with me, or rather a six- and a four-mule team, and had considerable trouble to get them along over the poor roads. . . . . Everything looked different from what I had expected and I supposed it would be an easy matter to pick up a dozen or two heads any day from what I had heard. Well, I found the heads were few and far between. . . . . I went to the celebrated place called Fossil and here I expected to scoop the oreodons by the dozen according to report and after going over the entire slide with several of the citizens living about there an entire day we found nothing whatever. . . . . Finally on the North Fork I got most of my specimens. In fact, I got more in a few days than on the whole trip."

Although so modest in the report of his experiences, Captain Bendire's work was evidently satisfactory to Professor Baird, the secretary of the Smithsonian, for during the winter Captain Bendire wrote of a proposed geological trip for the following summer, to which Mr. Condon answered:

EUGENE, January 12, 1882.

DEAR SIR:

Your very kind note of the 30th ult. is received. It was very thoughtful of you to think of me in connection with Marsh's work on the Odontornithes. Many thanks

for this. Your thought that I might have received a copy was correct. Prof. Marsh kindly sent me a fine copy, which I prize very highly.

Your proposed plan of a trip next summer interests me very much, especially as it bears on the possibility of my being able to accompany you for at least the time of our school vacation. It would be a real treat to help you dig at Silver Lake for some more bird bones. The whole region over which you would travel would have for me a fresh interest. Botany, mineralogy, geology, and all, to say nothing of what I should learn from you about our birds of that wilderness.

I have wanted to go back to those fossil horse beds with some implements suitable to rake over the dust or perhaps plough over the harder portions of it. Your teams would enable you to try this and it might result in unearthing a new layer. I shall take the liberty to write you again on this subject if I find I may be able to go.

Respectfully,

THOMAS CONDON.

In the spring Mr. Condon received the following friendly letter:

FORT WALLA WALLA, W. T., May 16, 1882.

DEAR PROFESSOR:

I have just received notification that my company has been ordered to Ft. Klamath, Oregon. I shall probably get away from here about the 25th inst., certainly by June 1st. Will be glad to take care of you, if you will come up during the summer. As this change has been made at the request of Prof. Baird of the national museum, facilities will be given me to go out on exploring expeditions, unless Indian troubles should prevent it,

which is not likely to be the case; and I am reasonably certain that if you come up we can explore the fossil region pretty thoroughly in that vicinity to mutual advantage. Of course I shall be working in the interest of the national museum and must look out for their interest, but we will have no trouble about that, and the knowledge gained by your assistance will compensate for more than the specimens you may want for your share. Please drop me a line either to this place or Klamath.

Very truly,

CH. E. BENDIRE,
Captain First Cavl.

When Henry Villard visited the University of Oregon in 1881, one of the most distinguished men of his party was James Bryce, M. P., the great English statesman and historian. This letter was written from Portland a few days after he had spent a pleasant two hours at the University enjoying Mr. Condon's collection, and shows an earnest wish that Oxford University might have some of the Oregon fossils. We believe either Oxford or Cambridge did collect in the John Day Valley a few years later.

MY DEAR SIR:

When I had the pleasure of seeing you and looking at the very interesting geological collection in your museum at Eugene University, I wished to ask you, but in the hurry had no time to do so, if you would kindly let me have a copy of the catalogue of the remarkable fossils in the museum in case you had copies to spare; and

also if you would tell me whether the fossil remains of the various species of horse and Hipparion found in the Miocene and Pliocene strata of eastern Oregon have been found in such quantities that it would be possible to procure specimens for our University museum in Oxford. They are of such great interest to the scientific world that I hope you will excuse me for troubling you with this question. Congratulating you on your discoveries, I am, Faithfully yours,

J. BRYCE.

It is a pleasure to remember that this distinguished visitor was given a set of foot bones from Fossil Lake in eastern Oregon, representing the Early Pleistocene Horse who lived before the Glacial Period.

PRINCETON IN EASTERN OREGON

W. B. Scott, Princeton's great paleontologist, was collecting in the John Day Valley in 1888 as recorded in this letter and Mr. Condon's answer:

PRINCETON, N. J., November 4, 1889.

DEAR SIR:

On page 16 of Professor Cope's great work I find the following statement: "According to Professor Condon, the formation of Oregon, on the John Day River, rests unconformably on the laminated beds containing *Taxodium* (sic) and fish remains which may be an extension of the Amyzon shales." As Cope gives no reference, I venture to address you directly in this matter. Are the "laminated beds" here mentioned the

leaf beds which occur on Bridge Creek? I obtained a number of plants from this locality last summer, but unfortunately did not see the place myself.

As you may possibly have heard, my colleague, Professor Osborn, and I are engaged on a work upon American fossil mammals and we are therefore anxious to get accounts of all the collections which bear upon this work. I had hoped to be able to visit your collection last summer, but had to hurry home at the end of the season 1888.

Now from what I have heard of the treatment you have received at the hands of some eastern palæontologists, I infer that you would be unwilling to let any of your material leave your hands; but if you would kindly let me know of any unusually perfect specimens in your possession, we might, perhaps, get the necessary points from a series of photographs for which we should be very glad to assume the expense.

Leander Davis, who was with my party all summer, spoke to me of your having found some Dinotherium remains in Oregon. Isn't this a mistake?

Hoping that you will not find my questions troublesome, I remain, Very respectfully yours,

W. B. SCOTT.

To this letter Mr. Condon replied:

EUGENE, OREGON, November 12, 1889.

DEAR SIR:

Your favor of the 4th is received. Its inquiries I will attempt to answer in their order.

1st. The Taxodium beds of Bridge Creek. These leaf beds occur in two rounded knolls of laminated shallow-water sediment, protruding from the surface of

the surrounding deep-water, muddy sediment of the Oreodon Beds. The sediment that encloses the leaves is clear as if deposited at the mouth of a running stream and is plainly unconformable with the surrounding muddy Oreodon Beds. Many leaves are one to two feet across and plainly all forest trees. The leaves are so thick as to indicate that they alone cause the lamination. Taxodium leaves are numerous in this cinnamon-colored deposit, but there are other Taxodium localities a few miles distant both above and below this.

Perhaps I had better give you the scope of my John Day fossils and then suggest the limitations in my ability to help. . . .

You are right in your doubt of Mr. Davis' statement of my having a Dinotherium. I have not. My fossil plants from the John Day Valley are but few. I sent Dr. Newberry in exchange for Ohio specimens nearly all of mine and have not resupplied myself from that locality.

You are right in your suspicion that I should be unwilling to send mammalian material away. But if you will write me what of this inclosed list your scope of work would need, I will tell what I have in that particular part of the line with more minute care and to what extent I can help you. Respectfully,

THOMAS CONDON.

Then in 1899 a letter was received from J. C. Merriam of California University:

BERKELEY, CALIFORNIA, March 31, 1899.

DEAR SIR:

You will pardon me, I hope, if I trouble you to the extent of asking for some information, which I am very

much in need of in making preparation for the University expedition to the John Day region this summer. I will put my questions as directly as possible so that you can more easily answer them.

1st. I suppose the country through which we shall work is sparsely settled and that it would be more convenient for us to depend upon a camping outfit than upon hotels or ranches.

2nd. Are there moderately good roads through the country, so that we could take a wagon, or would it be necessary to use a pack train? I had thought we could use a two-horse wagon, and a saddle horse for each of the three members of the party.

3rd. Could you refer me to any one near Arlington or Heppner, or in that region, who could furnish me with a good wagon and about six horses (three driving and three riding)? If you could give me the address of such a person I would like to communicate with him as soon as possible regarding the expense of the outfit.

4th. Could you put me on the track of a reliable man to drive and cook for us? Or could you refer me to some one who could give me this last item of information?

Again, I hope you will pardon me for putting so many questions to you. My only excuse is that I desire to have as much information as possible before leaving here, in order that I may better mature my plans.

I hope to leave here for Oregon about the end of the first week in May and shall avail myself of your kind invitation to stop at Eugene and examine your collections and get information regarding fossil localities.

Very sincerely yours,

JOHN C. MERRIAM.

BERKELEY, CALIFORNIA, Aug. 14, 1899.

MY DEAR PROF. CONDON:

Could you give me a reference to the article in which Prof. Cope described *Mylodon* sodalis from the Silver Lake region of Oregon?

Our trip to the John Day fossil field this summer was a very satisfactory one and I brought back a good quantity of material. Among other things we have a complete Entelodon skull with lower jaw and a very good Anchitherium skull with lower jaw. We would have liked to stay longer but could not remain longer than the middle of July.

Very sincerely yours,
JOHN C. MERRIAM.

The next letter was from L. L. Davis, one of Mr. Condon's young field workers in the seventies, and shows that the University of Munich, Germany, was also collecting in eastern Oregon.

THE DALLES, OREGON, Dec. 17, 1900.

