

its habitat extending nearly to the timber line. Washington naturally leads in shingle manufacture, and probably never will be overtaken for it has more than five times as much cedar as Oregon. Its stand of cedar is over 10,000,000,000 feet, on which the annual draft is about 400,000,000 feet. As this rate of cutting is rapidly increasing, it is not long before the lumbermen are beginning to give thought to careful lumbering. The only cedar accessible to Portland is tributary to the Cowlitz River, in Washington, and it is in the hands of persons who are holding it at stiff prices. The supply of cedar in Oregon is not large, but a railroad to the Nehalem country would make a large body accessible to Portland.

LUMBER CUT OF 1901.

Oregon Manufactured Nearly 1,000,000,000 Feet Worth \$8,948,900. According to estimates specially prepared for the annual number of The Oregonian, the lumber cut of Oregon last year was 988,565,000 feet, an increase of over 50,000,000 feet compared with 1900. The cut was valued at nearly \$9,000,000. If last year's activity in the industry obtains this year, Oregon's cut will pass 1,000,000,000 feet for the first time in the history of the state. At the present rate of increase the output there is no doubt that Oregon will in a few years take the place so long held by Washington as the chief lumbering state of the Pacific Northwest. Washington is, however, in no danger of losing the lead in shingle production. Following is the output by counties, with comparisons for 1900 and 1899:

Table with 3 columns: County, Feet, Value. Lists counties from Benton to Yamhill with their respective lumber production in feet and value.

CUT MUCH LONG LUMBER.

One of the Most Unique Lumbering Plants in the Northwest.

The Bridal Veil Lumbering Company, located on the main line of the O. R. & N. Co., 20 miles east of Portland, conducts one of the most unique, and at the same time one of the most complete lumbering plants on the Coast.

The company owns and operates its logging camps, cuts its timber from its own timber lands, and except for a little minor work, it does not use a horse or other power aside from that of steam about the entire property. The forest belt from which the timber for the mills is cut is situated on Larch Mountain, several miles back from the railroad. The general elevation of this timber land is several hundred feet above that of the river and railroad line which furnish the most available means of transportation for the large product of this company.

A mill with a daily capacity of 100,000 feet of finished lumber is located upon Larch Mountain. The point of location is convenient to the timber belt. From this point a flume three miles in length leads to the main yard and planing mill at Bridal Veil, the seat of the company's headquarters, and located on the Columbia River and main line of the Oregon Railroad & Navigation Company's tracks. As fast as lumber is cut from the logs at the mill on the mountain it goes floating away to the yards through the miles of flume. When this lumber reaches the yard it is picked up and yarded, or put through a dry kiln, or loaded on cars for shipment.

Timber grown in this altitude is much superior to timber of the forest belts of lowlands. The timber of Larch Mountain is free from pitch, and also from the coarse growth of trees of a rapid growth. Lumber cut by the Bridal Veil Lumbering Company is especially valuable for finishing work, and it is consequently in much greater demand than coarser grained lumber of the market.

At Bridal Veil station, the O. R. & N. Co. is building its main track closer to the river, thus affording the Bridal Veil Lumbering Company considerable additional needed room. Taking advantage of the increased space afforded, the company next Spring will rebuild their planing mill, increasing its capacity about one-third. They will also build at this site a new dry kiln. A new 200-horsepower engine was recently installed at their saw mill on the mountain. They have replaced the old engine which was not of sufficient capacity to meet the increased requirements of this plant.

This company was the first of the saw mill companies to use the log trolley. This was described fully in The Oregonian, issue of November 24 last. By means of this trolley, logs are picked up from the canyons and other places formerly practically inaccessible, and placed upon cars or skid roads which furnish easy transport to the mill. The use of this trolley greatly facilitates logging in a rough country.

Bridal Veil Lumbering Company. While the company's plant at the foot of Larch Mountain is not unlike other saw mill plants in successful operation in a heavy timber belt, its methods of logging are totally unlike those of any other mill in the world. It is in the unique methods of logging by the Bridal Veil Lumbering Company that the interest of this article centers.

passed through the planing mill and dryer and in condition for the builder before the sun had set. The officers of the company are: President, L. C. Palmer; treasurer and general manager, J. S. Bradley; secretary and planing mill manager, J. M. Letter. In this edition are presented views of the mill and logging processes. They form but a small idea, however, of the magnitude of the plant. It is among the best in Oregon. Interior lumber consumers find this not only a convenient but superior concern with which to place their orders.

WATER RESOURCES OF OREGON

Many Streams That Will Become Important Factors in the Development of the State—Work of Geological Survey.

