BUILDING OF PUBLIC DOCKS EPOCH IN PORTLAND'S SHIPPING

Modern System of Handling Cargo Is Feature of Docks

Cargo Masts Used in Connection With Ship's Gear or by Combination of Gear and Electric Winches.

By G. B. Hegardt, Engineer Commission of Public Docks.

THE first construction work undertaken by the Commission of Public Docks since its organization was the building of a motorboat landing at the foot of Stark street, on the west side of the Willamette River, in the latter part of the year 1913, and the first steps to acquire sites for the construction of public docks had been begun in 1912, both by process of condemnation and through negotiations with owners of waterfront properties at prices based generally on values established by the condemnation proceedings. It was not until June, 1913, however, that the Commission succeeded in acquiring the properties which were included in the site for Dock No. 1, between Fifteenth and Eighteenth streets, on the west side of the river, with a total frontage on the harbor line of 1075 feet and an average depth of about 450 feet.

Owing to the fact that a portion of this site was subject to a lease, which did not expire until February, 1914, the Commission was prevented from proceeding with the construction of the full length of this dock at the time the site was acquired. But in August, 1913, the contract was let for the construction of the first unit, or the southerly 663 feet of Dock No. 1. The unit was fully completed and equipped in April, 1914, and thrown open for business, the British steamer Lord Lownsdale being the first vessel to berth at this dock.

As soon as the remainder of Site No. 1 was made available, proposals were invited for the extension of this dock and contract for its construction awarded in March, 1914. With the annual rise in the Columbia River commencing shortly after the letting of this contract, only a limited amount of actual construction work was possible until later in the season, the principal work done before June being the reconstruction of the landing of the Lower Albina Ferry at the north end of the dock.

At various times after dock construction had been commenced by the Commission, shippers and others had made strong representations to the Commission to provide facilities at which bulk cargo, such as coke, pig iron, structural steel, lumber, etc., could be unloaded on an open or uncovered dock or handled directly to and from cars. The Commission, after a careful study of the situation, decided that such facilities could be provided at the north end of Dock No. 1, at a comparatively small additional expense, and as the work on the extension of this dock at that time had not proceeded far on account of the rise in the river, its construction was so modified as to provide for a slip covering a width of 120 feet and a depth of 484 feet, just south of and adjoining the reconstructed ferry landing at the north end of the dock site. Along the south line of the 120-foot wide slip an open dock 60 feet in width and extending from the dock proper to the east line of Front street, will furnish the open space facilities for the convenient handling of bulk freight. The open dock will have two tracks along its face for the direct transference of freight between vessel and cars, and it is also the intention of installing there a power derrick for the purpose of handling heavy bulk material and machinery.

Dock No. 1 955 Feet Long.

The complete layout of this dock installation, as it will appear when the work, which will be done with the funds which the Commission now has available, has been completed, is shown on the plan accompanying this article. Briefly stated, this installation furnishes a quay dock having a length on the harbor line of 955 feet, sufficient to accommodate at one time two of the largest vessels now making this port, and in the slip, without extending beyond the harbor line, one vessel 450 feet in length. In the slip, after a vessel is berthed, there is ample room for placing barges alongside the vessel, for coaling, loading lumber, etc.

By referring to the plan of Dock No. 1, it will be seen that in rear of the open dock there is ample space available for open storage, in addition to that provided on the open dock. It is believed, however, that as the port's shipping increases, there will also be a demand for increased shed space, and that the Commission will find it necessary to construct a shed or warehouse directly in rear of the open dock, joining the shed of the dock proper, and extending to Front street. Such a construction is believed particularly advantageous to the port, as it will enable a vessel to discharge its cargo, of whatever character, bulk material being loaded directly into cars, or placed in the 60-foot wide open dock, and its general or merchandise freight into the shed or warehouse, without the necessity of the vessel making a move or changing its berth.