DEAR SIR:

I returned home last month from a long trip into the John Day and Crooked River fossil fields. I expect you know that I went out with the expedition from California under Dr. Merriam. We worked over the John Day beds pretty thoroughly until July 26th, when Dr. Merriam started for home after a very successful trip, he having secured about 14 good sized boxes of material for his University, and I got seven boxes of very good fossils for Prof. Von Zittel of Munich University, Germany. After Dr. Merriam started home, Mr. Osmand of his party and myself started from Burnt Ranch and

went up the river to Rowe Creek, where we found quite a lot of good fossils in some beds which the main party had not examined. From there we went over the mountains at old Camp Watson (just west of Spanish Gulch) to Crooked River and then across to Camp Creek at Logan Butte. We secured a fine lot of material in that region both from the John Day beds and from the Loup Fork or Pliocene; from there we went east to the head of Beaver Creek, where we found the Cretaceous formation. Here we secured the finest lot of shells I have ever collected. They were in a new locality but not very far from the old place where shells were first found. (I think you have some shells from there.) A very interesting feature of our discovery here was, that we found in a very hard sandstone on the same level as the top of the shell bed, some very nice specimens of leaves. From this last named place we went east again via the head of south fork of John Day and Silvies River to Canyon City, then down the valley to the Loup Fork Beds at Cottonwood, where we spent two or three days and were quite fortunate in securing about thirty good horse teeth, also quite a lot of other good teeth and bones, including nearly an entire skull of what we suppose is a camel. From there we made another trip into "The Cove," where we secured five good boxes. From there we started back to The Dalles and got here about November 10th, having spent six full months away from home.

Now I have written you a long letter, but I thought you would be interested in learning where our trips led us to and about what success we had. I shall go to the fossil fields again about April 1st if all is well. I should like very much to see you and have a talk with you

about the region we were in this year. There are a number of things I want to ask you about it. I shall try and come to Eugene and see you sometime this winter if I can get the money. If you should get to The Dalles any way soon, or before I send them off, you could see quite a lot of our specimens as I shall probably repack some of them anyhow. Sincerely yours,

L. L. DAVIS.

As seen from the Davis letter, the University of Munich, Germany, was collecting under the leadership of Von Zittel. Most of these institutions made one or possibly two excursions into the valley. But this first visit of Dr. Merriam in 1899 was the beginning of many collecting and exploring trips made by the University of California under Dr. Merriam's leadership and he has done a great deal to develop and systematize the geology of this famous fossil field.

Mr. Condon's teaching at the University called for a wider range of minerals and fossils than is usually found on our Pacific Coast, for the West is not rich in the record of the most ancient geological periods, which are well developed in the Middle West and on the Atlantic Coast. So exchanges were constantly going on for specimens from New England, New York, Pennsylvania, Ohio, Indiana, Illinois, Iowa, Kansas, etc.

One shipment of Cretaceous Shells from the Black Hills of South Dakota was the source of

great pleasure. Many of them were Cephalopods —"cousins" of the Chambered Nautilus—and were of real beauty. Irving Glen, one of the University professors, has written of their reception, with rare appreciation.

THE ROCKY MOUNTAIN NAUTILUS.

A lucky accident took me past Professor Condon's door at the time when the case containing the Rocky Mountain Nautilus had just arrived from the Black Hills, and the venerable professor invited me in to "help him hurrah," as he expressed it. But as the contents of the case were unpacked and specimen after specimen, in an almost perfect state of preservation, came into view, he forgot the presence of others, forgot everything except the beauty and wonder of the opalescent objects that glowed in his hands, or the possibilities that the unwrapped packages might contain; and as he hovered over his treasures, laying one carefully here, another lovingly there, whistling all the while softly into his beard a little comfortable tune that defies reproduction, I thought that I had never before seen such enthusiasm, such rapt absorption as this man had in his work. He straightened up once and a rare smile lighted his face as he came over to me, and laying his hand on my shoulder, said, as if in explanation, "Oh, the tune inside of me is too big for my whistle." He returned to his shells and I to my class room, realizing that the message from the Black Hills must indeed have been of rare eloquence so deeply to move the soul of this High Priest of nature. IRVING M. GLEN.

To simply mention J. L. Wortman as a col-

lector in the John Day Valley seems entirely inadequate to express the work of this native son of Oregon, who later became one of the few greatest paleontologists in the United States.

After his year at Oregon University he began as an assistant to C. H. Sternberg's party working for Cope in the Rocky Mountains, where their work was seriously hampered by Indian troubles during the Bannock War. Two years later Professor Cope placed Wortman at the head of a very successful expedition into the John Day Valley, and in the early eighties he worked in Idaho and in the Big Horn and Wind River Mountains of Wyoming. He then devoted some time to the intensive study of anatomy in a medical school. And in 1884, having been recommended by some of the best comparative anatomists in the United States, he was appointed anatomist in the Army Medical Museum in Washington, D. C. The duties of this position were peculiarly fitted to his line of study and gave him time and means for original research into the structure of vertebrates, both fossil and recent. Wortman soon became a scientific writer of distinction and in 1885 the University of Oregon granted him the degree of M.A.

In 1892 he began publishing, in cooperation with Henry Fairfield Osborn, in connection with the American Museum of Natural History, New

York, and in 1895 these publications were continued for several years under his own name.

Before the death of O. C. Marsh of Yale he requested Dr. Wortman to continue the work of studying and publishing a part of the great collection Marsh had assembled at the Peabody Museum at Yale College. In making this request, Professor Marsh had turned as one expert turns to another for help in finishing his own life-work which was very dear to him; and found no one he considered better fitted to carry on his work than Wortman.

That Dr. Wortman never forgot his Oregon teacher is shown by this letter written after the University of Oregon had conferred upon him his master's degree.

WASHINGTON, D. C., October 8, 1885.

MY DEAR PROF. CONDON:

To simply thank you for the interest you have manifested in my behalf in the matter of the degree, as well as the appreciation and kindly assurances you extend in commendation of my endeavors to gain a position in the higher reaches of biological study, would indeed be a faint expression of the debt of gratitude under which I find myself.

If my efforts are in the end to be crowned with success, I will always feel that no one will be entitled to a larger measure of credit for the same than yourself. Although some years have elapsed since I first began to think seriously of a career in this field and many new

experiences and facilities for a wider grasp of knowledge have come in my way, nevertheless memory often carries me back to the little class room where the first lessons were so vividly impressed upon my mind.

To your charming and attractive method of presenting the subject I owe probably more than anything else the impressions which afterwards led me to take it up for a life work. And permit me to say just here, that I have never found occasion to question or modify in all my subsequent study those broad principles which you inculcated in so simple and unaffected a manner.

Believe me then, my dear professor, when I say that I appreciate the honor the University of Oregon has conferred upon me and that it will be the burden of my endeavors to make myself worthy of the confidence so reposed.

I am, Most sincerely your friend,

J. L. WORTMAN.

CHAPTER XXII

Ancient Life in the Oregon Country

As we have seen, the fossils telling of the ancient vertebrate life of the Pacific Northwest are scattered through many educational institutions in the United States and Europe, and perhaps it will be of interest to mention a part of this rich fauna extending through that vast stretch of time from the close of the Eocene to modern times.

It is well known that the oldest mammals that lived in the Rocky Mountains were earlier and therefore more primitive than the oldest yet found in Oregon. Just why this is so still remains an unsolved problem. For many years Mr. Condon believed Oregon was detached from the Wasatch Country by intervening waters. Others believed that the Eocene Mammals did live on the Pacific Coast but for some reason their remains were not preserved or were too deeply covered by great lava flows. But fossil leaves from Oregon Eocene are exceptionally fine and speak of great forests of hardwood trees and conifers as well as palms and other semi-tropical verdure showing that vegetable food was here, in great abundance.

It is still true that our Pacific States have not yielded fossils of Eohippus, the oldest American

horse, nor the first rhinoceros, nor the first primitive camel, nor the first ancestors of wolves or tigers or of many other forms; for the life of the John Day Valley of the Upper Oligocene is simply a continuation, a next chapter of the Rocky Mountain record. But if one is interested in the most primitive horse and his associates, he naturally wishes to follow the fortunes of these old families through intervening time. And Oregon has one of the most complete records from the Upper Oligocene to the present, covering perhaps a period of two million years. It shows that some types have steadily progressed, that some have migrated, and some have fallen by the way.

DOGS

Among the earliest diverging types of the Rocky Mountain region we look in vain for true dogs or bears or cats or any other modern form of flesh-eating mammal. However, according to Dr. Wortman, there were three or four distinct lines of carnivores already established in the Middle Eocene, and by the time our John Day series began, the country was full of highly specialized flesh-eating mammals.

One of the largest collections of Oregon dogs was made by Professor Cope and is now owned by the American Museum of Natural History, New York. Dr. Osborn says in his "Age of Mam-

mals": "The Middle John Day gives the most remarkable assemblage of canids known in any formation in America."

Dr. Merriam has recently revised the list of Oregon carnivores and as a result we have eleven genera and eighteen or twenty species of wolves and foxes and other dog types that once lived in eastern Oregon. All except two of these genera lived before the great Columbia lava flood, and these two flourished in the period just following that igneous flow.

While some of these species still retained the long jaws of the Eocene type and had a full mouth of common generalized teeth, the more progressive types had shorter, more powerful jaws with some highly specialized teeth fitted only for the cutting and tearing of flesh. And while some continued to walk plantigrade like man and the bear, with the heel and five toes all pressed upon the ground, others had learned to increase their speed by running on fewer toes with the heel lifted high above the ground.

Valuable notes on these native dogs and their ancestors are given by Dr. Wortman in his "Studies of Eocene Mammals of the Marsh Collection."

Mr. Condon wrote of these dogs as follows:

> The writer once found in these lower beds the molar teeth of a fossil dog which were twice the size of those

of our largest Newfoundland, but the term dog as here used must be understood as covering a wide range of carnivorous animals such as wolves, jackals and foxes. It is said there were at this time, more than a dozen species of wolves living in our Shoshone Region. In fact eastern Oregon was very rich in animals belonging to both the dog and cat families. Many of them were described years ago by Professor Cope, Dr. Wortman, and others of the United States Geological Survey.

