

Columbia River Jetty, One of the World's Greatest Engineering Works.

ONE of the great national marine projects is afoot at the mouth of the Columbia river, on the southerly margin of the harbor of Astoria, rooted at a point just north of Fort Stevens, on Clatsop Spit, which involves, first and last, about \$6,000,000 of money, and stupendous supplies of material, beside the employment of a big force of men, skilled and unskilled, namely, the jetty that is to so concentrate the enormous outflow of the mighty river that its power and volume shall scour the sea-bar of the river to a channel depth that shall offer no impediment to the largest draft vessels of the world; and gradually, year by year, this huge work is going forward with notable and demonstrable success.

Upon a brush-matress, seven and one-quarter miles in length, with a northwesterly trend, there has already been deposited 1,957,503 tons of rock taken from the great quarries of the lower Columbia valley, and barged, to the shore-end of the jetty, whence it is distributed over the exact lines of the project, by trains on a track laid upon the huge and narrow trestles that reach to the outer-most end, in the blue depths of the Pacific.

The work is under the direction and control of the United States engineering department, Lieutenant-Colonel S. W. Roessler, corps of engineers, U. S. A., in charge of the district in which this, and other large improvements lie. And to date, including the pending appropriation of \$1,700,000, there has been \$5,054,000 appropriated to this mammoth task.

At the shore-point of the jetty proper there is established, in the most permanent fashion possible, an immense depot for supplies, which comprehends a system of docks, machine shops, carpentering and milling plants, store houses, train yards and sheds, boarding houses, offices, and all essential conveniences for the despatch of the vast undertaking. It is a busy spot, swarming with life and activity and is crammed with all manner of devices for the handiest handling of the almost incalculable mass of material used in the work. The yards of the big terminal are crowded with derricks, flatcars, huge masses of piling, locomotives, and all the impedimenta incident to the approved plans of operation; and the engineering department is now at work preparing to deliver 4000 tons of rock a day, during the year 1908 and to this end will at once construct four more huge derricks for use at the delivery point on the docks, making 12 of these powerful and servicable instruments, each with a capacity for the lifting of from 350 to 400 tons per day. And in this same behalf, the shops are all busy with the new order for 110 additional flatcars (making over 270 in all), for the rapid hauling of rock to the sea-end of the jetty, now five and one-half miles to seaward; to which distance the rock-base has been carried and now stands well above low-water mark, for the full width of the trestle all the way.

The rock work will be extended about one-half mile further out to a height of about low mean water; and it is proposed, in 1908, to build up the outer one-half mile of rock, and to extend the enrockment as far as the amount of rock received will allow, probably not less than one-half mile; this will leave but one-half or three-quarters of a mile of the prescriptive length of the jetty to be built.

During the past year the sands have built out along the jetty, upon the north side, which is now bare, at low water, for a distance of over four miles, an invaluable protection to that portion of the jetty. So far, this winter there has been, practically, no loss of trestle, always a menace and deterrent in the work of construction, and should the trestle remain intact for the balance of this season, it will enable the work to be pushed vigorously next summer, to a point that will have marked effect on the bar; for the reason that the efficiency of the jetty increases very rapidly, in proportion to its nearness to the bar; in fact, every inch gained is a factor for success.

It is authoritatively stated at jetty headquarters, that the width of the crest of the bar, between the inside and outside 25-foot contours, has decreased in the last six years, from 3000 feet to nothing—that is, there are several channels now broken through the crest of the bar, with over 25 feet of depth at mean low water. The movement of sand on the bar between the years 1906 and 1907 amounted to 44,000,000 cubic yards, of which 21,000,000 were scoured off, and 13,000,000 cubic yards deposited at other points. The narrowing of the bar has now changed conditions to such an extent that some practical benefit would probably be derived from dredging. These figures, gleaned directly at fountain head of operations, are very encouraging to the people of the States of Oregon and Washington, and especially to the Oregonians,



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whose commerce will receive tremendous impetus from the successful completion of this work.

There is comprehended in the general scheme of jetty work here, another jetty, to run out into the sea, from North Head, on the Washington shore, for a distance of two and one-half miles, if the same shall be deemed necessary, after the great work on the south has been finished. The jetty dealt with in this article, has been amplified during the years, by the introduction of four groin-jetties, jutting out from the north side of the main line, and are said to be of very material assistance in the accumulation and holding of the sands bulking about the structure.

