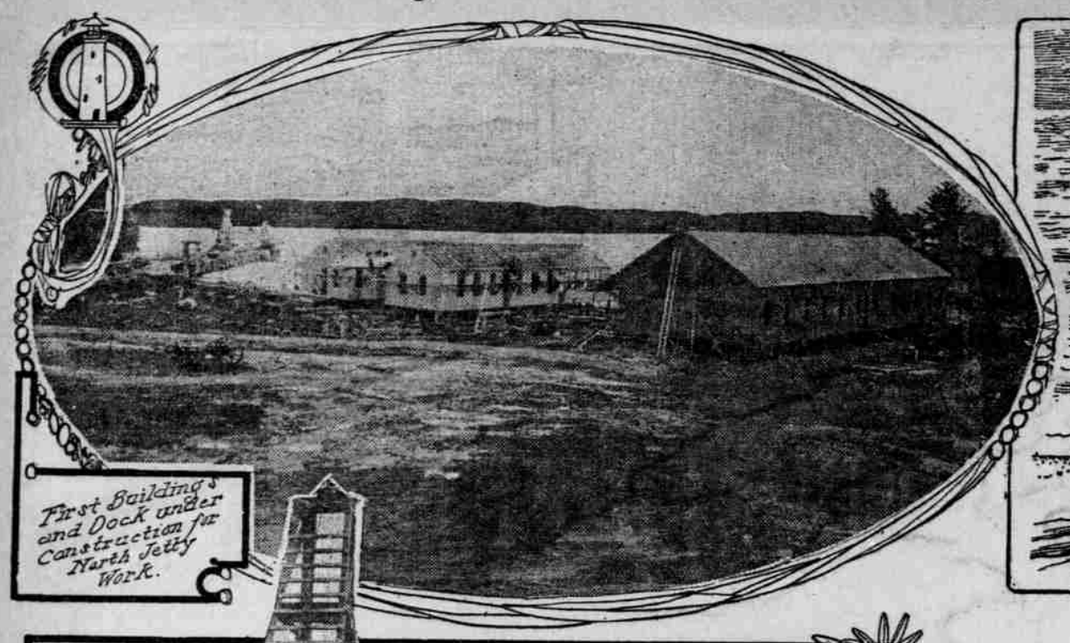
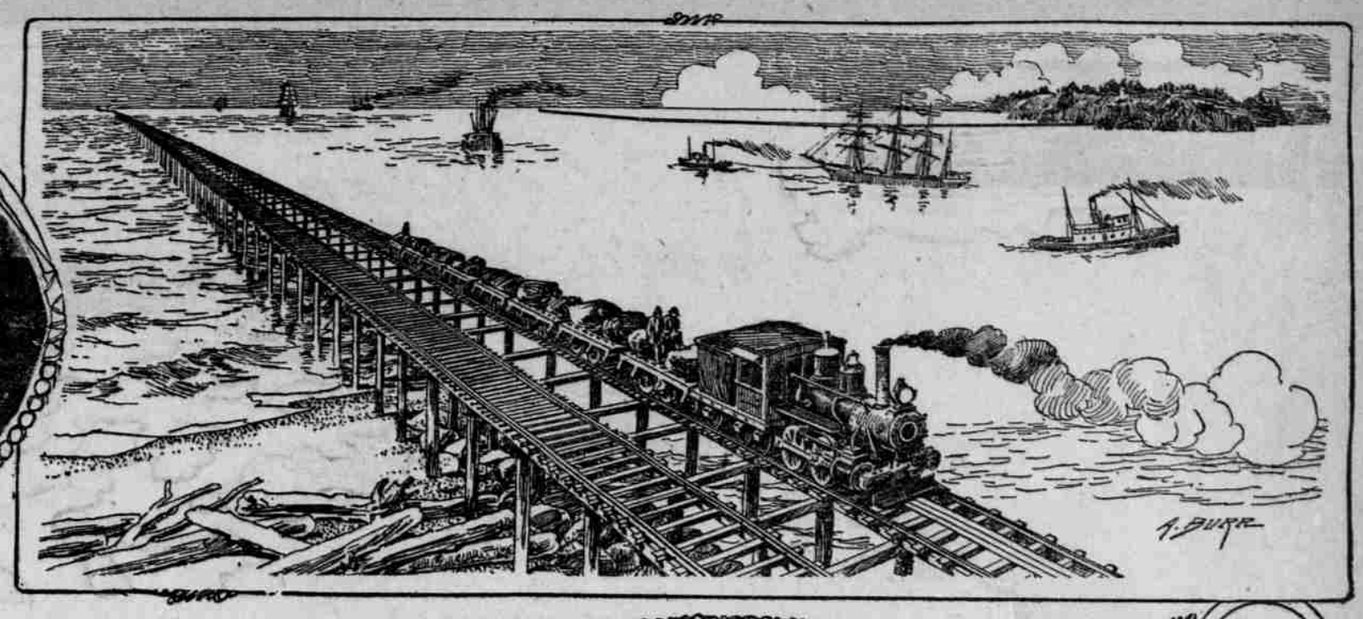