As Mr. Condon had experienced some long delays and other serious results in sending specimens away to be identified, he concluded to name two of these dogs at home and presented them at the Academy of Science of the University of Oregon. To one of these he gave the name Canis shoshonensis and to the other Canis rurestris. The following is from his paper at the time of presentation:

The first of these new fossils of which brief descriptions are given is the fragment of a skull of a dog containing four teeth, three of which are complete. This fossil is from Miocene rock of the North Fork of the John Day River. The teeth it contains are the right upper sectorial tooth, and the adjoining two tubercular molars. It is upon the characteristics of this fourth premolar, or sectional tooth, that the claim is laid of a new undescribed species.

As in all the Canidæ, the crown of this tooth is surmounted by three well-defined cusps. This crown is broadly triangular; the inner anterior angle is rounded to a broad base and this base is surmounted by a tuber-

cular cusp half the altitude of the main cusp of the tooth. It is upon the size, the altitude, and the out-of-the-line position of this third cusp that the claim of a new species is laid. In our living representatives of the dog family this tooth cusp is little better than rudimentary; in the fox it is better developed, but in our fossil, it is in both position and size a prominent feature of this portion of the jaw. For the animal to which this fossil belonged I propose the name—*Canis shoshonensis.*

The second of these fossils to which I would next ask your attention is a nearly complete head. It was taken from a light, porous rock, the deposit of a long narrow lake in the upper John Day Valley. The deposit belongs to the Pliocene period.* Nearly all the teeth except the incisors are in place and in fine condition. The size of the animal to which this belonged was that of an ordinary Spaniel, with broader face and shorter snout than those of our native dogs today. The features of this fossil upon which is based the claim of a new species, are: 1, A characteristic shortness of the anterior slope of the upper sectorial tooth, departing from the wedge-shaped cutting edge seen in the like tooth of the ordinary dog and developing a more tubercular form, and 2, the relative shortness of the whole head.

Our Coyote *(Canis latrans)* measures from the last molar to the upper canine, inclusive, 85 m.m. Our fossil measures, between the same points, 68 m.m. Of our wild dogs, the coyote most nearly matched our fossil in size. To indicate the fact that the animal to which this fossil belonged was indiginous to the shores of the Oregon Pliocene Lake, I propose for him the name of *Canis rurestris.*

* Now called Mascal Miocene.

It often happened in the early days of the study of paleontology that an animal would be given a Greek name by Professor Marsh of Yale and the same species would be honored by a second classical name by Cope of Philadelphia; so it was not at all strange that one of Mr. Condon's dogs was found to have received two names and as Temnocyon ferox was given first, the later name, Canis shoshonensis, automatically disappeared.

Of his second fossil, Mr. Condon once wrote as follows:

> This fine head of a dog was badly broken when taken from the rocks, but with a great deal of labor it was reconstructed. It is one of the few fossils the writer has ever attempted to name, but when the restoration was complete, it looked so dog-like that it seemed unwise to send it away from home to be named—a procedure that in other years had cost the writer many attractive fossils; so it was decided to find for it a name at home. And inasmuch as this dog could not go to the large cities of the world where the records of new species were kept it seemed fitting to treat him like a country cousin and call his name *Canis rurestris.*

Dr. Merriam saw *Canis rurestris* figured in Mr. Condon's "Two Islands" and wrote the following letter:

UNIVERSITY OF CALIFORNIA,
BERKELEY, March 26, 1903.

MY DEAR PROFESSOR CONDON:

I am just finishing a paper on the carnivora of the

John Day region and would like if possible to insert a description of the splendid dog specimen which you obtained in the white beds near Cottonwood. We have no good material of this form and I think it important to have all of the types figured and described together. If you could loan us this specimen for a short time I would prepare it carefully and describe it, giving you full credit. I believe you have named this species and I shall be glad to use the name which you have proposed. This specimen I refer to is figured in your book on the "Two Islands" on Plate 18, the larger figure. If you can send the specimen to us, would you kindly forward it by Wells-Fargo Express, collect, and I shall attend to the charges here.

Hoping you will be able to favor us, I am,

Very sincerely yours,

JOHN C. MERRIAM.

In answer Mr. Condon wrote as follows:

DEAR SIR:

I would gladly loan it to you for any examination and measurements that should leave its present form unbroken. To explain the importance I attach to this limitation: I found the Cottonwood material in this specimen was in all its loose, friable, ashy lightness, and both lower jaws broken off not only, but embedded out of place. I did my best in my attempt to replace them. Now, if your promise to prepare the specimen, means to take them apart again and put them together along the lines of their fracture for measurement, I would have to refuse my consent. Science had better indulge a guess or two than risk the ruin that might result. I mixed a good deal of glue and Cottonwood rock to build up the

structure to what it is. Let me know whether, with this restriction, your measurements would answer your purpose. Respectfully,

T. CONDON.

The granting of this request resulted in Canis rurestris spending a year at Berkeley. While there, Dr. Merriam found that it differed a little from the genus Canis and renamed it Tephrocyon, but retained the old specific name so that it came home with the title Tephrocyon rurestris Condon. By the skillful application of an electric machine, it had lost some of its superfluous rocky matrix and was indeed a fine specimen.

CATS

Professor Cope published a part of the record of Oregon's ancient flesh eaters as early as 1878 and '79 in the proceedings of the Philadelphia Academy of Sciences and in the American Naturalist. But if one wishes to delve into the original first publications of Oregon's native cats corresponding in a broad way to the lions and tigers of the old world he will do well to hunt up Cope's *big book* published by the U. S. Government Survey in 1884. Here he will find recorded from page 950 on, five genera and about ten species of fierce flesh eaters, some of them primitive saber-toothed tigers and all living in eastern Oregon before the great Columbia Lava Flow.

In revising this old record in 1906, Dr. J. C. Merriam retains the five genera, but slightly reduces the number of species. And after an able review of the whole subject says, "Much yet remains to be learned concerning the John Day cats as in most cases but little excepting the skull and dentition has been discovered."

BEARS

In 1916 Chester Stock and Clarence Moody of the University of California discovered the fossil remains of a Pliocene bear in the John Day Valley a few miles west of Dayville. Until this discovery there was but little evidence that bears had reached North America before the Early Pleistocene, so this Pliocene bear is perhaps the oldest member of the family yet found in the New World. It is even more interesting because Dr. Merriam has decided that it is so closely allied to a genus of bears described from the Pliocene of India that he provisionally places it in the same genus and calls it Indarctos oregonensis, showing that its immediate ancestors had walked all the way from Northern India to Oregon.

TAPIR

The lineage of the tapir, the rhinoceros, and the horse have virtually been traced back to a common ancestry. Many changes have come to

the first two of this group, but except in greatly increased size the tapir has changed but little. It still loves the quiet forests where its primitive teeth limit its food to browsing on the soft leaves and twigs. Its skeleton is still very much the same as it was in the Eocene of the Rocky Mountain country; so it has been called a "living fossil." It lived in North America much earlier than it did in Europe.

One of the first fossils that were sent east to be identified by Mr. Condon in 1870 was a fragment of a jaw containing two upper molar teeth. Dr. Leidy reported it to the Philadelphia Academy of Sciences as "an interesting specimen from Bridge Creek, that consists of a small fragment of an upper jaw containing two teeth, apparently of a tapiroid animal and probably the same as that indicated by a tooth from the Mauvaises Terres and referred to a species with the name of Lophiodon occidentalis. They may belong to a different genus from Lophiodon but their condition renders a positive determination uncertain." It seems that later, Dr. Leidy concluded that the Oregon specimen from Bridge Creek was entitled to be placed in a new species and in 1873 described it as Lophiodon oregonensis.

The next link in our knowledge of the tapir line in Oregon was Protapirus robustus, found by Dr. J. C. Merriam and his party in 1900 below

the Columbia basalt west of Spray post office in John Day Valley. "Three associated upper molar teeth of tapir have also been found three miles south of Cape Blanco on the Oregon Coast. This fossil was in late Pliocene or Early Pleistocene deposits and was near the living type of today."

RHINOCEROS

Dr. Osborn says: "The rhinoceros seems to have originated in neither Europe nor America but appeared in both regions simultaneously in the Upper Eocene or Lower Oligocene in a similar stage of evolution."

The three early types were the running Hyracodon, the aquatic Amynodon, and the true Lowland Rhinoceros. It seems that neither the runners nor the aquatic forms had horns and that the *early* lowland rhinos were also without horns. But by the time that Oregon became the home of the family both the aquatic and running types had passed away and many of the lowland group "were now armed with a transversely placed pair of horns on the end of the nasal bones."

These Diceratheres or two-horned rhinos were very common in Oregon and the hornless type were undoubtedly here also. Dr. Wortman, in looking over Professor Condon's collection in 1905, called attention to two very fine specimens of the hornless type which he called Aceratherium pacificum.

We have seen that rhinoceros bones were among the earliest fossils found in Oregon. In August, 1869, Mr. Condon wrote to Dr. Newberry: "A soldier found in the same place a fine piece of a jaw bone of a rhinoceros which I tried but failed to purchase." Some rhinoceros fossils were sent to Dr. Leidy in 1870, who reported them to the Philadelphia Academy of Sciences and from their proceedings in October 1870 we quote: "At least two species of rhinoceros are indicated from Bridge Creek Valley. One of these I think to be Rhinoceros occidentalis, and an isolated upper molar marked Alkali Flat clearly belongs to a different species and may perhaps pertain to the species R. hesperius. It is not improbable that the tooth may belong to a peculiar species, but the material thus far brought to our notice is insufficient to determine the question positively."