ONE of Oregon's most valuable natural resources is in its water supply. The value of this to the state is much increased by the effects produced by the marked topographical and physical features and the climatic conditions which result. Oregon is fortunate in the possession of lofty, snow-capped, heavily



J. T. Ford, Photo.

forested mountain ranges. These form nature's most effective means of levying tribute on the moisture carried by the atmosphere. They are the gathering grounds for innumerable streams. The deep accumulations of winter snow with in the forests act as natural storage reservoirs, feeding and sustaining the streams which flow from the lofty summits to the dry lowlands.

The features of notable value in the mountain system of Oregon, especially in the western part of the state, are the elevation of the headwaters of the streams, their rapid fall, and their close proximity to the most thickly settled and best-developed portions of the state. The rivers furnish an abundant supply of exceptionally pure water for municipal needs and offer opportunities for the development of many valuable water-powers. As population and manufacturing enterprises increase in the fertile valleys of Western Oregon, these streams will become increasingly important as a factor in the development of the state.

Some of these rivers have been made the subject of investigation by the United States Geological Survey for the purpose of learning of their flow and the volume of water carried by them at different seasons of the year. There is need of an extension of this work on other streams

having their sources in the Cascade and Coast Ranges. Unlike most of the Western States, Oregon is not wholly within the arid region. Sufficient humidity prevails over large areas for the success of dry farming. For the greater part of the fertile lands of the state the rainfall is too small for the production of most crops, even in the Willamette Valley, and the prevalence of severe droughts in the critical crop-growing season makes a certain amount of irrigation necessary. In all such localities the streams are of great value, as the extent of the acreage which can there be put under cultivation is limited directly by the available water supply; hence it is of importance that systematic measurements be made of the streams commanding these lands, and that as much information as possible be obtained which will lead to their judicious and largest use.

Deschutes a Remarkable River. The United States Geological Survey has started investigations among the streams of Oregon as part of its general study of the water resources of the whole country. The work in Oregon, however, is but a beginning of what it is hoped and expected will be later undertaken. Thus far the investigation has been confined to a few of the streams draining from the Cascade Range: Umatilla River,

which flows through an important section in the northeast, and Deschutes River, one of the largest streams in the interior of the state.

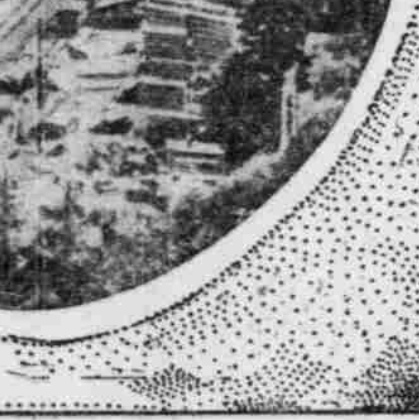
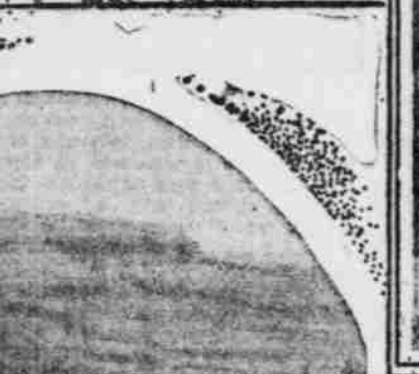
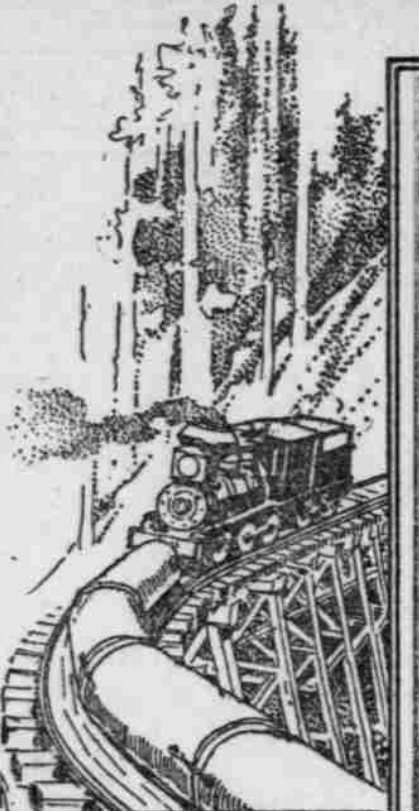
Deschutes River is in some respects one of the most remarkable streams in the United States, from the fact that its volume of flow is nearly constant throughout the year. Almost universally the streams run full in the Spring, or wet season, and are much diminished in volume in the Summer and Fall; but Deschutes River has almost no fluctuation between its Summer and Winter volumes. This feature is of great importance, and makes the river of much more value than ordinary streams for irrigation and water-power, as absolute dependence can be placed upon it to supply definite amounts of water for these purposes.