This jetty-work is to be a history-maker in the commercial annals of the Northwest, since the original conception involved only the work done up to 1896, and which has been extended, with most encouraging results ever since. The original work proved very successful for a

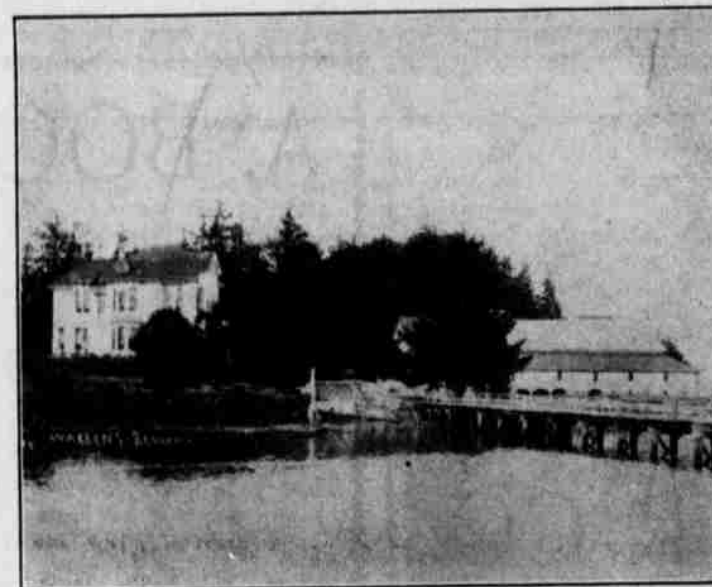


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time, and wrought an increase of channel-way on the bar to 30 available feet; but in 1897 this 30-foot channel had widened considerably, and in 1898 it commenced to deteriorate, and this deterioration continued until 1902, when only 21 feet of water were available at mean low water, there being three channels of this depth. This necessitated the new project, and the larger, and since the commencement of the new work, the benefits have been as set forth herein. The cost of the jetty, in 1896, upon the close of the original plan, was \$1,958,000 carefully expended; since which the sum of \$1,396,000 has been put into the enterprise, and it is confidently hoped that the pending appropriation of \$1,700,000 will accomplish all that is desired, and in permanent fashion. In default of this, the project will be carried on so as to include the original incorporation of the north jetty, which will not be of so great a cost, provided the depths to be filled off the Washington coast shall not be excessive.

The increased cost at the south jetty is due largely to the cutting-out ahead of the jetty, which has occurred to such an extent, that that portion of the jetty built since 1905, is located in a depth of from 45 to 55 feet of water, which means a very heavy enrockment on a base of 130 feet in width and requires an enormous amount of stone.

The men who, for the past 22 years have had charge of this immense and baffling task, have given devoted care and attention to the undertaking in all its multifarious detail and have saved the work, from year to year, from the annihilative effect of storms and tides, to the good of the main project, are all well known engineering officers of the nation, to-wit: Colonel George E. Mendel, Colonel Powell, Colonel Hanbury, Colonel Post, Major Langford, and last, and as capable and earnest as the best of them, Colonel Roessler. Assistant Engineer G. B. Hegardt, served on this work for 16 years, up to May, 1905, and was succeeded by the present incumbent, Assistant Engineer Gerald Bagnall, who came from the Columbia river service and now has to do with both the river projects and the great jetty. He has immediate custody of



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the work, the property, the personnel and the pay-roll, and is intimately familiar with the oldest and the latest detail of it all, and is invaluable to his chief and the Government. He is there constantly, rarely leaving his post save for a day. He has from 250 to 300 men under him the year round, and to oversee the various departments is an Herculean labor that will not cease for an hour until the last pile is driven and the last ton of rock is cast into the sea at the end of the jetty. He has to look out for the care and maintenance of 20 miles of jetty trackage, hundreds of cars, 13 locomotives, and two huge pile-driving machines, besides all the shops, quarters, and offices of the plant, and keep the voluminous records of it all, in the rigid line and method demanded by the Government. The work of a day on this jetty is done in eight hours, in accordance with the limits set by law for all Government work, but it is apparent that the system is not at all popular with either the men nor the officers at that plant. The pay-roll aggregates from \$13,000 to \$15,000 per month. The eight-hour law is peculiarly a handicap in the race with the ubiquitous toredo, the sea insect that eats into all the wood work that has a bearing upon the salt waters of the Pacific; and in this relation it is an endless and enormous impediment to rapid progress. This deadly nuisance will eat into an unprotected pile in one year and utterly destroy it in two years; and has to be counted religiously in the computations inseparable from the progress of the work. The men in all departments of labor, inside and outside the shops, would be glad to have longer hours, more work and larger wages; so that the toredo and labor hour are no inconsiderable disadvantage in the processes there. The short day, rigorously imposed, interferes with the delivery of the great rock-tonnage, with the pile-driving, and cripples the barge-service, to an exasperating degree, and it is said that an effort will be made to have the operations at the jetty classed, by Congress, as emergency work, and made amenable to the longer system of hours.

The great shops at Fort Stevens serve not only the jetty here with the finished materials incident to the work in hand, but also does the same service for the fortifications at the mouth of the Columbia, as well as the nearby Governmental enterprises, such as the jetties at the mouth of Gray's Harbor, on the Washington coast, for which they are now turning out a long line of rock-cars; thus saving largely in time and money on all sides and expediting the work of all concerned.

The jetty is another of the profoundly interesting points to which

the attention of the touring stranger in Astoria is always turned, and a visit there is always compensating to the last degree, since it is a wholesale exposition of the unlimited lengths to which Uncle Sam goes when he starts in to do a big thing for his people; and interest that is amplified to downright delight, bolstered as it always is by the unending courtesy and consideration shown to visitors by the officers and men in charge of, and responsible for the huge and important undertaking.

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