Dr. Hay of Smithsonian gives the following list of seven species of rhinos from Oregon, including those living in Upper Oligocene and later times; but the genera to which these seven species belong seem to be in some confusion: pacificum, annectens, armatum, hesperium, nanum, oregonensis, and truquianum.

The American rhinoceros continued through the Miocene into the Pliocene and one of the later forms, the Teleoceres, even showed a strong ten-

dency to brain development. Professor Marsh of Yale took a great interest in studying the relation between unusual brains in the early mammals and their long survival in the struggle for existence, but, as Osborn observes, "We shall find that even large cerebral development as in certain rhinoceroses (Teleoceres) and elephant (Mastodon) may fail to preserve a race." Judging from the heavy stupidity of the modern types, it seems certain that the rhinoceros with brains did not survive.

HORSE

Mathews and Chubb have written for the American Museum:* "The earliest known ancestors of the horse were small animals not larger than a domestic cat . . . . . and twelve stages have been recognized from as many successive formations, showing the gradual evolution of the race into its modern form. The Hyracotherium is the most primitive stage known but only the skull has been found, so that it has not been determined exactly what the feet were like. The only specimens which have been found were in the London Clay or Lower Eocene of England and are preserved in the British Museum. Eohippus is much better known. It comes from the Lower

* Guide Leaflet No. 36 of the American Museum of Natural History, by Mathews and Chubb, 1921. When quotation marks are used in the chapter on the fossil horse, this valuable publication is often the source of information.

Eocene of Wyoming and New Mexico. The fore foot of this animal has four complete toes. The hind foot has three complete toes and the splints of the first and fifth digits can still be detected in some species."

Oregon's record began in the Upper Oligocene when the horse had grown to be about as tall as a sheep and had lost his fourth toe. But at this time our Pacific Northwest was full of small, light-limbed, graceful, little three-toed horses with short-crowned browsing teeth, that made the rich forest growth a vital necessity for their existence.

In his valuable Equus Memoirs Osborn records nine species of horses now called Miohippus, all from Oregon, and at the head of the list he gives "Anchitherium Condoni, Leidy 1870, now Miohippus Condoni, Bridge Creek, Oregon."

Above the "Columbia Lava" we find no Miohippus; for an indefinitely long period had elapsed after the great lava floods before the lands of eastern Oregon and southeastern Washington were again ready for mammalian life. And when in the Middle Miocene, life had returned in even greater beauty and variety than before, we find that somewhere the horse family had continued the pursuit of its early ambitions and was not only far more numerous, but the old genera had passed away and all of its new types were more advanced.

One of these later forms was Hypohippus, found in Colorado and Oregon. It was about the size of a Shetland pony. Dr. Osborn has called it the "Three-toed Forest Horse" because "its wide flat hoofs and strong side toes enabled it to tread on soft ground and the teeth were fitted for browsing rather than grazing." And eastern Oregon at this time was extremely rich in forest growth.

Another genus of this mid-period was Parahippus, which is one of the first three-toed horses in which a coating of cement appears in the valleys of the teeth. "The side toes are very slender and no longer touch the ground." This genus was also represented by an earlier species before the "Columbia Lava."

But the most prominent type of this middle period of horse development in Oregon is Merychippus. "The permanent molars are intermediate in length of crown and quite heavily cemented. The side toes no longer reach the ground and in some species they are almost reduced to splints."

The last stage of three-toed horses is represented by three genera: Hipparion, Pliohippus, and Protohippus. The first two and probably Protohippus also were well represented in Oregon. "These three closely related genera represent the latest stage of three-toed horses, before the side toes were reduced to splints. The teeth are long

crowned, both milk and permanent teeth being heavily cemented, and the side toes are extremely slender. They first appear in the Upper Miocene, probably directly descended from Middle Miocene species of Merychippus."

This long list of fossil horses with three and four toes on each foot is now taken for granted but in the early seventies such specimens were almost unknown. Teeth had been found in the United States and a few detached foot bones that suggested more than one toe, but when Professor Marsh of Yale visited Oregon in 1871 or '73 and found in Mr. Condon's collection the foot of a three-toed horse, he was more than delighted, and borrowing a darning needle and strong cord he sat up very late sewing the tiny bones to a firm piece of pasteboard. It so appealed to his imagination that he even begged Mr. Condon to sell it to him for the collection at Yale College, but in vain. He said there was nothing like it in the United States except a cast made from a Hipparion foot found in France.

Professor Marsh called this new found treasure Hipparion, but it has recently been transferred to the kindred genus Merychippus.

It was probably some time in the late eighties that Mr. Condon received a letter from one of his old Dalles boys, W. R. Abrams, who had become a banker in Ellensburg, eastern Washing-

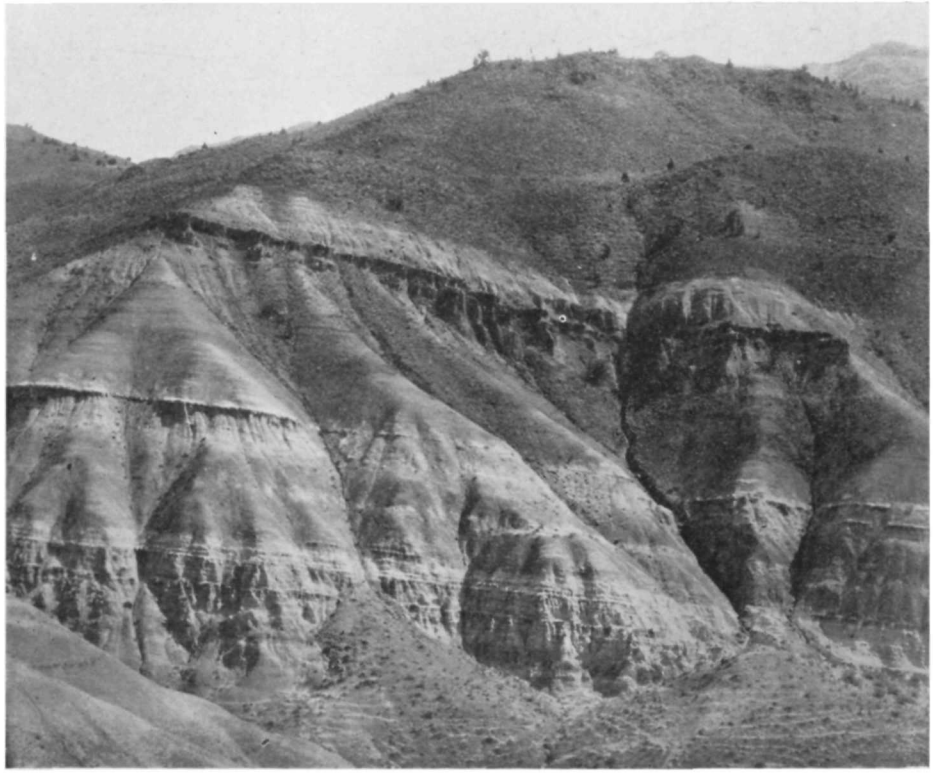
ton, and who wrote: "We are using stone from a nearby quarry for our new bank building and the other day some fossil teeth were found in the quarry stone. I am sending them to you. Are they not the teeth of a small three-toed horse?" And he was right; for they were called Protohippus, and later Hipparion, and now are listed as Hipparion Condoni. They were for many years the only fossil mammals found in the Ellensburg formation and when scientists began to study the geology of eastern Washington in earnest these fossils became an important factor in the determination of the geology of the region. It was in 1894 that Dr. J. S. Diller of the U. S. Geological Survey wrote the following letters:

UNITED STATES GEOLOGICAL SURVEY,
WASHINGTON, D. C., Dec. 18, 1894.

MY DEAR PROF. CONDON:

I write to ask of you a great favor, and I do it with some trepidation. However, it is in the interest of science, to which we are both so much attached, so that I feel sure you will do all you can to aid in the matter.

The fragment of a horse's head which you have in your collection from the stone quarry near Ellensburg, Yakima County, Washington, I am exceedingly anxious to have examined and compared with others here in Washington for definite specific determination. It seems very probable indeed that the careful specific determination of that fossil will throw a great deal of light on the age not only of the beds in which it was found but also



—Kindness of Dr. Stock and Dr. Buwalda

SHOWING THE MAMMAL BEARING JOHN DAY BEDS

of other beds on the Pacific Coast containing essentially the same flora. In the National Museum here there is a very considerable collection of fossils of that kind, and Mr. Lucas, the assistant curator, is well able to make the necessary comparison. This he has promised to do for me. When this is done, I shall, of course, be most happy to return to you completely all of the specimens which you sent me, together with any information that I may be able to obtain from Mr. Lucas concerning the fossil.

This fossil is of very special importance in that the age of the beds to which I refer can not be determined from plant fossils alone, and we need all the evidence that we can possibly obtain to throw light on the subject. I know of none that is more important than that which can be afforded by the fossil horse in question, and if you will trust me to bear the expense of transportation and safely return to you your fossil unharmed after the examination is made, I feel that you will be doing not only a special favor to myself but a very desirable act in the advancement of science.

With great respect, Very sincerely yours,

J. S. DILLER.

UNITED STATES GEOLOGICAL SURVEY,
WASHINGTON, D. C., Feb. 1, 1895.