It is contemplated to install a system of cargo masts at the rear of the open dock, which will furnish the means of landing the vessel's cargo at any point on the open dock or into cars without rehandling, and also at the face of the shed or warehouse, if such is later constructed. The two tracks along the face of the open dock will have placement for about 15 cars, which, in case of lumber shipments, will enable about 300,000 feet of lumber to be assembled for loading out.

Both the quay dock and the slip have a depth of about 30 feet at low water. The material excavated from this slip has been deposited in rear of the dock, bringing the fill up to the level of Front street.

The original project of the commission for the expenditure of the funds voted for dock purposes included the construction of a reinforced concrete warehouse, five stories in height, in rear of Dock No. 1, at an estimated cost of $150,000. Before proceeding with its construction, the commission went carefully into the question of construction and operating expenses and the business which could reasonably be expected to be handled at such a warehouse to return a fair profit on the investment. The commission decided, after a careful study of the subject, that the interests of the port and the business which would have to be taken care of for several years did not justify such an extensive construction or large expenditure of money at this time. Instead, the commission approved the construction of a one-story, heavy mill constructed warehouse equipped with sprinkler system, of the same ground area as the proposed concrete warehouse, or about 25,000 square feet. It has an electric conveyor for the direct transference of freight between the dock and the warehouse, of a capacity to handle grain in sacks, flour, case goods, nails, etc. In the warehouse, portable gravity conveyors for distribution of goods will later be provided, if the business done warrants such an installation.

Second Dock Ready Soon.

Late in January the Commission had acquired the property needed for Dock No. 2, between East Washington and East Stark streets, and in March the contract for the construction of this dock had been let. It is a two-level dock for its entire length of 526 feet. A radical departure was adopted in the construction of the floor of the lower level. It consists of a reinforced concrete slab, suported on creosoted timbers, a construction that should be permanent so far as the life of the dock structure itself is concerned. The elevation of the lower dock is only 18 feet above low water, so that it is, at times, subject to overflow, and in this respect the concrete floor should have a distinct advantage over the usual wooden floor construction. Besides, the floor is rendered sanitary, easily cleaned, and not like a wooden floor subjected to the absorption of all kinds of impurities. The upper floor in the two-level sections of docks is waterproofed to prevent damage to goods on the lower floor from leakage caused by sprinkler system or from other causes. This dock also has a dredged depth along its face of 30 feet at low water.

At the close of the year the following progress had been made on the dock construction work:

The motorboat landing, on which work was commenced in 1913, was completed early in January, and since that time has been in constant use and of great convenience to the public. As already noted, the first unit of Dock No. 1 has been in operation since April, 1914. The extension of Dock No. 1, including the slip and the portion of the open dock under contract, and the one-story warehouse in rear of this dock, had been fully completed in the latter part of December. At the present time the open dock has only been constructed to the width of 20 feet, so that the remaining 40 feet in width remains to be completed before the improvement can be utilized by vessels. It is expected that early in 1915 funds derived from sale of bonds will enable the commission to let the contract for the final completion of this work.

Dock No. 2, on the east side of the river, will be completed within the contract time, or about February 1, 1915.

For the expeditious and economical handling of cargo the commission has adopted the latest and best practice followed in the most modern dock construction in the principal Atlantic Coast ports. For this purpose it has provided at both of its docks what are known as cargo masts on the harbor face of the docks. These cargo masts are used either entirely in connection with the ship's gear or by a combination of the ship's gear and electric dock winches, of which four have already been installed on Dock No. 1.

Cargo Handling Expedited.

