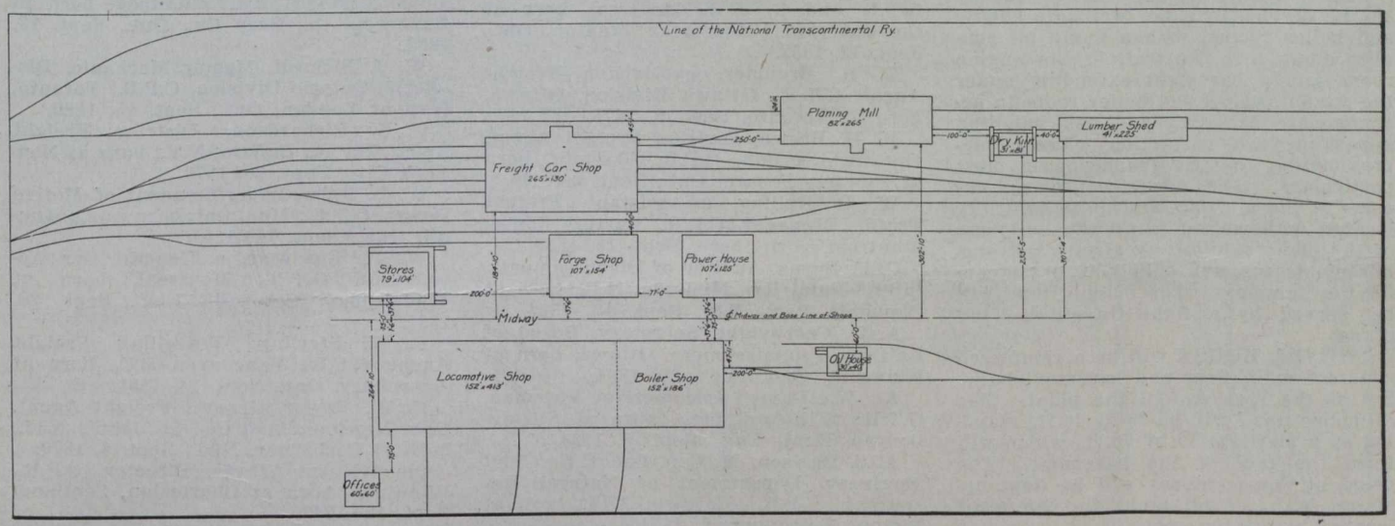
and it is important to use the last vestige of daylight. A pole rod, self reading, with figures painted on the wood was used almost invariably. The telescope rods were apt to play tricks, slipping down unnoticed at times and refusing to extend when required.

Repairs were difficult to make, and as a matter of fact this question of repairs with the elementary tools which could be carried (the axe, spokeshave, auger and awl) was one that entered into consideration with almost every article of the equipment.—Engineering News.

National Transcontinental Railway Shops at Quebec.

The plans for the shops to be built by the National Transcontinental Ry. at Quebec, Que., estimated to cost $1,500,000, have recently been prepared and tenders will shortly be invited for the work. They are intended to handle all the repairs on the eastern end of the N. T.R. in conjunction with the larger shops at Transcona, Man., 5 miles east of Winnipeg, the major portion of which has been in operation for some time. A description of the latter, dealing with each of the locomotive department buildings in detail, appeared in Canadian Railway and Marine World for Feb., 1912. These two shops will handle the whole 1,800 miles of the N.T.R. from Moncton to Winnipeg, and in addition, it is the intention to handle the repairs on the G. T.P.R. lines west of Winnipeg, until such time as it becomes necessary for that line to build additional shops further west, as the C.P.R. has recently done at Calgary.



Layout of Shop Buildings at Quebec National Transcontinental Railway.