DEAR PROF. CONDON:

I am just in receipt of your welcome letter of January 25, and have to thank you very much for sending to me the fossil horse from near Ellensburg, Washington. As you suggest, I think it would be a good plan to make a wider comparison of material, and if you will be kind enough to send the other fossils by express

at my expense, I shall be glad to do what I can to have them carefully compared and reported on and get the information into print so that it may be available for those who are interested in the geology of the west.

I wish you were in Washington to favor us with a lecture on a journey from Portland to Sacramento, a region with which you are so familiar. I have been called by the National Geographic Society to give them a brief talk on that subject, but feel that I am ill prepared for such a task as compared with one like yourself who has been amid those beautiful and attractive scenes for so many years, in fact so long that the grandeur of the scenery has grown into the character of the individual.

With great respect, Very sincerely yours,

J. S. DILLER.

Later Dr. Diller wrote as follows:

MY DEAR PROF. CONDON:

Sometime ago I showed to Mr. Lucas the horse teeth from the State of Washington, and during the meeting of the National Academy Mr. Lucas showed the teeth to Prof. Cope. Both Cope and Lucas agree, and as a result of their observations Mr. Lucas sent me the following statement:

"The right size and pattern of either Hippotherium speciosum or Hippotherium isosensum. The former has not been found so far in the Northwest, and the latter is said to be a common species. Both are upper Miocene."

Nineteen years later Dr. J. C. Merriam of Berkeley, California, became interested in the same fossils from Ellensburg and wrote as follows:

UNIVERSITY OF CALIFORNIA,
DEPARTMENT OF PALAEONTOLOGY,
BERKELEY, CALIFORNIA, Oct. 16, 1912.

MY DEAR MRS. MCCORNACK:

In connection with some of the work that I have been doing on the Tertiary mammals, it has become important to obtain some additional information relative to a horse specimen that was found a number of years ago in a formation at Ellensburg, Washington. I remember discussing this specimen with Professor Condon, but I have not been able to obtain any information as to its present location. Is it possible that this specimen is in the collection of the University of Oregon? Any information you can give me will be very gratefully received and will be of value in connection with this study.

With kindest regards, I am,

Very sincerely,
J. C. MERRIAM.

On October 29th Dr. Merriam wrote as follows:

I wish to thank you for your kind letter of recent date relative to the horse specimen from Ellensburg, Washington.

I am able to judge to some extent relative to the nature of this specimen from your description and from the drawing, but since the exact determination of the genus and species of this specimen is a matter of very considerable geological importance, I would like very much to see the specimen if for only a few days. Would it be possible for me to obtain the loan of the specimen for a stated time, say for two weeks? And I would ask if you would kindly present this request for me.

Early in November Dr. Merriam acknowledged the receipt of the specimen and later wrote as follows:

I have just finished a study of the horse specimen from Ellensburg which you very kindly sent down, and shall have the specimen returned to you sometime in the near future. I may want to compare it a little further with some other material from the Great Basin region. As this specimen has been discussed to some extent in literature and no figure has been published, I have a figure prepared to accompany the discussion of this specimen in my article.

I ought to say that the significance of the Ellensburg specimen relates to the age of the Ellensburg formation compared with the middle Miocene of the John Day region. The Ellensburg formation has been presumed to be of the same age as the Mascall formation of the middle Miocene age in the John Day region. The comparison has been based entirely on correlation by means of plant remains and on supposed stratigraphic relations. I have been making an extensive comparison of all the faunas of the formations in the Great Basin region, and have found that the only specimen from the Ellensburg beds was comprised in these horse teeth obtained by your father. These teeth have been referred to as *Hipparion* and *Hipparion* has also been referred to as occurring in the Mascall beds of the John Day region. I have recently been writing a paper on all of the *Hipparion* species west of the Rocky Mountain region, and in so doing have brought in question occurrences of *Hipparion* species in the Mascall. I have therefore naturally been very desirous of knowing

whether the specimen from Ellensburg was really *Hipparion* or whether it belonged to some other genus. While I have made the comparisons and sketches of the specimen, I desire to review the whole subject before making a final statement as to the real systematic position of the Ellensburg horse, but concerning this I shall write you as soon as my study of the whole field is completed.

Finally Dr. Merriam concluded that the Ellensburg horse was a new species of Hipparion and returned it to the University of Oregon as Hipparion Condoni.

CAMEL

Perhaps nothing on exhibition at the American Museum of Natural History, New York, appeals more to the amateur paleontologist than a delicate little skeleton fastened to the wall in its own small glass case, for it is the earliest type of camel in the Rocky Mountain region. It is much smaller than Eohippus with its cannon bone only two inches long and four distinct pointed hoofs on each foot, but with the outer toes shorter than the other two. This extremely small camel was Eohippus' greatest rival in the evolutionary race, and for a time the camel gained upon the horse and seemed to outstrip all rivals in advanced development.

The Oregon Country had no dainty camel the size of a domestic cat, for by the time the John Day beds were laid down the camel tribe had de-

veloped into a larger form, the Poebrotherium, which lived in Oregon below the great Columbia lava flow. "It was a little taller than a sheep but much lighter in proportion. It still had a full mouth of forty-four teeth and its upper molars were of the low crowned browsing type, although the lower molars were already slightly changing into grazing teeth. This small camel had only two pointed toes on each foot without a pad" but the two departing side toes were still represented by small nodules telling the story of foot evolution. Poebrotherium lived in Oregon in the Upper Oligocene.

The camel series was continued in the upper John Day Beds of Oregon by a larger primitive camel Miolabis and undoubtedly this type was followed by the true, browsing, giraffe camel, Alticamelus, who used his long neck to reach the tender herbage too high for ordinary animals. This giraffe camel was very characteristic of North America during the Early and Mid-Miocene and their remains have been found in the Oregon Pliocene.

Protolabis was another camel of the Mid-Miocene living not only in Oregon but, as Osborn says of them and other camels of their time: "Their wide geographic range in North America is most remarkable. They were certainly present in great herds and lent the most characteristic

aspect to the landscape." Protolabis was a rather small generalized type whose teeth were changing from browsing into the more advanced grazing line of camel. "Its feet had lost their side toes entirely and their hoofs indicate that they were partly buried in a small pad."

A little later in the Pliocene the camel family had not only spread all over the United States, but, wandering southward, they had discovered the newly elevated Isthmus of Panama and had crossed into South America, where they are still represented by the Llamas and Vacunas. Some also traveled northward and crossed the land bridge from Alaska into Asia, and so introduced the camel clan into the Old World, for this family is believed to have been native American stock. But they still flourished in the United States through the Pliocene and Early Pleistocene. They have been found in Walla Walla and Yakima Valleys in Washington and in The Dalles stone quarry just above the fossil leaves. Camels were very abundant in southeastern Oregon during the Early Pleistocene and by mutual agreement Wortman, Merriam, and Hay have accepted Dr. Leidy's old name, Camelops, to designate this line. Two species of Camelops lived in the Fossil Lake region—C. hesternus and C. vitakerianus named for the late ex-Governor Whiteaker, who found the exposed fossil quarry.

OREODONS

Oreodons first appeared in the Upper Eocene of the Rocky Mountain region. They were vegetable feeders with a full mouth of forty-four teeth, the grinding teeth being very low crowned and fitted only for browsing. It had five distinct toes on its fore feet but the fifth toe was soon lost and all later forms had four pointed toes on each foot. There were perhaps a dozen species of oreodon living in Oregon, ranging in size from that of a coyote to that of an elk, and their remains are so extremely common as to create the impression of large herds of these harmless and interesting creatures browsing along the streams and lake shores, or later grazing on the hillsides. One form was probably semi-aquatic in its habits, another, Agriochoerus (about the size of a small panther), developed sharp claws with which it climbed trees to browse on leaves and twigs. Still other forms, including Oreodon superbus, developed a short proboscis.

All of these oreodons are now extinct, leaving no direct descendents. There was a decided advance in the progress of their foot development and tooth structure, but their defensive armor seemed entirely inadequate to cope with the rapidly increasing dangers from the powerful flesh eaters around them.

They neither developed destructive teeth nor horns nor great speed and not even brain power to defend themselves, and so became an easy prey to wolves, tigers, and entelodonts. The oreodon is an exclusively North American family and Dr. Leidy, who first studied and named them, called them "Ruminating Hogs." They have also been spoken of as a comprehensive type having some characteristics of the hog, others of the deer, and some of the camel line.

PECCARIES

Peccaries have been called American swine, although they are believed to have branched off from the true swine in the Eocene.

A large group of primitive peccaries lived in Oregon in the Upper Oligocene with the rhinoceros, entelodonts, and camels. The many different species were once divided among two or three different genera by Leidy, Marsh, and Cope, but Sinclair and others have decided that they all belong to one genus, and as Sinclair finds eight species of Thinohyus, the peccaries must have been a common sight in this old Oregon fauna.

We next find peccaries represented in the Mid-Miocene of John Day Valley by the genus Platygonus, which continued through the Pliocene and was later represented by two species in Fossil Lake region of eastern Oregon. It may have

been glacial cold that finally caused them to migrate to the South.