The method of handling cargo is to rig a block directly over the door on the dock through which freight is being handled and to place a block on one of the ship's booms directly over the hatch in the ship which is being worked. A line is passed from a winch, either on the ship's deck or on the dock, through a block directly over the hatch, and this line is attached beyond the block to another line which is run from a winch through a block on the cargo mast of the dock, and near the point of junction of these lines there is placed a hook. In discharging cargo from the hold of a ship the line passing through the block on the cargo mast is left free and the cargo is hoisted out of the hold by the winch operating through the block on the ship's boom above the hatch. When the cargo is clear of the ship's hatch and deck the line from the winch operating through the block in the cargo mast on the dock is brought into action by slackening the line passing through the ship's boom block and taking up on the line passing through the cargo mast block, the cargo is brought directly beneath the block on the cargo mast and lowered from that to the deck of the dock.

This is an exceedingly simple and effective method of handling cargo. It is very positive in action, for when one line only is carrying, the hook is directly in position over the hatch, and, when the other line is carrying the hook is directly over the door of the dock shed. There is no swinging of booms to be carefully gauged, and there is no doubt about the location where the cargo will be when either one line or the other is carrying. It will then be readily seen that by this method it is immaterial whether the position of the hatch opening is directly opposite the door in the dock shed on discharging or loading a vessel.

By actual experience at dock No. 1 it has been demonstrated that a saving in time of about 15 per cent is thus effected, when the ship's gear alone is used on the cargo masts. With dock winches it will be possible to work two gangs to the hatch, thus still further cutting down the time of discharging a vessel. The electric dock winches have a rated capacity of 31-horsepower. The number of dock winches to be provided at dock No. 2 has not yet been determined, and their installation will depend on the amount and character of business that will be done at that dock. The second sketch accompanying this article illustrates very clearly the use of the dock cargo masts by the ship's gear or by a combination of the ship's gear and the electric dock winch.

The question has been raised why the commission, in the building of its docks, did not provide movable power derricks and cranes of the types used in European ports. This matter was gone into very thoroughly by the commission, and it was readily demonstrated that such installations would involve a greatly increased construction expense and would be of but little value in expediting and lessening the cost of discharging vessels, taking into consideration the amount of business done and the class of freight that is handled at this port. Investigations and reports showed:

That savings by machinery over customary methods of handling do not pay for the material, maintenance and operating cost.

That sorting is nearly always required in the case with freight, be it European, Atlantic, coastwise, railroad or general.

That capacity of cranes is always relatively low in handling of general cargo which takes a long time to stow and consists of light packages.

That records of crane installations in largest European ports show that for general cargo the total number of hours during which cranes are at work in the course of a year averages only 1000 hours, and that the mean number of hours per annum worked by all the cranes of a port, including cranes used for coal and other bulk freight, hardly exceeds 1500 hours.

That ship's winches are very generally used, notwithstanding the installation of cranes and derricks.

That the more closely a natural order and condition is followed, as against artificial creation, the more surely will economy be conserved.

That the more artificial any proposition is, the more expensive it is bound to become in the end.

Investigations made by the Bush Terminal Company, of Brooklyn, during a number of years, with a view of cheapening the cost of handling cargo by the installation of mechanical appliances and machinery have not resulted in the placing of any machinery whatever, the conclusion being, apparently, that on account of the great cost of sorting required no present known form of installation would have sufficient elasticity to be economical.

Dock Autos to Be Used.

At dock No. 1, in connection with warehouse service, it is proposed to furnish two electric dock, autos, of two-ton capacity each, for transference of freight which cannot be handled by the conveyor, and for transportation of goods from distant points on the dock to the conveyor. It is further proposed to operate the dock autos with three or four trailers to each auto, thus expediting not only the transfer of goods, but also considerably reducing the cost of transfer.

The two tracks now in rear of Dock No. 1 will accommodate, at one time, 27 50-foot cars. Should these trackage facilities at any future time prove insufficient to handle the dock's rail business, the Commission has made provision for sufficient space in the marginal way, running parallel with the rear of the dock, to permit of the construction of an additional track the full length of the dock. By recent construction of additional roadways three entrances and exits, connecting with Front street, have been provided, which has eliminated the team congestion to which this dock was subjected before the fill in rear of the dock had been completed.

