

canal. The corresponding reading on the gauge at the upper end will be ninety-six feet. The lift of the lock at this stage will be twenty-four feet. At the lower end of the lock there will be provided a lower guard gate, and at a lock's length above the upper lock gate, an upper guard gate to exclude high water. Immediately above this there will be a caisson gate to be used in case of needed repairs to this gate. Above and below the guard gates the canal will be made wider, in order to facilitate entrance to the lock, and to provide a limited harborage for boats awaiting their turn to go through. This work is all designed with the idea of ultimately providing for the passage of boats at stages of water higher than twenty feet, should it be found that the exigencies of the commerce of the river require it."

After giving minute details of the work accomplished, the report says that "a little more than one-third of the excavation required to complete the canal has been accomplished. It is doubtful if so large a proportion of the other necessary work is finished. To bring the canal to its present state with the small appropriations that have from time to time fallen to its lot, has taken a period of twelve years. At this rate it will require, perhaps, twenty-four years more before any benefit to commerce will result from this work, or the country receive the least remuneration for the money expended. A generation will have been born and gone to its grave between the beginning and ending of an enterprise which a healthy syndicate would have prosecuted to completion within six years, at farthest, after commencement, and been in the enjoyment the balance of the time of a liberal income from the money invested. From 1876, the date of the first appropriation for this work, up to the present time, but \$1,112,500.00 have been made available for its prosecution. This is an average of about \$95,000.00 per year. The various appropriations that have been made during this time, the total of which is given above, if invested in an enterprise paying four per cent., with their yearly interest re-invested at the same rate, would amount to \$1,490,490.00, an excess over the amount appropriated of nearly \$348,000.00, for which there is nothing to show. The next yearly interest would amount to \$79,600.00, almost as much as the average yearly appropriation. To illustrate more plainly the effect which the policy of small appropriations for a work of this magnitude will have upon its ultimate cost to the people, who, after all, must, in some way, either directly or indirectly, supply the money necessary for the enterprise, let us suppose that the work is estimated to cost \$3,000,000, and that an annual appropriation of \$100,000.00 is made for carrying it on. The time to be consumed in carrying out the project will be thirty years. The

annual appropriations, with their accumulated cost at four per cent. will, upon the completion of the project at the end of this time, amount to \$5,832,800.00, nearly twice the estimated cost of the work. If, instead of this, we suppose that the annual appropriations had been made in amounts as large as could be profitably expended, say \$500,000.00, this amount will be \$3,449,000.00, a saving of \$2,383,800.00. The work will be completed in six years, and the people at once begin to reap the benefit of the money invested. This exhibit of the case is purely from the money dealer point of view. It takes no note of the large increase in the cost of work resulting from deterioration and renewal in plant and appliances, and other causes that must necessarily pertain to a long term of years and small appropriations; nor does it include the large amount that results from the difference in freight rates on the commerce that would take this new route, were the improvement finished, but which now goes by some other to market. For all works of this character, where the improvement to be effected must be completed before any advantage can accrue to commerce, it does seem that the policy of small appropriations, running through a long term of years, enhances enormously their ultimate cost. The upper cascades of the Columbia river is an absolute barrier to navigation. It must be flanked by a canal and lock in order that the commerce of the river may pass by it. These must be finished, the last boulder removed from the canal, and the last rivet driven in the lock gate before one penny's return can be had for any outlay that may have been made to effect the improvement. On sound business principles it would therefore seem that this work should be liberally appropriated for and pushed forward to completion as rapidly as possible, in order that some return may be had within a reasonable period of time for the large amount of money already expended."

The bearing of the above remarks on the policy observed by the government in making appropriations for important river and harbor improvements will readily be seen. The argument is pertinent and forceful. If the plainest principles of business policy were observed in pushing work once begun, and of undoubted utility, the net savings to the government would be enormous. The recommendations of competent engineers entrusted with government work are generally overlooked, and the question whether or not appropriations are made for improvements of vital importance seems to rest more upon the turn of a political trick than upon any merits the case itself may possess. People of the northwest have watched the course of the government in relation to the work on the Columbia, and at times have despaired of ever having that great waterway opened for navigation.