ENTELODONTS

Entelodonts appeared in the United States in the Early Eocene and after continuing through the Oligocene into the Miocene they disappeared, leaving no direct descendents. Dr. Leidy reported two species sent to the Smithsonian by Mr. Condon in 1870. He says: "Fragments of a canine tooth in the collection indicate apparently a huge species of Elotherium (Entelodont) perhaps E. superbum. Another mutilated canine apparently belongs to a smaller species, perhaps E. ingens." Entelodont imperator has been found in Oregon and the massive, slow-moving Boöchoerus also represented his family type in the John Day beds. The largest of the race Dinohyus may have lived in Oregon, although not yet reported. Dr. Mathews' writing for Natural History says: "Dinohyus is the largest of the entelodonts. These extinct animals are commonly called giant pigs, although they were not related to the pigs any more closely than to the ruminants. They were rather small, but compactly proportioned, with two-toed feet like a bison's, very large heads with long muzzles and large, powerful tusks. The tusks and indeed all the front teeth are much more like those of wolves or other large carnivores than

like those of any living herbivora, while the back teeth are of omniverous type. These formidable beasts were probably omniverous like the pigs and bears, but better equipped than either to pursue and attack animal prey. Dinohyus was somewhat larger than a modern bison, but its huge head, with its long jaws and powerful, wolf-like teeth, suggests a fierce, aggressive beast, as active as a bison and more savage than a wild boar."

SLOTHS

A few years ago it was believed that the great ground sloths had all migrated north from South America in late geological times. But recently their fossil remains have been found in the Mid-Miocene of the John Day Valley in Oregon, in the Miocene of Vera Cruz, California, and in the Lower Pliocene of Florida, thus proving that they were old residents of the United States. But it still seems true that there was a great invasion of modern forms of these animals crossing from South America in later times. They were represented at Fossil Lake in southeastern Oregon and in the John Day Valley Pleistocene and also in the Willamette Valley. They were evidently more common in California where three or four genera have been discovered in Samwell and Potter Creek Caves of Shasta County and Hawver Cave further to the south; but the finest specimens

have come from the Rancho La Brea or the Tar Pits of Los Angeles.

These sloths were harmless vegetable feeders, some of them as large as a grizzly bear. They were slow moving and clumsy, with "large and powerful claws used for digging and scratching for food," and like their distant relatives, the armadillos, they also had a protective armor, for "the outer side of the skin was covered with long coarse hair, while the inner side contained, embedded in it, a great many small pebble-like bones." This bony armor was very difficult to penetrate except for the long sword-like canine teeth of the saber-toothed tiger.

Proof of this armor has come from a cave in Patagonia and from the Los Angeles Tar Pits. In Patagonia some of the coarse hair was preserved on the outer side of the skin in which the small bones were embedded.

CHAPTER XXIII

The Blue Mountains—The Siskiyou Mountains —The Willamette Valley, Yaquina

While Mr. Condon was doing his early work in the John Day Valley, the Tertiary forests and mammalian life were of such absorbing interest that he had no time to explore the great group of surrounding mountains. He saw that the Cretaceous seabeach formed an inside border against the distant sweep of these mountains which he thought of as pre-Cretaceous. But little by little light was thrown on this old pre-Cretaceous land; first by a group of fossil sea-shells found by Mr. Day west of Canyon City, which are referred to in the following letter from Dr. Diller:

WASHINGTON, D. C., Feb. 20, 1894.

DEAR SIR:

By this mail I send you a package containing the fossils which you kindly loaned me from the Blue Mountains. Prof. Hyatt has kindly labeled them so that they will be a valuable addition to your collection. The three small specimens which you agreed to give him in exchange I have sent to him with the request that he send the exchange directly to you.

By this mail I send you also a copy of a paper of mine in which I refer to the fossils for the first time, on page 221.

I am greatly obliged to you for kindly loaning me the fossils to fix firmly this new locality for Jurassic rocks. They are of much importance in working out the history of our continent and promise a rich field for the paleontologist. Very sincerely yours,

J. S. DILLER.

Then Huntington of Baker wrote:

BAKER CITY, OREGON, March 17, 1900.

MY DEAR MR. CONDON:

Your very kind letter is at hand. I shall try to get you another package of the fossils. I have marked with pencil on the map "Red Butte," where the fossils exist. It is some twenty-five miles north of Burns, in Harney County. There is not much to be said of the country surrounding this place, the greater part of the formation being shale and lava, but one of these buttes looks like a small crater on top, the gravel being in a burned condition and numerous pieces of what look like iron slag or iron shot from the size of buck shot to that of goose eggs. The hill is called Red Butte. East of this, say one-fourth mile, the lime crops out in which the fossil is found.

No one has ever dug to see what or how many different kinds might be found. How I wish you could take a trip out there for I am sure you would enjoy the sights.

Now, Mr. Condon, I did not want you to send any money, but since you have done so I will put it to the best use I know how to help out your interesting work. I sometimes think I might have made a good geological student as I love to study the rocks and have wished so many times that I could have you handy, to question.

If the fossil I sent you is of special interest or new, I will make a trip over there and go prepared to get a good lot of them.

Hoping to hear from you soon again, I will close.

I am, Yours sincerely,

A. H. HUNTINGTON.

Professor Condon writes to Dr. Diller:

You will remember the small group of Jura-Trias specimens from a point west of Canyon City in the Blue Mountain region whose geological place you so kindly secured for me. I have lately got trace of another locality of the same fossils twenty-five miles north of Burns in Harney County. Have sent for and obtained a nice parcel of the fossils which I will be glad to show you here when you come to your field work.

The Huntington fossils were simply from an extension of an old Jurassic seabeach.

Then a group of Carboniferous Productus shells were sent from Baker County. And finally, in the autumn of 1901, a young surveyor, Mr. Campbell, brought from near Wallowa Lake a group of Triassic fossils—Halobia, found 8,000 feet above sea level. This was a most valuable addition to the slowly accumulating knowledge of the Blue Mountains or Shoshone Region.

About 1900 the U. S. Geological Survey asked Waldemar Lindgren to study the Blue Mountains with particular reference to the gold and copper found there, and the result of his work was pub-

lished in 1902 in a valuable bulletin entitled "The Gold Belt of the Blue Mountains of Oregon." Lindgren evidently discovered the Triassic Halobias before Campbell found them. They are referred to in the following letter:

WASHINGTON, D. C., Feb. 25, 1901.

DEAR SIR:

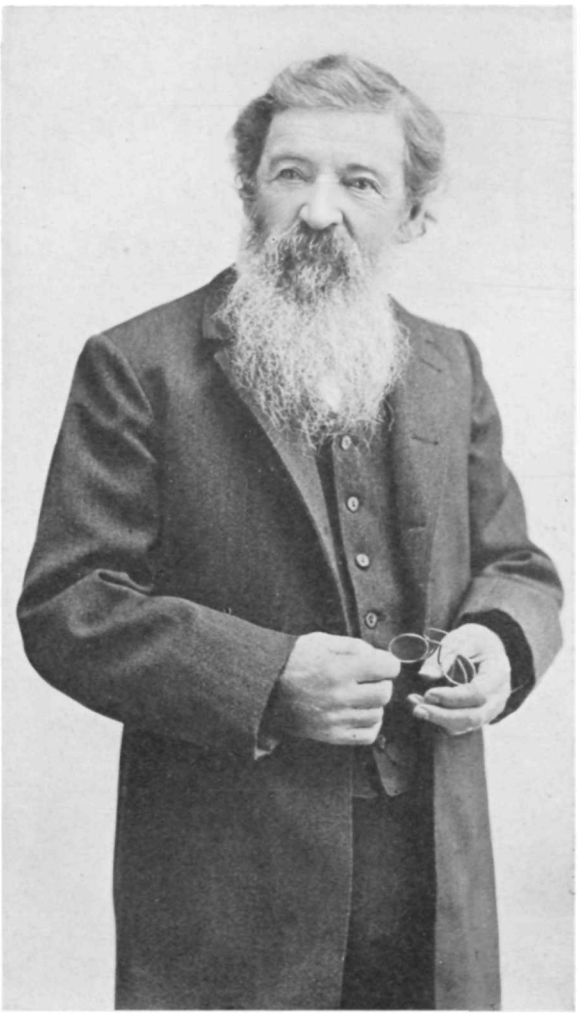
Your letter of February 16th at hand. I regret very much to say that I do not expect to pursue any field work in Oregon during the coming season, and that it will not be possible for me to give employment to your friend. My work will be in the southwestern states, and I shall only have use for one trained assistant. I have spoken to Mr. Diller of this, and hope he will be able to find a place for him in another field party.

Having been very much interested in your previous work as a pioneer in the geology of Oregon, I was glad, last summer, to be able to add a little, by the discovery of Messozoic fossils in the northeastern part of your state. The Eagle Creek Mountains, as well as corresponding rocks on Snake River, appear to largely consist of Triassic sediments and the fossils, though scant, corroborate this view. Unfortunately, I did not find time to visit the Crooked River section where you had previously found so many interesting fossils.

I remain, With sincerest regards,

W. LINDGREN.

The same slow process had been going on as to knowledge of the Siskiyou Mountains. In 1889 Mr. Condon wrote of the geology of southwestern Oregon:



THOMAS CONDON AT 80 YEARS OF AGE

GEOLOGY OF SOUTHWESTERN OREGON.

This division is one of mountain ranges whose center and dominating feature is outlined by the Siskiyou Mountains. It is not only an elevated mountain region but is built up of some of the oldest rocks in Oregon. The present outline of the Siskiyou Mountains emerged from mid-ocean while Europe was yet in its infancy. The northern slope was drained as that region is now, making Rogue River the oldest river in Oregon.

Among the older rocks of the Siskiyous are granites and marbles of fine quality and the marble in great abundance. Perhaps nowhere else on the western coast is there such a rich supply of limestone and marble as this of the northern slope of the Siskiyou Mountains.

A still later portion of the history of the region is represented by the dark-colored metamorphic rock from whose quartz veins the gold of southern Oregon was derived.