At Dock No. 2, entrances to both levels of the dock have been installed at each end of the structure, thus providing complete circulation of team traffic and doing away with the necessity of turning the teams inside the dock. In rear of the dock there will be three parallel tracks, which will furnish placement for a sufficient number of cars to handle the rail traffic of the dock. The installation of dock autos here is not contemplated until such time as warehouse facilities have to be supplied.

The policy of the Commission, so far as the use of Dock No. 1 is concerned, has been to restrict its use to Atlantic and overseas shipping. The vessels of the Atlantic & Pacific, Boston-Pacific and the Royal Mail Steam Packet companies are regularly using Dock No. 1, and before the outbreak of the European war the Hamburg-American line had made application for berth at this dock, and since the beginning of the present wheat-shipping season practically all foreign tramp steamers also have discharged their cargoes at this dock.

It is expected that when Dock No. 2 is completed it will be utilized to a greater extent by coasting than by the larger type of vessels making the port.

Since December 1, 1913, the tariffs of the Oregon-Washington Railroad & Navigation Company and the Spokane, Portland & Seattle Railway Company provided for assessment of wharfage and loading and unloading of cars at Portland on merchandise from Asia, Hawaiian Islands, or Philippine Islands, California and Alaska, interchanged with water carriers passing over all Willamette River docks except those owned by these companies. The Commission early in the year took up the matter of doing away with this handicap against the port with the railroads, with the result that all the railroads so amended their tariffs, effective during December, 1914, that they will assume wharfage, loading and unloading charges, not exceeding 50 cents per ton of 2000 pounds, or 40 cubic feet measurement, on carload freight to or from Asia, Philippine Islands or Hawaiian Islands, when originating at or destined to points on their lines and connections beyond certain points specified in their tariffs. These absorption charges are also made to apply on canned salmon, pickled, salted or frozen fish. By the absorption of these charges by the railroads, this port has been placed on an equal basis with the Sound ports in this class of business.