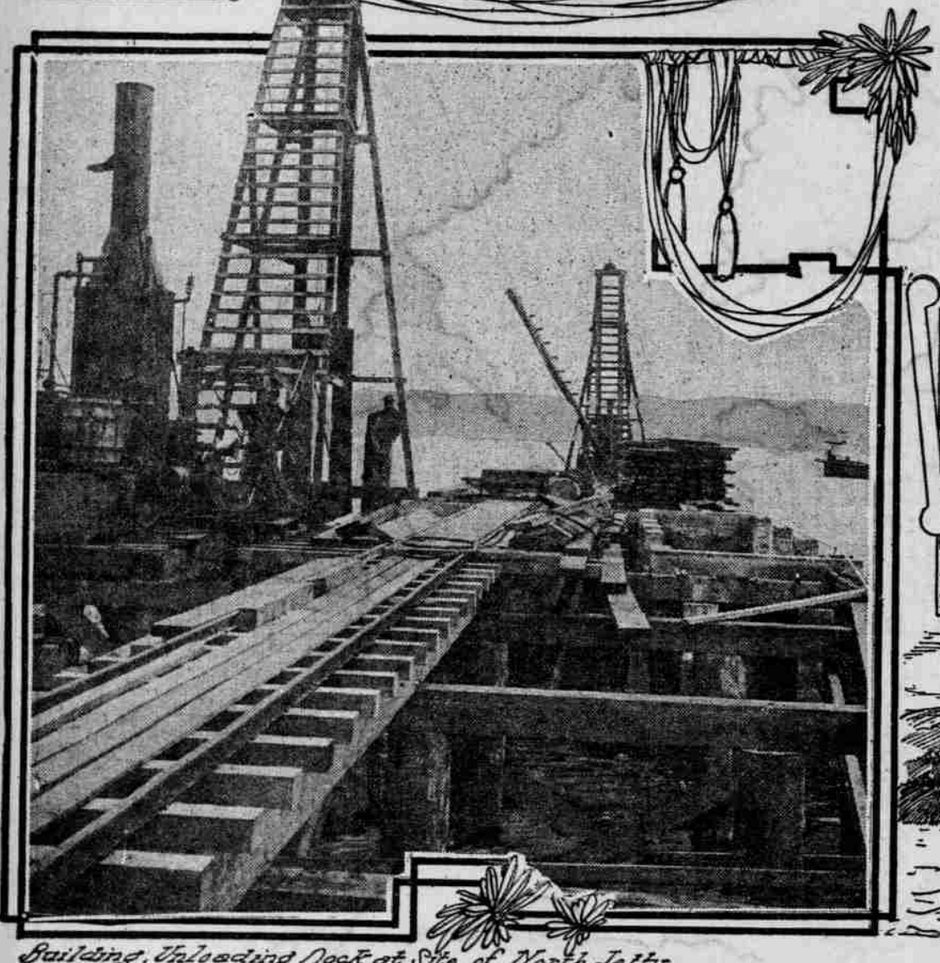
GREAT JETTIES DEEPEN CHANNEL FOR PORTLAND'S SHIPS

