area of about 84 acres (see Fig. 1), and immediately below will be located twin locks 6, 5 and 4 in flight. These three locks will overcome a descent of 139½ ft. One flight will be used for down bound vessels and the adjoining flight for up bound, a double flight being required to save long delays in the passage of vessels through the canal.

The main line of the G.T.R. between St. Catharines and Niagara Falls will cross over the foot of twin locks 4, by means of two short bascule lift bridges.

The Port Dalhousie-Welland branch of the G.T.R. is situated just where the new locks are to be built, and it will be necessary to divert it some distance to the west. The diverted line will bear the same relation to the new canal as the present line does to the present canal, following upon the west side of the locks, but remaining on the west side of the canal for some distance above the present lock 25, when it will cross the new canal by means of a bascule lift bridge.

From lock 4 the proposed waterway will run northwards, following in part the bed of the Ten Mile Creek until it crosses the present canal at the foot of lock 11, at an elevation of 382 ft. above sea level. This is the level of the present canal at that point, and small vessels may, if desired, use the Port Dalhousie entrance, as at present, as far as lock 11. (See Fig. 1.)

Lock 3 will be located immediately north of the present canal, and at its head on the east side will be situated an equalizing basin or pondage with an area of 150 acres. Below lock 3 a heavy cut will be required through the village of Homer to a point where the bed of Ten Mile Creek is again reached, and below this point lock 2 will be built, as shown. It was difficult to find a location for this lock on account of the lack of rock for a foundation, but eventually a suitable foundation was found at this site. The canal at the head of lock 2 will be at an elevation of 335½ ft. above sea level and will flood about 200 acres of land along Ten Mile Creek. Below lock 2 the canal will follow the bed of the creek to the lake, lock 1 being situated just below the Lake Road. The pond at the head of lock 1 will cover an area of 107 acres.

Some typical cross-sections of several locks are shown in Fig. 3.

The Entrance Into Lake Ontario.

The outer entrance piers in Lake Ontario will be placed about a mile and a half from shore, where the depth of water is 30 ft. A wide channel will be dredged from these piers to lock 1. The sides of this channel will be protected near the shore end by reinforced concrete cribs, with concrete superstructures, alongside which vessels may lie. This arrangement is illustrated in Fig. 1. From the shore line of the lake to the outer entrance piers an embankment about 500 ft. wide will be formed on either side of the channel, from material excavated from the canal between the lake and Thorold. For the purpose of conveying this material from the different contracts to the lake, the Department of Railways and Canals will build a double track railway along the west side of the canal from the foot of the flight locks near Merritton to the lake, and temporary trestles will be built out in the lake on either side of the harbor, from which to start the dumps. The railway will also be utilized to haul crushed stone from the site of the flight locks to locks 1, 2 and 3, for making concrete. The contractor for the rock excavation from the site of the flight locks will, under his contract, be obliged to crush a sufficient quantity of the good rock taken from his excavation to supply all the crushed stone required for making all the concrete for the different locks and structures.

The construction of the new canal is under the direction of the Department of Railways and Canals. It will cost approximately fifty million dollars. The engineer in charge of the entire construction is Mr. J. L. Weller, M. Can. Soc. C.E.

The contract for the first section of the work, a length of about three miles, including lock 1, and the pier works at the Lake Ontario entrance, was awarded early in July to the Dominion Dredging Company, Limited, Ottawa, the contract price being about $3,500,000. Other sections are following closely, and contracts for them will be awarded before the close of August.

MONEL METAL.

A synopsis is given by R. H. Gaines in Chemical News, of the methods of manufacture of this new alloy, the reduction of which has now been so perfected as to give a product of very uniform composition, different analyses of different varieties only varying betyeen the limits: Nickel, 67.55 to 69.54 per cent.; copper, 26.25 to 27.53 per cent.; carbon, 0.17 to 0.44 per cent., and iron, 2.07 to 3.33 per cent. In forged or rolled metal the manganese varies from 1.26 to 1.82 per cent., and the silicon from 0 to 0.37 per cent., while in cast metal the manganese varies from 0.09 to 0.49 per cent., and the silicon from 1.08 to 1.41 per cent. Variations in mechanical properties have little relation to variations in composition. Carbon appears to strengthen the alloy; iron hardens, whitens, and increases the strength, but appears to reduce the elastic limit. Silicon and manganese do not materially affect the physical properties, but manganese may correct the action of sulphur, which is probably present. The alloy resembles nickel in color, it machines well, and takes a high polish and retains it indefinitely. It melts at 1,360° C.; has a specific gravity of 8.87 and a hardness number of 20 to 27 on the Shore scale. It is magnetic and absorbs carbon, which can exist in it both free and combined. Compared with nickel and copper its mechanical properties are:—

	Copper, rolled.	Nikel, rolled.	Monel metal. Cast.	Rolled.	Annealed.
Tensile strength, pounds per square inch	34,000	75,500	85,000	100,000	110,000
Elastic limit, pounds per square inch ...	18,000	21,000	40,000	50,000	80,000
Elongation, per cent. in 2 inches	52	43.9	25	30	25
Contraction, per cent.	57	57	25	50	50
Modulus of elasticity.	....	.....	22,000,000 to 23,000,000		

Monel metal resists corrosion by sea-water, superheated steam, and chemical solutions about as well as Parson's manganese bronze, phosphor bronze, and Tobin bronze. There is no difficulty in forging and rolling it, but on account of its high melting-point and power of dissolving gases special precautions are needed in making sand castings, somewhat similar to those necessary for making steel castings. These uses are suggested: pump cylinders for sea-water, propellers, rudders, mining screens, valves, and plumbing fixtures subject to corrosive influences. Sheets of monel metal are largely used in America for roofing purposes.