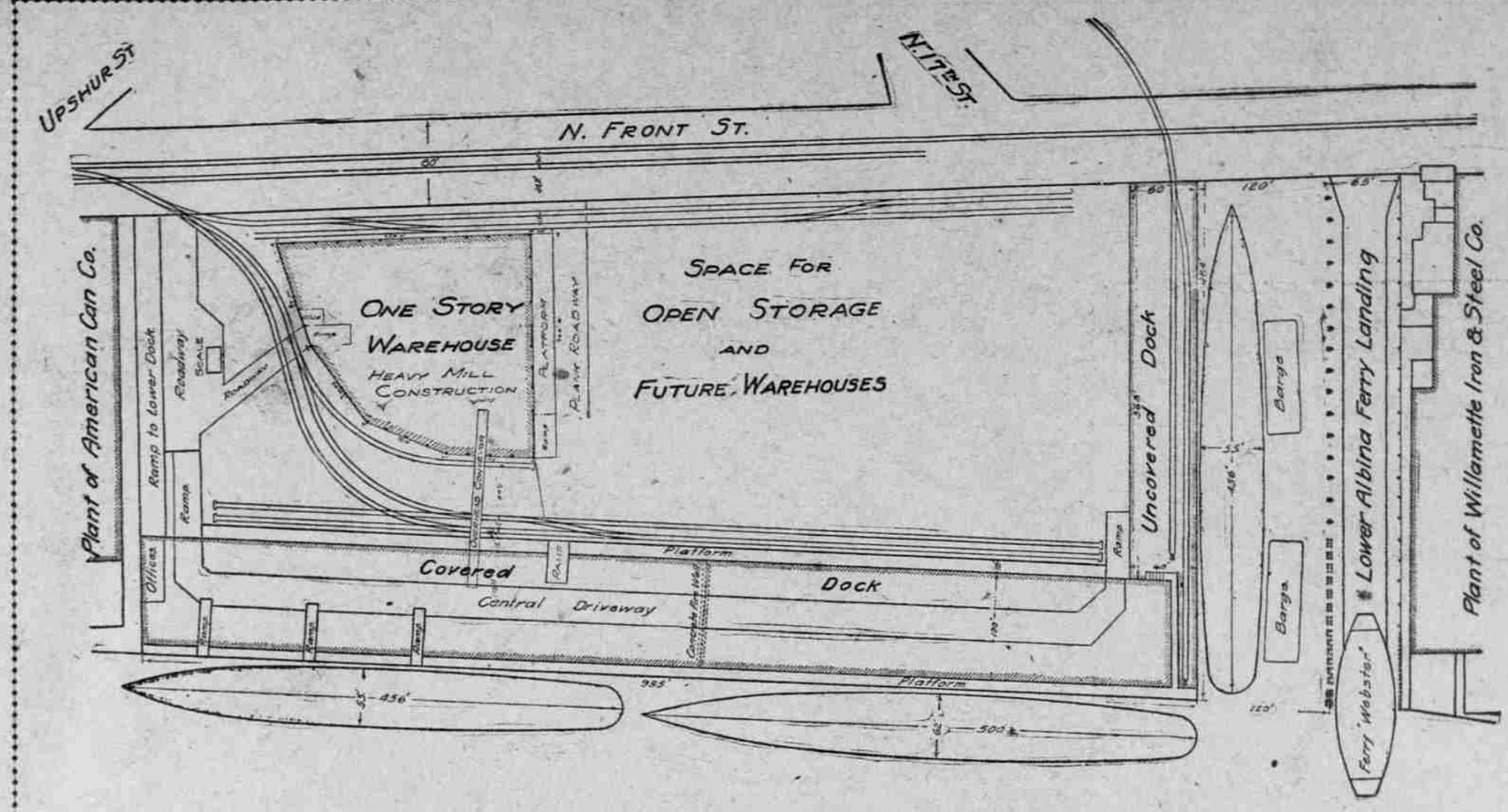
Switching Service Excellent.

During the past two years the Commission has been working for the removal of all but one track from Front street north of Broadway bridge, to provide additional trucking space for the rapidly increasing teaming on the main thoroughfare of the docks. These tracks are owned and operated by the Northern Pacific Terminal Company. Through the efforts of the Commission and the Commissioner of Public Utilities, the Northern Pacific Terminal Company and the Spokane, Portland & Seattle Railway Company have reached an agreement as to trackage and switching arrangement and have announced that, effective November 23, 1914, the freight rates of the Spokane, Portland & Seattle Railway Company, Oregon Electric Railway Company, Oregon Trunk Railway and United Railways Company now applying to present terminals in Portland will also include receipt and delivery of carload freight without additional charge to and from Northern Pacific Terminal Company's tracks on and adjacent to North Front street from a point near Albers Dock No. 1, northward to the Oregon-Washington Railroad & Navigation Company's "boneyard" north of Nicolai street, including the Eastern & Western Lumber Company's tracks on Sherlock avenue.

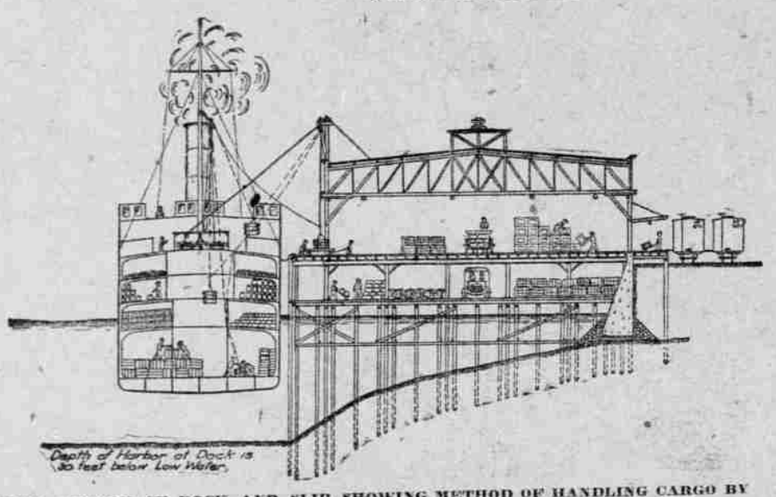
This action of the railroads placing switching service at all docks and industries located along this portion of Front street on an equal basis, and the absorption of wharfage and loading charges on Oriental and Alaska business, is a distinct advantage to the port.