Later yet the whole Siskiyou region had its sea-beach of sandstone that remains to this day unchanged; this was the sand beach during the Cretaceous or Chalk period. The sea-shells are as abundant and as beautiful as those of recent times.

This knowledge was soon increased by the personal work of F. M. Anderson and other friends, but when the U. S. Geological Survey took the field under Dr. Diller's leadership, his careful systematic work soon resulted in a steady stream of light, and several valuable bulletins were published, including his work in the Siskiyou Mountains and western Oregon.

To find Productus sea-shells in the highlands near Baker and the Triassic Halobia sea-shells cropping out in the Eagle Creek Mountains near Wallowa Lake at an elevation of 8,000 feet above the sea, proved that there had been a great upheaval in the Pacific Ocean where the Blue Mountains now stand, and a continuation of this violence had brought with it the molten gold and copper that filled the crevices and cracks with veins of wealth.

But to find these conditions repeated in the Siskiyou Mountains with the same old sea-shells, the same minerals, the same precious metals was an added revelation that made a deep impression on the mind of Mr. Condon; and the long process of evolution which followed this great upthrust of nature seemed to him to radiate from these two early centers of Oregon's life and growth. He knew that the ocean flowed over much of eastern Oregon during the Cretaceous period and that a Cretaceous sea-beach encompassed part of the Blue Mountains, and he believed this beach was continuous around the older lands of the Blue Mountains, just as it was in the Siskiyou region. So he called his book published in 1902 "The Two Islands" and wove around these ancient lands the story of Oregon's geology.

Some chapters of this book had been written many years before. "The Rocks of the John Day

Valley" was published in the Overland Monthly in May, 1871, but Mr. Condon wished it to be incorporated in "The Two Islands" just as it was, for it was a historic document showing what he had believed to be true in 1871. And he said: "Others would criticise and revise it in the years to come."

The writer believes that "The Two Islands" and its later edition, "Oregon Geology," should be read by scientific readers in close connection with the old letters written by Mr. Condon in the '60's and '70's to Dr. Newberry of Columbia, to O. C. Marsh of Yale, to Cope of Philadelphia, to the Smithsonian and other scientists regarding his discoveries in this new and important field. For in the author's preface he wrote as follows:

PREFACE BY THE AUTHOR.

The want which these pages attempt to supply is a popular rather than a scientific one.

For years our general government has been publishing, through railroad surveys and the annual reports of the United States Geological Surveys, a large mass and wide range of geological information on the structure and history of our Western Coast. But this large body of information is so scattered that few have the time to collect enough of it to form a continuous unity of its history. Besides, there are many things in the geology of Oregon of lively interest to the young and the uninstructed, and running through them all are threads of a continuous unity that seems capable of a

possible narrative form such as might increase the interest of the young.

An attempt to meet this double want, not with a fresh contribution to science, but with an attempt at picture-making for the uninstructed, has led to the writing of these pages. THOMAS CONDON,
University of Oregon, Eugene.

It will be seen that a great deal of Mr. Condon's original research was being carefully studied and criticised by experts.

It was particularly gratifying that Dr. Diller approved Mr. Condon's classic paper entitled "The Willamette Sound," which was a favorite child of his early explorations, published in 1871.

In connection with his review of this paper, Dr. Diller writes:*

It gives me much pleasure to call attention in this place to the work of Professor Thomas Condon, the veteran geologist of the Northwest . . . who has contributed more than any other man to what is known of the geology of that state. He has traced the Pleistocene deposits from the mouth of the Columbia not only north to beyond Shoalwater Bay (now Willapa Bay), but also eastward far up the Columbia and into the Willamette Valley, where he named the water body in which these sediments were laid down "Willamette Sound."

Dr. Diller's chief criticism on this paper was that Professor Condon's estimate of the water

* A Geological Reconnaissance of Northwest Oregon. Pp. 44-45. 1896.

over Portland was probably too conservative, for he writes:

> Judging from the height of the terraces on the Columbia near the mouth of the Deschutes, he estimated the depth of the water over the place where the City of Portland now stands to have been 325 feet. . . . If this material on Portland Heights was deposited in the Willamette Sound of Condon, as *appears* to be the case, the depth of the water at Portland must have been not less than 600 feet.

And early in the same year Dr. Diller wrote Professor Condon as follows:

> WASHINGTON, D. C., January 18, 1896.
>
> DEAR PROF. CONDON:
>
> Great was my joy this morning in looking after some other matters to find in the Overland Monthly for November, 1871, your excellent paper on "The Willamette Sound." It is a real treasure especially acceptable to me at this time and I shall take great pleasure in quoting from it in my report. My only regret is that you have not written many more, and my hope is that you may yet be spared many a day to complete the work you have in hand. Very cordially yours,
>
> J. S. DILLER.

We have seen that when visiting the Southern Oregon Coast at Cape Blanco and at Bandon, Mr. Condon found old beaches with stratified deposits containing fossil clams or other life similar in species to those living today. At Cape Blanco the elevated beach was 210 feet above tide water. In

1877 he had found similar elevated beaches at Yaquina Bay and all of these must have recalled his earlier research in 1871 at the mouth of the Columbia River and at Wallapa Bay on the southern coast of Washington, for he had then written: "That every inlet on our northern coast has its group of facts of like import, there can be no doubt."

But after "The Willamette Sound" was written, the fossils found in the valley continued to accumulate in numbers and variety until the fauna included the great ground Sloth Megalonyx or Mylodon, an extinct bison, and three species of horse which Dr. Hay of the Smithsonian calls Equus laurentius, E. pacificus, and E. occidentalis. Mastodon americanum was also at home in the Willamette Valley and the fossils of Elephas columbi are very numerous.

The story of the Willamette Sound was also enriched by the finding of many erratic boulders scattered throughout the valley. In writing of some of these in 1883 Mr. Condon said: "They suggest an iceberg journey from some northern shore."

But as the years passed, most of his time and strength were given to his teaching at the University, while his summer vacations were spent with his family at his Nye Brook cottage by the sea.

Here his life was almost unique, but it again

brought him into the most friendly relations with many classes of people from all parts of the Northwest. Sometimes there were formal lectures before a Summer School, but more often there was an informal announcement that "Professor Condon would lecture on the beach," perhaps near Jump-off Joe; and here his audience would gather around him in the shelter of the bluff or headland, some standing, some sitting on the rocks, others perched upon the piles of weather-bleached drift-wood, while the children sat turk-fashion upon the dry glistening sand. And he, with his tall alpine stalk in his hand, his broad hat, and loose raglan coat, made a picturesque figure standing in their midst. Perhaps he talked of the three beaches, the one upon which they stood and the two old geological beaches so plainly visible in the ocean bluff behind them. The banker, the college president, the physician from a distant part of the state, the young city clerk, the carpenter, the teacher of the country school, the farmer and his family taking an outing by the sea, even the high school boy, and the children, all listened with interest. And when the talk was over and all their questions had been answered, the motley gathering strolled leisurely away. But the rolling breakers at their feet, the hurrying scud and blue summer sky, all had a new significance as they pondered on the mystery of creation.

Or perhaps a geological picnic was planned up the beach to Otter Rocks. After a brisk ride of a few miles over the hills and along the beach, Mr. Condon's carriage would stop, the other vehicles would group themselves around nearby, and standing in his conveyance, he would give a short talk on the geological formation of the particular cove or headland with its base of old sandstone full of fossil shells. Then the company would move on, and after a few miles of delightful beach ride upon the hard sand near the breakers, they would leave their carriages, gather their picks, hammers and chisels and spend an hour chipping fossils from the bluff or from the large boulders at its base. The next stop would be to lunch near Otter Rocks and explore the unique Devil's Caldron or Punchbowl and the interesting beach beyond.

But the most common picture, the one that has made the Condon cottage at Nye Brook a spot of pleasant memories, were the parties strolling homeward from a morning on the beach—especially at low tide. They always stopped beside the cottage door to show their treasures to Mr. Condon. There were baskets, and tin pails, and all sorts of packages filled with curios gathered on the morning walk; one had a rare shellfish, another an unusual fossil, some had sea moss, others only a group of bright pebbles, while a

few proudly exhibited their water agates. All had their eager questions and his kindly helpful interest never failed; for if a small child but left his cottage door with eyes large and shining with a new joy, because it had caught a glimpse of the beauty of knowledge, he was content.

In September, 1901, a great sorrow had come to him in the death of Mrs. Condon, who had been his beloved companion for almost fifty years. It was written of her:

> She was one of earth's noble women. The beautiful qualities of heart and mind, the sweet simplicity and tender modesty of her character endeared her to all who knew her well; yet, blended with these gentler attributes were the readiness to use her strength and voice in opposing wrong and the superb moral courage in defense of the right. A true woman of the hearth and home, impressive in moral integrity, saint-like devotion to truth and sterling Christian worth, her influence is far reaching and the world is better in that she lived and the memory of her pure life is an inspiration to the friends who loved her.

And Mr. Condon, in his great sorrow, exclaimed: "The light of my life has gone out."

CHAPTER XXIV

Birthdays—His Love for Knowledge

One of the earlier celebrations of Mr. Condon's birthday was when he was 78 years of age and was honored by a special assembly at the University. The faculty then presented him with a fine Morris chair of oak, and the students' gift was a beautiful gold-inlaid ornamental ink stand.

The one chosen to make the presentation speech for the students was Clifton Nesmith McArthur, affectionately known as "Pat." This was the same C. N. McArthur who in later years so ably represented the State of Oregon in Congress.