The reason for this remarkable uniform flow of Deschutes River is not fully determined, but it is thought to be due to the large storage capacity of the layers of lava of which the surface of that part of the state is composed. The water percolates into the lava, and generally finds its way to the stream. The river contains a number of rapids which form admirable water-powers. Between Prince Falls and Crooked River there is a fall of 1200 feet, and it is estimated that over 50,000 effective horsepower can there be produced by diverting the water by means of short flumes, and without the construction of dams. It is also possible to utilize this water for irrigation.

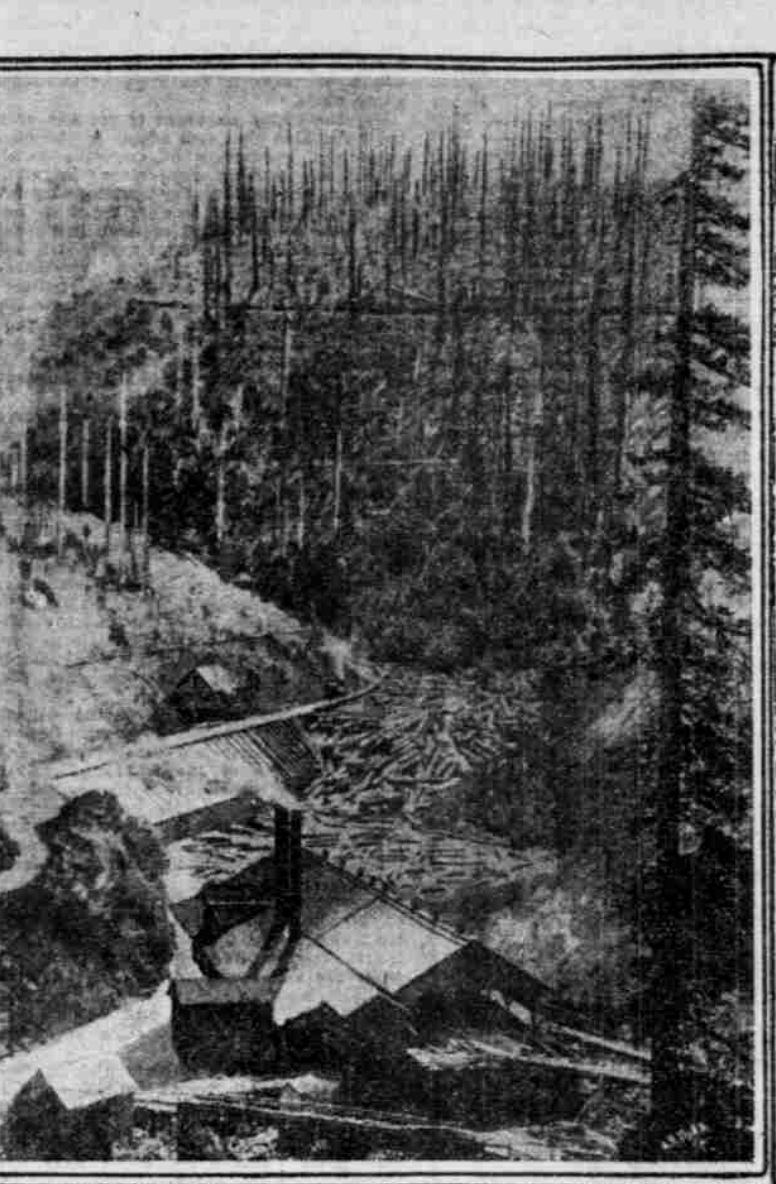
Lands Fertile and Easily Cultivated. Surveys have recently been made which show the possibility of constructing several irrigation canals heading at various points along the stream and conducting water out on the extensive sagebrush and juniper plains, and to the gently sloping benchlands. The soil of these areas is composed of disintegrated lava, is very fertile and easily cultivated. By the construction of these canals it is estimated that several hundred thousand acres would be added to the tillage area of the state.

The gauging station maintained by the Geological Survey on Deschutes River is 15 miles from The Dalles, and the measurements show the discharge of the river to be about 1000 cubic feet per second for the Summer season, with but little additional increase during the Spring and Winter months. The river at this point will generate approximately 570 horsepower per foot of fall, and with the 25-foot fall which is said to exist there, 14,250 horsepower gross would be available.