Direct Railroad Connections With Docks Maintained

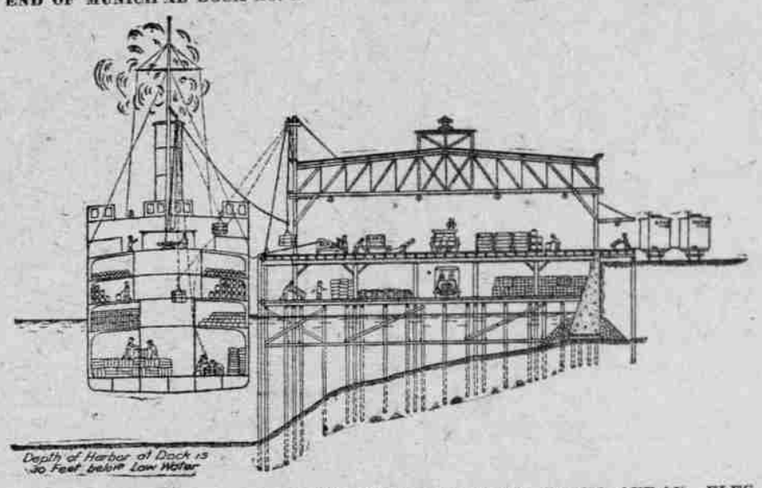
Provision of Switching Service and Absorption of Wharfage Charges Is Distinct Advantage to Port.



SKETCH SHOWING SLIP TO BE BUILT AT NORTH END OF MUNICIPAL DOCK NO. 1.



CROSS SECTION OF DOCK AND SLIP, SHOWING METHOD OF HANDLING CARGO BY MEANS OF MAST AND WINCHES.



METHOD OF HANDLING CARGO WITH MAST, ONE SHIP'S WINCH AND AN ELECTRICAL DOCK WINCH.

PORTLAND SOON TO BE BIG INDUSTRIAL CENTER

By W. H. Lewis, of Lewis-Wiley Hydraulic Company.

THE writer's view of a subject of such tremendous importance to a city as its industrial development, is the view of one who has somewhat recently come to Portland, and who has seen fit to invest for himself and friends over $1,500,000; and this expenditure was not made as a gamble, but after a thorough investigation of Portland's growth and her future opportunities. The writer does not claim an extremely great knowledge of manufactures and manufacturing, but his opinions here expressed are the same opinions he held when he first viewed the city.

One of the first conditions now looked into by the modern manufacturer is the home life possible for the industrial worker. Home life and social environment cannot be too ideal for large production and low manufacturing cost. Factory after factory in America has increased its production and reduced its overhead through paying better wages, educating the employe, providing recreative hours and equipment for employes, assisting the worker to better living quarters and improved community associations and looking to the better health of employes. In the East the producer frequently is forced to large expense to create these conditions, due to the congestion in the large Eastern cities and to the lack of natural advantages.

Portland has been given by nature most of the advantages others have had to buy. Extreme temperatures are unknown. We have a mild Summer day, drenched with golden sunshine—not hot and weakening, and a Winter seldom more severe than a gentle rain—the mean annual temperature being 52 degrees Fahrenheit. The healthfulness of Portland is demonstrated by the extremely low death rate, it always being at the head of the list, either first, second or third in the health statistics of the Union. In no city have I ever been where the air was cleaner, where dust and flying dirt was such an unknown thing.

