## THE NEW LOCK AT THE SOO.

Coincident with the construction of large permanent steel ore docks at Lake Superior shipping ports, capable of accommodating the mammoth carriers recently built, provision is being made to facilitate the passage of such vessels through the channel at Sault Ste. Marie, where the existing locks are proving inadequate to the service. The principal work now in progress there is the building of the new Davis lock, recently described in the Mining and Engineering World, which was begun in March, 1907, and will not be completed until 1916.

Next to the Panama canal this is the most important aid to navigation now being carried out by the federal government; and it is due entirely to shipments of ore from Lake Superior ports.

The total length of the lock will be 1,715 ft. and its width 80 ft., 1,350 ft. being within the inner gates. Six culverts are provided for; 1,200 ft. of the wall is 50 ft. high and 26 ft. wide at the base. It is to be built up from bed rock in sections, alternate sections being constructed first and the intermediate sections later. They are 25 to 35 ft. in length. The concrete of the lock floors will be 1½ ft. thick. The work also includes lining about 325 linear ft. of tunnel rock, and the building of about 170 linear ft. of tunnel in trench, in addition to the tunnels and passages through the masonry. To furnish the crushed rock for the concrete work there has been built for the concern having the complete contract, viz., the Great Lakes Dredge and Dock Co., the plant described in the following. It is located in the vicinity of the new lock.

This plant is designed to crush Lake Superior trap rock. There are two gyratory breakers. One is a No. 7½ machine, with receiving opening 14 by 52 ins. set to crush to 3½-in. cubes, and the other is a No. 5 breaker with 10 by 38-in. opening which makes a 2½-in. product. Their foundations are flush with ground level, or about 8 ft. above the normal water line. Both machines are fitted with manganese mantles and concaves.

The discharge from the breakers is taken by a No. 7½ continuous bucket elevator, with centres 68½ ft. apart, and discharged to a 48-in. by 16-ft. iron-frame, revolving screen. From this the oversize rejections are returned through a spout to the No. 5 breaker, while the screen product falls to a storage bin, of heavy-timber construction, set 12 ft. above the rails of the 36-in. gauge loading track. This bin is 16 ft. wide, 48 ft. long and 21 ft. deep, with steel-rod reinforcement, and suitable discharge gates in the bottom.

There are also provided two troughing-belt conveyers, each 16 ins. wide with 100 ft. centres, suspended on light wooden trestles, which have ⅛-in. rubber covering on their carrying surfaces. To these the excess stone can be diverted, as required, and borne to two stock piles, 60 ft. high, and having centres 120 ft. apart. By means of a timber-frame work, like that of a mine shaft, a tunnel, with gates at the top, is made to extend through the piles, enabling cars to be readily run under the gates and loaded. The tunnel tracks are parallel with those under the bin.

The entire plant is electrically operated on alternating-current, 3-phase, 60-cycle, 240-volts. Induction motors have been installed as follows: 75 h.p., 690 r.p.m., for driving the No. 7½ breaker; 30 h.p., 860 r.p.m. on the No. 5 breaker, 40 h.p., 860 r.p.m. for the elevator and revolving screen, and two 5 h.p., 1,150 r.p.m., each of which operates one of the belt conveyers. These motors are so placed as to secure for the plant the benefit of the most efficient belt drives, and they are protected from the elements and flying dust by suitable roofing and siding, which also permits free ventilation.

The unusual dimensions of the lock are made necessary, both by the ever increasing traffic on the lakes, and by improvements that have been found necessary in the operation of the two locks now there. The length in use will not only be utilized in handling longer boats, as they are built from year to year, but it also will make possible the entry of two of the longer craft in tandem style, a practice never yet indulged in.

At present the two or more boats often passing the locks together are locked through abreast of each other. Vessel owners and masters declare this is a dangerous proceeding. The boats, they say, not only require more time to take their positions in the locks in this way, but also that there is great danger from suction to the boat remaining in the lock when the first one steams away.

On more than one occasion lines have snapped and boats have drifted temporarily in a helpless manner in the locks.

The present largest lock, the Poe, is 100 ft. wide. The new one will measure but 80 ft., making it impossible to lock vessels through in any other way than tandem.

Probably the most distinctive feature of the new lock will be its depth. When opened for navigation it will present a loading depth of 24½ ft., or 6½ ft. more than the present depth accorded the boats of the great lakes. While all channels on the lakes are now dredged to a depth of but 21 ft., experts declare it will prove of less expense to dredge the channels deeper than to construct or remodel other locks.

The practical value of the depth presented by the present locks, an average of 18 ft. is displayed in the trouble the larger boats experience in locking through. Unnecessary delay is now experienced by the masters in locking through by the upheaval of water at the bow of the boat. Such conditions, engineers say, are due to the excess of water caused by the entrance of the boat to the lock being unable to escape fast enough at the sides of the boat. With the additional depth presented by the new lock, this water, it is figured, will be forced under the boat to the escaping channels beneath the flooring. With such facilities at hand vessels will be able to lock through in less than half an hour, while it now takes many of the larger ones over an hour.

The importance of the work now being done by the federal government on the new locks and canal here, may be seen from the fact that the present locks already float the greatest commerce of any inland waters of the globe. In 1911 the total tonnage amounted to 62,000,218, which is two and one-half times greater than that passing through the Suez Canal, and seven times greater than that of the Kiel Canal. What the traffic will amount to with the addition of another lock, the greatest yet constructed, remains to be seen.

The present commerce exceeds that borne by all ships, British and foreign, entering the ports of Great Britain in one year, and valued at an average of $654,010,844 annually. When completed the new lock will not only be by far the largest in the world, but will represent an expenditure of about $9,000,000.

## PATRICIA LAND.

Mr. J. B. Tyrrell, who led the Government expedition to the Hudson Bay through the new district of Patricia, has returned to Toronto and commenced the preparation of his report to the proper authorities.

According to him, there is a larger area of tillable land in this section than was at first supposed, and he is confident that the bog lands are so situated that their drainage is a simple problem. The best land in Patricia is forest covered, and other large stretches resemble Temiskaming, rocky ridges, in which hardly a clear acre of good soil may be found, alternate with large sections of promising land. Mr. Tyrrell states that this portion of the Dominion will some day be a sportsman's paradise, as the swamps teem with flocks of wild ducks and the rivers abound with fish.