Hood River, rising among the snow-fields of Mount Hood, and which has a large amount of water available for irrigation, is being measured. The valley which it waters is noted for the excellence of its fruits and strawberries. Umatilla River, which is also being gauged, near Gibbon, is important as the source of water for a number of irrigation canals in the lower part of its course. In order to form an idea of the possibilities of development in the water and forest resources of Central and Eastern



J. T. Ford, Photo.



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and lead to the reclamation and settlement of large portions of it. Almost all of these rivers also contain fine water powers, which, when developed, will provide cheap power for the generation of electricity, pumping of water from the river canyons to irrigate large tracts of fertile bench lands, and for manufacturing and other purposes. There is an admirable field in Eastern Oregon for the establishment of an extensive system of electric traction, the power for which can be derived from the rivers. Such a system would undoubtedly assist in the increased settlement of this portion of the state. In anticipation of the part the rivers are bound to play in the development of this part of Oregon, it is most desirable that their resources should be studied. Measurements of their flow should be made, their water-power sites investigated, and locations for irrigation determined, and locations for storage reservoirs at their headwaters examined.

Good Country Along the John Day. John Day River, which heads in the Blue Mountains, flows west through Grant and Wheeler Counties, then north between Sherman and Gilliam. It is one of the most important of these streams. It has much the same general features as Deschutes River. Along its upper portion some use is made for the irrigation of alfalfa is already made. Lower down in its course in Gilliam County, there are fine, arable bench lands, which would be very productive under irrigation. Careful investigation of this river ought to be made, both to develop its supply for irrigation and to find whether there are any water powers upon it which can be improved. In the northeastern tier of counties there are also three or four important streams which would repay investigation. The most northerly of these is the Grand Ronde River and its tributary Willows, which come from the Blue Mountains and flow generally toward the north, draining Union and Wallowa Counties. There are fine powers on both of these streams which, when accurately determined, would in all probability soon be improved. The next large river to the south is Powder River, skirting the northern side of Baker County, and Burnt River, which drains the southern part of the same county. All of these streams are at present used for irrigation, but not to the extent which would be possible if the conditions of their flow were better understood. Snake River, the master stream of all of this section, which forms its boundary with Idaho, should also be thoroughly studied.

The great section to the south of Blue Mountains, in Malheur and Harney Counties, is in great need of irrigation. Its soil is remarkably rich, and, if sufficient water could be found for its cultivation, large sections in this now sparsely inhabited region could be reclaimed. It is here that artesian waters are thought to exist, and it is most desirable that a careful study be made of the geology of the region, and experimental wells driven to see whether water can be found. In addition to the possibility of artesian waters, this section contains several streams which could furnish much water for ir-

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resource upon which the development of the country most depends. It is, therefore, of the utmost importance that a thorough investigation of them be made and reliable facts and figures collected with regard to their flow and water powers, which will give confidence to the capital of the state, which may seek investment in their improvement.

An important field for investigation is the search for artesian waters which may be found in the eastern and southern sections of the state. The successive layers of lava separated by sections of sand and gravel, of which this part of the state is largely composed will probably furnish an underground water supply. The investigations of Professor I. C. Russell, of the geological survey, which have been successfully carried on for a series of years in the neighboring territory across the line in Idaho, make it probable that a similar search would yield results of value in sections of Oregon. During the past Summer, Professor Russell's work in Idaho was directed particularly to the lava-covered section in the southeastern part of the state, which is similar in structure to the land on the Oregon side of the border. His studies in Idaho led to the location of a number of artesian basins, one of which closely approached the Oregon border near the towns of Nampa and Caldwell, Idaho. The formation of the artesian basins, and the recurrence of these artesian basins, and it would be of decided advantage if they could be discovered in Eastern Oregon and water from this source obtained for the grazing country in that section. If sufficient interest is manifested by the citizens of the state, it is possible that arrangements can be made to have an investigation of this nature started during the coming Summer.

It is due to the interest and energy of Representative M. A. Moody that the hydrographic work in Oregon is being pushed. It is to be hoped that the people of the state will appreciate the value of this work, and will make their wishes known for its continuance. So many calls are made for work in different sections of the country, that activities in this important branch must, necessarily, be confined to those states where the people are most insistent for its prosecution. It is interesting to note that of the 61,000,000 acres of land in the state, about 40,000,000, or one-third, are unappropriated and still remain Government land. A proper utilization of the water supply would tend to open up large additional territories and greatly increase the taxable property of the state.

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PHOTOS BY HICKS-CHATTEN CO.

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Portland Lumbering & Mfg. Co. MANUFACTURERS OF FIR LUMBER Foot of Lincoln Street PORTLAND, OREGON

ANNUAL OUTPUT, 75,000,000 FEET Inman, Poulsen & Co. OREGON PINE LUMBER CAR AND CARGO SHIPPERSPortland, Oregon