A large factor for public health and for high efficiency in labor is the water one drinks, and the Bull Run water supply is conceded by all who know to be the equal of that of any city in the world. For those lines of manufacture requiring a pure water with a low percentage of dissolved and free mineral and other matters, the supply is unlimited.

One of the first things to be considered by the promoter of a new industry is the adequacy of shipping facilities by rail, and especially by water. Portland is favored, not only by numbers of rail lines entering from and departing in all directions, but in every direction there is competition by rail and by water, hence a constantly growing competition for favorable freight rates. All roads reach Portland on a water grade, and its natural advantages as a shipping center seem unsurpassable. Being the natural distributing center and clearing-house of a basin comprising 250,000 square miles of the most fertile territory on earth, she can never be dislodged from her possibility as a manufacturing center. A glance at the map will show Portland at the junction of two great waterways—the Willamette and the Columbia. These two streams drain this immense area just being opened to real development. All that comes in and goes out finds its natural transfer point at Portland. The river boats ruturn to their respective home points miles away loaded with finished products and manufactured articles purchased from the Portland factories and wholesale houses.

The movement of freight via the railroad from coast to the interior and interior to coast is accomplished on a lighter grade than from any coast outlet in America. The movement to Portland is down grade—water grade—and on return the average pull to all this immense basin is but a grade of one-quarter of 1 per cent.

Then isn't it logical for us to assume that we can take many of these products of the soil and pasture, and add to them some labor value at this clearing point? Why shouldn't we take some of this raw material and instead of transferring to the dock and from dock to ocean liner, or coaster or railroad, unload at the factory, make a more finished product, add to the raw material a payroll and stow this output in the sea-going vessels' holds? I am sure the boats and freight cars have no objections to this—finished freight brings better freight rates, and everything that it would be possible and plausible for us to manufacture in Portland, would not bring us into profit-reducing competition with the territories of exchange.

Timber Wealth Enormous.

Oregon alone contains one-fifth of all the standing timber in the United States, or 500,000,000,000 feet of uncut merchantable timber. Portland ranks first city in the world as measured by the value of lumber sawed and shipped. No city in the entire world has the capacity for cutting the amount of lumber that is cut annually by Portland mills. This lumber represents Douglas fir, spruce, hemlock, red and Port Orford cedar, sugar and yellow pine. I would like to ask you how many things are made of wood; how many articles of all kinds can be made of the wood we have in Oregon? Yet without taking issue with the lumberman, I would like to know what effort he is making to do any more than to cut down our magnificent timber and put it in bottoms and on cars and ship it away for others to capitalize. For years I have heard complaint from the lumberman on the Coast, but until recently I have not seen this same complainer take one step toward attempting to solve his problem. He can, it seems to me, continue to float out raw lumber the rest of his life and never really and truly make the money he would like to make on his investment. Wouldn't it be a reasonable thing for him to add a little more labor value to his lumber, put it in more marketable shape, increase his per capita of possible usage by manufacturing articles from the wood that are and can be used everywhere and especially in our American markets? And again, I say, he is backed by the greatest source of supply in that one thing of any possible industry on earth—lumber.

Strange as it may seem, I have met a number of big lumber men who have never looked at this simple point clearly; they have never gotten out of the rut of the business they so ably pioneered. Yet just consider the history of a tree worth perhaps $2 per thousand feet in the stump. If we cut the same tree into cordwood, it may market at $4 to $6 per cord, and furnish a number of days' work. This same tree if sawed into lumber is worth say $20 per thousand feet and would furnish employment for several days for one man. If worked into finished lumber, it becomes more valuable, say $26 to $60 per thousand feet, and would furnish employment for more skilled and better paid laborers for a greater length of time. This same lumber in a furniture factory produces several hundred dollars' worth of furniture and might furnish employment directly and indirectly equal to six months or more of one man's time. The working of the wood into articles, more articles, such as the graphophone toys, etc., might produce several thousand dollars' worth of articles. And all of this represents labor value and a few more materials added to the original tree at $2 a thousand in the stump. A range of values created out of labor, from a few dollars up to several thousand, depending upon the degree of refinement extended to identically the same raw material through quantity and quality of labor employed upon it. That is the style of industry we require in Portland.