Nine Miles of Enrockment, Over Two Thirds of which is Built, Assures 40-Foot Depth Over Columbia Bar.

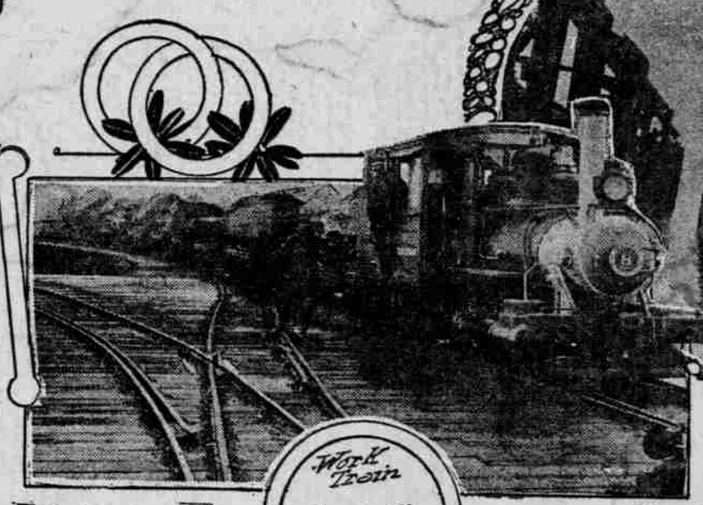


First Building and Dock under construction for North Jetty Work.

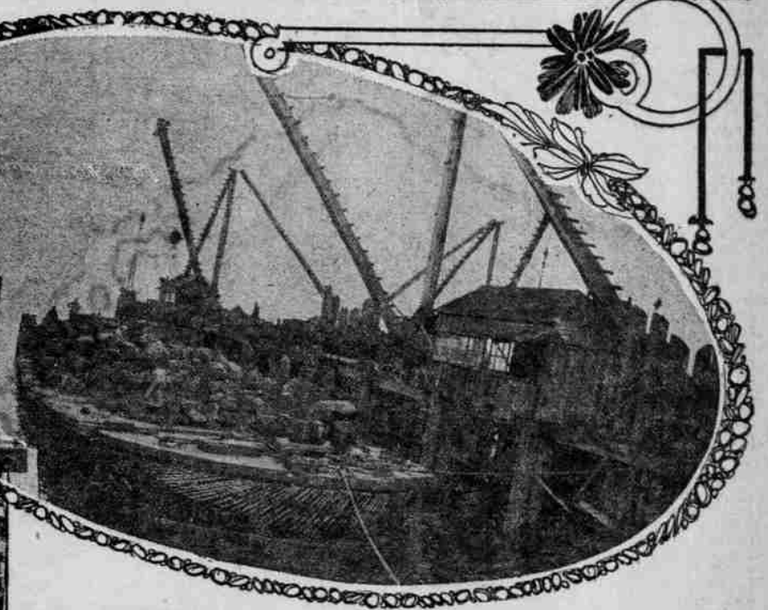




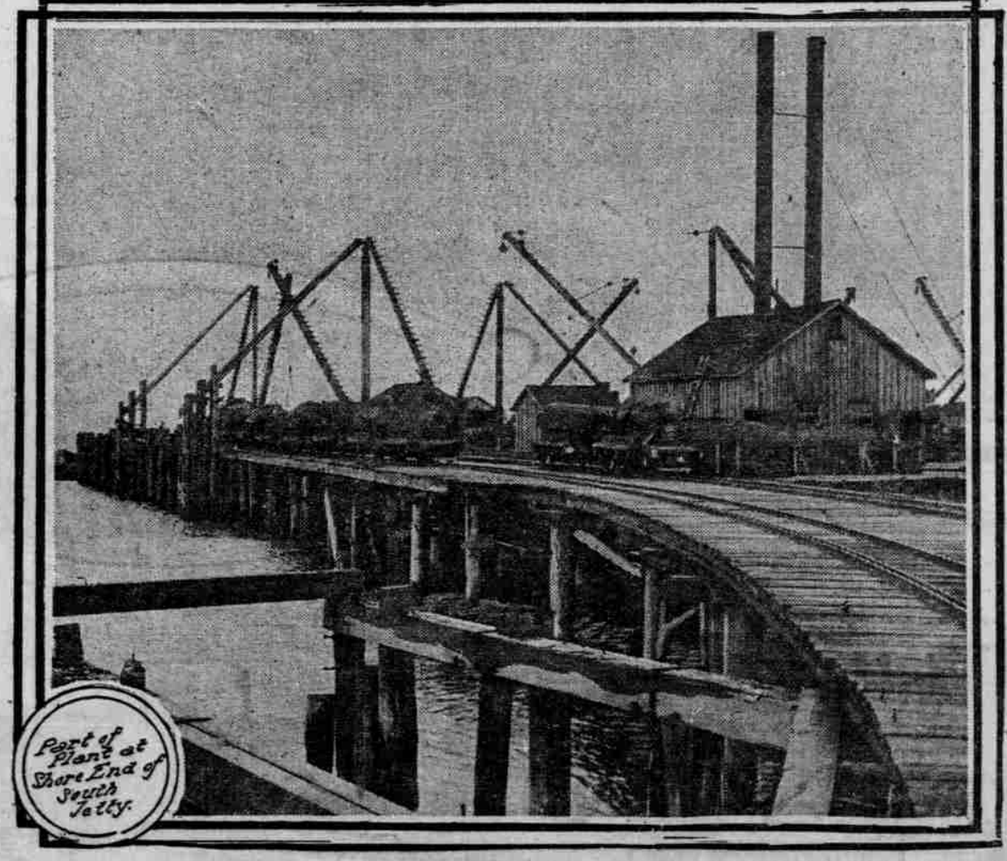
Building Unloading Dock at Site of North Jetty.