A few years later one of Professor Condon's children wrote:

Yesterday was father's 82nd birthday. He went to the University twice as usual and received many calls there and at home from professors and students and friends. A written message from the Junior Class was brought to the house before eight o'clock in the morning, and the Senior Class gave him a bouquet of messages, each written on a separate card and tied with their class colors. There were also many flowers and other tokens of love and affection.

This morning in speaking of his sight he said:

"The cross-lines that produced double vision are all gone. The branch of the tree is only one branch. When

I see two people walking together on the street they are just two, not four. And I haven't a bit of rheumatism." And he began whistling Juanita softly to himself. His grandson, Hall Bean, came over and pumped up his tricycle and he went off to the University as easily as a man of sixty.

He appreciated and enjoyed the many tokens of affection from his students and at one time exclaimed: "There is something perfectly grand in having such a halo of friendship among the young people."

In 1906 Mr. Condon received this letter from a young minister who had filled a pulpit in Oregon and then was called back to a church in the East:

MY DEAR FRIEND:

During the past few days you have been much in my thoughts as you have been since we parted one Sunday evening at Eugene. It does not seem three years past since then. I congratulate you on the passage of your 84th birthday and I doubt not that the occasion was as enjoyable as was your 80th which I well remember.

While you are still within hearing I want to tell you again how much we all love you, for I believe we should give our flowers this side of Jordan when people can appreciate whatever fragrance they may have. I still look back on the little town between the hills as my theological seminary and count you my master. "For still at the prophet's feet the nations sit." It was not so much things that I learned there; but it was the new viewpoint, vision, poise of mind that came to me that I shall ever be thankful for.

We are on the eve of building a new meeting house here and in the midst of much work. But within one's soul there still flows the Willamette with its far-off vistas of glory and there also are the everlasting hills.

Mr. Condon's love for knowledge was not confined to natural science, for his interests were broad as the universe. To him, human history began with the men of pre-glacial age, and he sought eagerly for every ray of light that archeological research could throw upon the old cave-dwellers of prehistoric times. He studied all primitive peoples, their religion, industries, and social development, and endeavored to trace their relationship to common ancestry.

There were but few obscure nations of the world in which he was not deeply interested; he knew their past history, their present political condition and struggle for liberty. He prized the history of our Aryan ancestors and treasured their old Vedic hymns as among the first bright glimpses of the human soul in reaching out for its Creator. The religion, art, and literature of the Egyptians, Arabians, Persians, and Greeks were to him a source of great pleasure. He followed the lives of noted statesmen and was most enthusiastic in his admiration for the world's true heroes. All great religious movements, including the Higher Criticism and the relation of science to religion were matters of absorbing interest.

And yet there were but few who knew and loved Oregon's trees, shrubs, and wild flowers so well as he.

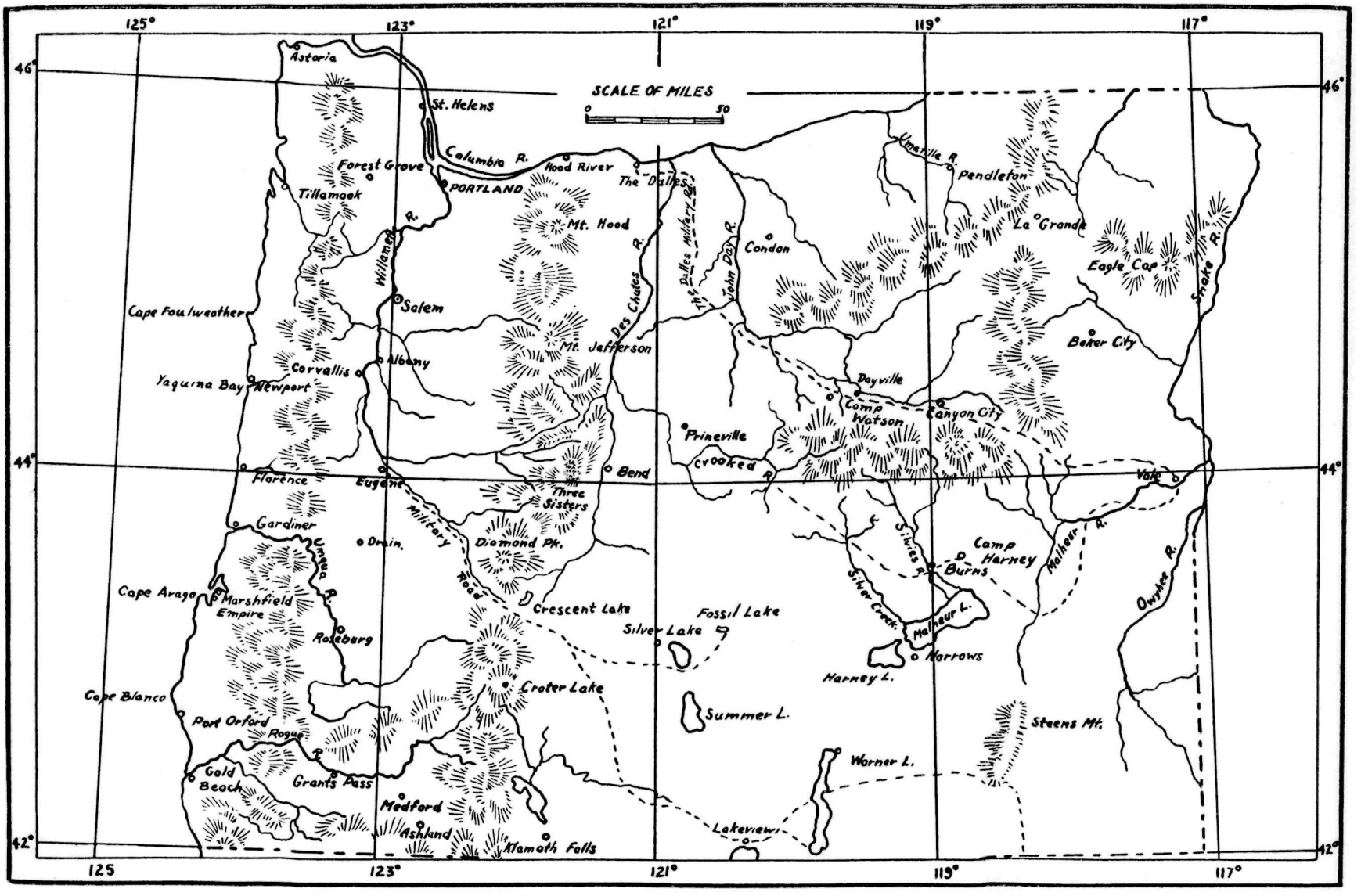
No, Mr. Condon was not a specialist, either by nature, inclination, or education. And it was well for the early development of Oregon that he was a true pioneer with a large appetite for all knowledge, a keen pleasure in imparting that knowledge to others, and a broad, sympathetic outlook into the needs of the Northwest. If he had been a specialist he might have received more technical credit in the scientific world, for he discovered many new fossils and named but few. But what is the naming of a few fossils more or less, when compared with the grandeur of such a broad sweep of knowledge permeated by such a beautiful spirit of helpfulness?

The pioneer work in this new and unexplored state, so remote from the great centers of learning, required just his type of mind; just his habit of first sketching in the broad outlines and then filling in the details with all their picturesque beauty. For as the artist works, he worked: A colleague who wrought by his side has said of him, that instead of beginning with the minute details and progressing toward the large facts of life, he always began with the broad outlines, the great principles of any subject, and worked down to its details.

After this active, eager life had passed and failing health gave him ample time for retrospective meditation, he realized that he had lived through a grand period of pioneer history and remarked as he looked forward into the future in store for the rising generation: "I do not know that I would exchange the rich chapters of my own life for all the future opportunities of these young men."

For he was the pioneer geologist who, by his own original research, caught a first glimpse of Oregon's lands as they rose from the ocean bed. He saw the sea-shells upon her old beaches; watched the development of her grand forests; saw her first strange mammals feeding upon her old lake shores; he listened in imagination to the cannonading of her volcanoes and traced the showers of ashes and great floods of lava. He followed the creation of Oregon step by step all through her long geological history and then entered with enthusiasm into the industrial and educational development of her present life.

But above all, infinitely above all, he prized and labored for the noble character of her sons and daughters. Is it any wonder that his heart was full of gratitude to God for having guided him into such a rich heritage of life?


125°
123°
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SCALE OF MILES
0
50
Astoria
St. Helens
Columbia R.
Hood River
The Dalles
Umatilla R.
Pendleton
Forest Grove
Tillamook
PORTLAND
Mt. Hood
Willamette R.
Deschutes R.
The Dalles Military Rd.
John Day R.
Condon
La Grande
Eagle Cap
Snake R.
Cape Foulweather
Salem
Albany
Mt. Jefferson
Corvallis
Yaquina Bay
Newport
Baker City
Dayville
Camp Watson
Canyon City
Prineville
Crooked R.
Florence
Eugene
Bend
Three Sisters
Vale
Gardiner
Umpqua R.
Drain
Military Road
Diamond Pk.
Malheur R.
Owyhee R.
Camp Harney
Burns
Silvies R.
Silver Creek
Cape Arago
Marshfield
Empire
Roseburg
Crescent Lake
Fossil Lake
Silver Lake
Malheur L.
Harney L.
Narrows
Crater Lake
Cape Blanco
Port Orford
Rogue R.
Summer L.
Steens Mt.
Worner L.
Gold Beach
Grants Pass
Medford
Ashland
Klamath Falls
Lakeview

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