Water Power Unlimited.

Then comes the power to run the wheels of industry. Steam power is obsolete—though for those factories requiring coal for other purposes than power, we have mines at hand from which to supply them. For power, electricity is the thing, and, the supply is practically unlimited. The electricity in Portland and the Northwest is produced by water power. Portland is prepared at this moment to supply electricity in immense horsepower through two large competitive companies, the competition naturally maintaining just rates. The great Columbia Basin, at the inlet and outlet of which stands Portland, holds one-third of all the undeveloped water powers of the United States.

Climatic and living conditions are ideal for manufacturing, especially in the use of high-class labor, which we most desire; shipping facilities are here and the rates are self-solving; water power is unlimited; of raw material we have a bounteous supply, where many states and countries have to go after it. The markets of the world have been opened to us by the Panama Canal and by dissension in the producing countries of Europe.

Why not double the canning industry in Oregon, and float the canning products of the soil down the river on boats to the Portland plants?

Why not increase the already prosperous development in the meatpacking industry and the manufacture of the various byproducts thereof?

Why not develop the growth of flax through the manufacture of flax products? And, so we could name numbers of raw materials for use in manufacture.

"Made in U. S. A." New Watchword.

I can see the argument put up by a few against this sort of thing. They will begin claiming "no market." But well we know that all the value has been taken out of the phrases, "Made in Germany," "Made in England," "Imported From Paris," and such. Without considering the foreign markets open to us and the added advantage of their European source of supply now being cut off, we can have quite enough to do supplying "Made in U. S. A." articles to Americans. And truly I can see no opportunity greater than the opportunity of Portland to look into, investigate and establish these new manufactories.

Permit me to add just one word more, gained from the experience of plants the world over, that have made good articles for unfound markets. I will say, don't spend all your capital in your plant; reserve a fair amount for finding, uncovering, creating and educating your market. Remember, there is selling expense in anything worth while, and that selling expense is relatively small if you have the capital to put it through. Profit by the experience of the lumberman who has tried for the last six years to move lumber on practically no selling expense, and has failed, by realising that it takes time, advertising and salesmanship to tell the world of what you have to offer, and those things all cost a certain amount of money.

It is apparent that the manufacturer establishing here finds a gold mine of ideal conditions and ready-to-use opportunities. But there is so much more room for manufactories to utilize our advantages that it seems we should cooperate more strongly in locating them.

Co-operation Supreme Need.

My attitude in this is not critical, but intended to be constructive. Here is the condition: The Portland Railway, Light & Power Company has one or more men working energetically to create new industries for Portland or to bring factories from the crowded Eastern centers here. The Northwestern Electric Company is likely doing the same thing. The Portland Commercial Club is working for more factories, and the Chamber of Commerce and Manufacturers' Association of Oregon are especially active in this direction. The other clubs occasionally interest themselves in thus building up the city. Also different individuals having in mind the welfare of Portland, the safe investment of capital and the capitalizing of natural resources, are working for more factories.

It is the story of organization as against unorganized effort. When will those clubs and individuals organize and follow out a definite plan of campaign for securing new industries for Portland, the ideal industrial center, where farm and factory meet? When they do, we will see many new monuments to Portland's progress spreading over the excellent factory sites of Industrial Center, North Portland, and along the Willamette. And the substantial increase of regularly paid skilled and unskilled labor will advance Portland beyond her highest expectations.