Work Train Used on South Jetty Work.



Unloading Rock for South Jetty Work.



Part of Plant at Shore End of South Jetty.

DOWN at the mouth of the Columbia River Federal engineers are just completing the first and main division of one of the greatest engineering projects ever undertaken by the Government. Battling against wild seas, heavy gales and shifting sands, they have built a huge rockway far into the ocean, forming a permanent barrier against the mighty tides and the strong currents from the Columbia. This rock wall is known as the south jetty. Across the bay preparations have been made for the construction of another similar wall, confining the waters on the north, and when it is completed the two will form the greatest jetty system in the world.

This work, costing millions of dollars and requiring many years of the most difficult labor, is being done to improve one link in Portland's channel to the sea. The south jetty alone has wrought wonders. It has changed the Columbia bar from a waterway dreaded by navigators, because of rough seas and shifting channels, to one of the safest entrances on the Pacific, affording an easy crossing to vessels of great size. The object of the north jetty is to create a permanent bar channel 40 feet in depth at low water.

Some idea of the magnitude of the south jetty is conveyed by the fact that its construction has required approximately 18 years. The first work was done in 1885 and in 1893 the project, as then outlined, was completed. The effect was satisfactory at first, the channel deepening until there was 31 feet of water in 1895. But the jetty was not of sufficient length and after 1895 the channel began to swing towards the north, the depth each year being less than the previous year. This movement of the channel to the north not only caused a shoaling, but made navigation more difficult on account of the direction of the channel with regard to the prevailing winds and seas.

By 1898 the depth had been reduced to 29 feet, in 1900 there was 24 feet and in 1901 there was 22 feet on the bar. In 1902 a channel broke out to the south and also one between the new south channel and the north channel which remained, but there was only 21 feet of water in any of these channels.

Portland citizens regarded the gradual shoaling of their waterway to the sea as a tragedy. From one of the leading seaports of the western coast they had visions of their city losing entirely its marine prestige. Already the larger vessels hesitated about entering the Columbia and in rough weather were sometimes barbound for weeks at a time. Pressure was brought to bear at Washington, a special survey was made of conditions at the mouth of the river and a new project was formulated to add nearly three miles to the jetty, which was then about four and one-half miles long. This new work was started in 1903, and it was not long before its benefits became apparent. The Federal engineers, after soundings last July, reported that there is a channel 10,000 feet wide, with a least depth of 34 feet, and two other openings through it into least depths of 27½ feet deep at low water. The channel no longer shows a tendency to shift, and all indications are that it will be deepened rapidly until the desired 40-foot stage is reached.

One who has not inspected the jetty work can have little idea of the great task involved. Near Fort Stevens, the shore terminus, the work is comparatively light, but gradually becomes heavier, until for the last three miles the base of the enrockment has a width of 250 feet, or more than a Portland block. As the depth is at some places from 50 to 60 feet an immense amount of rock has been required. The jetty has been built both higher and wider than was at first contemplated. Plans for a crest of ten feet, raised to the level of mid-tide, were altered so that the jetty, nearly completed, has a crest of from 25 to 40 feet and rises at least to mid-tide. The 40-foot crest extends for the entire three outer miles of the jetty.

