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The Canadian Pacific Ry. Shops.

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The Angus shops are situated on the Quebec line of the C.P.R. in Hochelaga ward, Montreal, about $2\frac{1}{2}$ miles from the Place Viger station. The site is a plateau with an average elevation of about 127 ft. above sea level. It is very nearly level, having a general slope of about 1-10 of 1% towards the river. The property is a rectangular plot, about 4,700 ft. long and 2,000 ft. wide, its longer axis running northeast and southwest.

The connection of the shop tracks with the main line of the railway is at the northwest corner; the steep gradient of the road making any other connection impracticable.

Although the contour of the ground is favorable and the necessary grading comparatively moderate in amount, much expense had to be incurred in order to procure safe foundations. This was due to the fact that the solid rock bottom is from 8 to 20 ft. below the ground line (except in the case of one or two shops), while the blue clay overlying the same is altogether too soft to support the foundations of the buildings. The extra expense involved in these extra foundations was nearly \$80,000. In a few cases ordinary piles capped with concrete were used, but almost all the important shops are built on what may be called a dry wall foundation. For each wall a trench 3 to 4 ft. wide was excavated to bed rock and filled to a level of 5 ft. below the ground with large flat quarry stones laid dry. On this subfoundation the ordinary masonry walls were reared. As the ground was thoroughly saturated with water, this work was expensive and tedious. It is believed, however, that on the whole this was the most economical and suitable foundation that could be used. This was especially the case as the stone for these foundations, as likewise for all rubble and concrete work, was taken from a limestone quarry on the shop grounds about a quarter of a mile from the buildings. Near the freight car shop is an outcrop of the hard trap rock locally known as Banc-rouge, involving about 8,000 cubic yards of rock excavation. The eastern portion of the ground was wooded, and had to be cleared, while a part of the central portion was swampy, requiring a moderate amount of gravel filling. For surface drainage several open ditches, 4 to 5 ft. wide, were built, but these also drain the shop grounds. The surface drainage of the central part of the grounds will go into the sewers referred to later in this paper, which connect with the city system. The

main purpose of the shops sewers is, however, the carrying off of wastes.

The Angus shops are intended primarily for the maintenance and repairs of the rolling stock in use on the eastern half of the transcontinental railway; in addition to this, provision has been made for the construction of a considerable number of new locomotives, passenger and freight cars. Besides this, a separate building is devoted to the manufacture of frogs and switches, while the machine shop and foundry will turn out many miscellaneous articles required in operating the railway, and in new construction. The general stores are

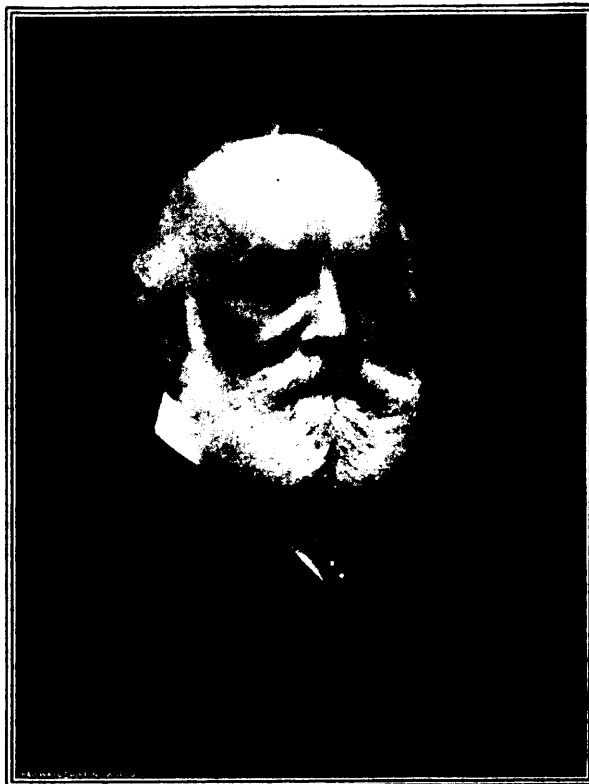
kilns. Locomotive work is mainly concentrated in the large locomotive, machine and erecting shop, while the blacksmith shop and grey iron foundry, with its pattern shop and storage building serve for car work as well as engine construction.

The arrangement of the buildings with reference to one another and the best methods of moving the material within the shop grounds was of the first importance and became the subject of extended investigation. It was influenced largely by the shape of the property, and the position of the main line tracks, as well as the ground available for storage. The

future enlargement of the shops had also to be considered. Every building is, in fact, so arranged as to allow future enlargement, while suitable locations have been reserved for additional buildings. The main point to be considered in the arrangement was, however, the economical and direct handling of the material from the raw state to its incorporation into the finished car or engine. The general lay-out may be called a combination of the longitudinal and transverse system. The tracks running parallel to the buildings and to the long axis of the shop grounds form the principal means of access. As may be seen by reference to the plan, most of the buildings are arranged along a transverse avenue, 80 ft. wide. On this avenue, popularly called the "Midway," the usual transfer table is discarded in favor of a 10-ton overhead electric travelling crane, running on structural steel supports over 1,000 ft. long. It is believed that this crane will prove a most valuable adjunct in handling material between the different shops. It is supplemented by a surface track with turntables on the "Midway." A similar outdoor crane serves the stock yard adjacent to the grey iron foundry.

The different classes of the work may be briefly indicated. The building of freight cars is one of the most important functions the shops will have to fulfil. A large and increasing number are a necessity to the road, while existing facilities in Canada are meagre, and the prevailing duty makes importation from the U.S. expensive, besides being opposed to

the policy of the railway to have all possible work done within the Dominion. The proposed output is 25 to 30 cars per day, requiring in the aggregate a very large amount of lumber and iron. The large wood storage grounds indicated will probably prove scanty rather than too liberal. This lumber will all of it pass through the planing mill, though a large proportion of it must first be dried in the larger or soft-wood kiln. The finished timbers emerge from the west end of the mill, and pass on to the freight car shop; a small



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to serve the entire system, while the general offices will serve as headquarters for the Superintendent of Rolling Stock, the Master Car Builder and the General Storekeeper. The shops naturally fall into three classes; 1st, those devoted exclusively to car work; 2nd, to locomotive construction and repair; the 3rd being common to both departments. The first class comprises the planing mill and cabinet shop, the passenger car shops, freight car shop, truck shop and car machine shop, as well as the wheel foundry and the dry