The shops at Quebec will be located in the suburb of St. Malo, which is about 2 miles distant from the centre of the city and almost due west. From the north end of the Quebec bridge, now under construction for the N.T.R., the line follows a northwesterly direction along the St. Lawrence River to Wolfe's Cove, piercing the escarpment at this point, the tunnel running straight back from the river, coming out near the site of the projected shops at St. Malo. The C.P.R. Quebec-Montreal branch passes through St. Malo, and the N.T.R. line from near the point where it leaves the tunnel, forms a Y in two directions to make connection with the C.P.R. The shops will be located on the southerly of the Y branches, in the track engirdled area, the shop area being about 1½ miles long by ¾ mile wide, the main line running along one side.

The arrangement of the buildings is shown in the accompanying plan, from which it will be noted that the layout, while providing for ample accommodation for meeting all requirements for many years to come, is considerably smaller than that at Transcona, but the layout and grouping is such that additions to present buildings, and additional buildings, may be made at any time without destroying the utility of the present arrangement.

The shop buildings will be arranged along a midway, which will parallel the main line, the relation of the buildings to the midway being somewhat different from that in the generally accepted midway shop arrangement in which the shops are placed end on the midway, with each of the buildings close together, with room for expansion to the rear. In this layout the arrangement is different, involving the location of the buildings which use the heavier materials along the midway, with the other buildings back from it. It is considered that this arrangement will prove most satisfactory for a small shop such as this, because the material brought to the shop by the midway crane and placed at one of the several doors of the building, will be taken from the door to the machines in the most direct way. In this respect, it will do away with the "long haul" in the shop. The midway, which will extend the full length of the main part of the shop grounds, will be 75 ft. wide, and served by a 20 ton travelling crane, the track for which will be supported on building abutments and steel columns.

The level of the ground on which the shops will stand is to be raised slightly by spreading over the surface the material removed from the tunnel under the mountain. Most of the buildings in the group will be of practically the same construction, a self supporting steel frame with white brick superstructure walls, the whole supported on a concrete wall carried up to the window sills. The roof of each building will be of double wood sheathing, with ventilators and skylight, and covered with a prepared roofing. The flooring in all cases, save where specially excepted, will be of 6 in. concrete overlaid with a 1½ in. layer of special grease resisting mastic asphalt. The heating of all but the locomotive and boiler shop will be by direct radiation, the locomotive and boiler shop having an indirect fan system.

THE LOCOMOTIVE AND BOILER Shop Building will be 603 by 152 ft., containing both locomotive and boiler departments in opposite ends, there being no divisional walls in the length of the building. The building will be divided into three bays, extending the length of the shop, and divided into 26 traverse bays at 23 ft. centres. Of these traverse bays, 18 will contain locomotive pits, leaving 8 traverse bays for the boiler shop. The longitudinal bays will be as follows:—Erecting bay, 75 ft. wide; large machine bay, 55 ft.; and small machine bay, 18½ ft. Over the small machine tool bay there will be a gallery extending the length of the shop, containing the lighter equipment and heating plants. The locomotive shop space will give an area of 3,400 sq. ft. of floor area per pit, which is slightly smaller than that of the Transcona shops. These shops being smaller will probably not average as heavy repairs as the western shops near the centre of the combined system. The floor area per pit when compared with many other shops, shows that there is ample provision for future needs, and the shop will not soon become encumbered with material and locomotive parts.

The relation of the locomotive and boiler shop building to the midway will be rather unusual, being located with the long side to the midway instead of the usual end on arrangement. This layout is the result of careful consideration, which counselled this arrangement in order that all parts of the shop would be convenient to the midway, for the crane in the latter to bring parts from the stores and other buildings into the shop without disturbing the interior working of the shop as frequently occurs when material must be handled the full shop length. The material can be taken in through doors located at intervals along the midway side. Along the other side of the shop there will be two entry doors to the locomotive shop, and one to the boiler shop, for the entry of locomotives and tenders. In the erecting bay of the locomotive shop there is to be a 120 ton travelling crane for placing the locomotives on their respective pits. There will be in addition, two 10 ton cranes. The boiler shop will have a 20 ton crane, as