Rock for the jetty is towed on large barges to Fort Stevens from Fisher's quarry above Vancouver, Wash. The last contract, let September 25, 1912, called for 350,000 tons of stone, and it is expected that this will complete the south jetty. At Fort Stevens the rock is hoisted from the barges to dump carts by means of 12 large derricks, and trains of 16 cars each carry it seven miles to the end of the jetty where it is dumped. In this way from 3800 to 4200 tons of rock daily is added to the jetty body. Approximately 5,000,000 tons of rock have been used. The entire trestle above the jetty is double-tracked and with the yards there is 32 miles of single track in use. Fifteen locomotives, 270 dump-cars and 35 flat-cars are used.

The work of dumping the rock at the end of the jetty is very hazardous. Here the most capable and daring workmen are employed. Frequently they work with seas dashing over them and in a wind that threatens to carry them from the trestle. Several have been blown over and lost their lives and others have been saved with difficulty. During the fiercest storms it is impossible to work on the outer sections of the jetty, but there is some unfinished work nearer shore to keep the equipment busy.

At several places along the north face of the jetty groins or spurs have been built. These are about 400 feet long, and one more of these will be constructed next Spring. Their purpose is to prevent the jetty from being undermined by currents along its length. At present the jetty runs over dry sand where there was formerly deep water. So great is the accumulation of sand, due to the jetty, that Clatsop spit is now connected with the mainland, and besides has advanced nearly a mile seaward during the last five years. At present at low tide a sandy bottom is exposed, where five years ago there was a depth of 55 feet at low water.

Both the trestle and the embankment are under heavy strain during stormy weather. The seas strike it with such force that it is not uncommon to see a ten-ton rock moved from one side of the jetty to the other. In the past there have been occasions when sections of the jetty have been torn out, but the increased width and height of the entrenchment will probably prevent this in future. The added height, however, tends to make the seas run up the slopes and break over the trestle. This trestle is approaching the limit of its life and the expensive work of replacing it would soon be necessary if the jetty were not so nearly completed.

The Government has provided the most complete equipment for the 250 men who are at work on the jetty. There are machine shops, with all the most modern devices, and so well-fitted up that the cars, derricks, pile-drivers and other apparatus used have been made right on the job. The machine shop, carpentry shop and sand-blast for cleaning the cars are operated by electric motors. The derricks are operated by steam, generated in four 80-horsepower boilers. There is a complete telephone system connecting every department and extending to the end of the jetty seven miles at sea. The telephone wires are used in stormy weather to operate a system of block signals for running the trains. It is proudly pointed out by the men on the work as the oldest block signal system in Oregon.

Gerald Bagnall has been resident engineer in charge of the work for the past seven years. He has a grasp of every detail and has handled the many problems presented in a masterful way. But with all his work, which includes the preparatory construction that has been started at the site of the north jetty, he has time to look after the welfare of the men and is popular with all the employes.

The cost of constructing the south jetty will be almost $11,000,000. Congress has appropriated altogether $11,143,424, but of this amount $150,000 is being used on preparations for the north jetty. In recent years the appropriations have been much larger than in the early stages of the work and progress has been much more satisfactory. The $850,000 of the last $1,000,000 appropriation, from which $150,000 was taken for the north jetty, will be sufficient to complete the south jetty and the last rock will be placed the coming Spring.

Already the preparatory work for the north jetty is well under way. About 25 acres of rough land has been leveled at Fort Canby, the old and almost deserted military post at North Head. This required heavy work of clearing, draining and excavating. This land will be used as the site of the 20 or more buildings that will be required for the jetty work. Already three of these are nearing completion. These are to be used immediately by men who will be employed in erecting the other buildings.

The heaviest part of the preliminary work is the dredging of a channel along the north side of Sand Island to Fort Canby so that equipment and rock may be towed to the jetty site without regard to tides. This channel will be about six miles long, 300 feet wide and 11 feet deep. About 2,250,000 cubic yards of sand must be taken out, and suction dredges, such as are used for deepening the river from Portland to the mouth, will be depended on for this work. When it is completed small craft, such as are used, will have easy access to the dock at Fort Canby. This dock, with approach, will be about 2000 feet long and has been commenced. The material will be carried from the dock across a narrow peninsula to the jetty site on the sea side.

The north jetty will be only about two and one-half miles long, or hardly more than one-third the length of the south jetty. All of the work, however, will be in rough and much of it in deep water and the character of the construction will be much the same as that of the last three miles of the south jetty. The cost of the north jetty was originally estimated at $1,205,000, but in view of the experience at the south side of the bay, t estimate must be increased to from $5,000,000 to $6,000,000. The machinery, cars and other equipment will be moved over from the south jetty, so that the beginning of work will be greatly expedited. The first rock will probably be placed the coming Summer. If Congress keeps money available for the work, as is expected, the north jetty should be completed in five years. Before work has been under way a year, however, it is probable that the deepening of the channel will be noticeable. By the time the jetty is completed, or soon afterward, the 40-foot channel over the bar will be a reality.

The improvements at the mouth of the Columbia, as well as those from Portland to the mouth, are under the supervision of Major James F. McIndoe, Corps of Engineers, United States Army. Major McIndoe took charge of the work in July, 1908, and is working to a successful conclusion the problem of giving Portland a greater channel to the sea.

FACTS ABOUT THE PANAMA CANAL.

Preliminary canal organization by French, 1876.
Panama Canal Company formed by French, 1879.
Panama Canal Company bankrupt and work suspended, 1889.
New Panama Canal Company formed by French, 1894.
United States appoints canal commission, 1889.
Congress votes to buy property of new Panama Canal Company, 1902.
Work begun by United States, May 4, 1904.
Formal date of opening, January 1, 1915.
First vessels to pass through canal, September 23, 1913.
Total excavation for canal, 195,323,379 cubic yards.
Excavation accomplished May 1, 1912, 168,486,495 cubic yards.
Excavation remaining May 1, 1912, 26,836,495 cubic yards.
Paid new Panama Canal Company and Republic of Panama for property and concessions, $50,000,000.
Cost of sanitation work, $20,053,000.
Cost of civil administration, $7,382,000.
Total cost of canal, $375,000,000.
Cost of fortifications, $3,000,000.
Length of canal, deep water to deep water, 50 miles.
Length of canal, shore line to shore line, 40 miles.
Time of transit through canal, 10 to 12 hours.
Time of passage through locks, three hours.
Locks in pairs, 12.
Usable length of locks, 1000 feet.
Width of locks, 110 feet.
Summit level of canal, elevation 85 feet.
Average bottom width of canal channel, 649 feet.
Minimum bottom width, 300 feet.
Minimum depth, 41 feet.
Approximate number of men employed, 35,000.
Relocated Panama Railroad, cost $9,000,000.
Relocated Panama Railroad, length 47.1 miles.
Size of canal zone, 448 square miles.
Chief engineer, Colonel George W. Goethals.

Siuslaw Harbor Is Opened to Vessels

Coos Bay, Tillamook and Other Coast Ports Soon Will Get Federal Aid—Coquille Tonnage Grows.

PROGRESS is being made in the Federal jetty work at the mouth of the Siuslaw River and this is virtually the only development, with the exception of that at the mouth of the Columbia, being done at present on the Oregon coast.

The work is in charge of Captain H. H. Robert, of the United States Army engineers. F. E. Leefe is the engineer in charge, with W. G. Carroll as junior engineer.

More than $100,000 already has been spent in building the south jetty at the Siuslaw. The total cost will be $430,000, according to the official estimate. The Johnson-Anderson Company, of Portland, has the contract for the construction work. In building the north jetty a portion of the old and abandoned jetty wall constructed several years ago, and abandoned, has been used. The walls will project far beyond the average shore line and will afford an eight-foot channel at the mouth at low tide. The distance between the outer ends of the two walls will be about 750 feet. The work will be completed in about two years and will afford ample navigation facilities for all vessels calling at Siuslaw ports.

Early activity is expected at the mouth of the Nehalem, the estimated cost of which will be in excess of $600,000. About 44 per cent of this amount will be provided by local bond issues. The Government will do the work and furnish the balance of the money.

Nothing is being done at Tillamook Bay this year, owing to a controversy between the rival interests at the two principal ports—Tillamook and Bay City. It is evident that these misunderstandings will be settled soon, after which the Government probably will offer financial assistance and co-operation to develop the harbor.

A new dredge has been provided for the port of Coos Bay and will be engaged throughout the year in dredging the bar, at a cost of $50,000 annually.

As evidence of the development that follows Federal improvement of coast channels is the remarkable increase in tonnage at Coquille since the harbor work was done there. It is said that the tonnage from that port increased 400 per cent after the work was completed.

One Sack Yields 50.

From one sack of Early Rose potatoes planted last March M. M. Williams has dug 50 sacks of fine potatoes.—Echo's Echoes.