and their power of endurance was shown at a trial practice at Creusot, when the three Tinspong 5 9 inch composition projectiles passed unharmed through the 9.8 inch armor plates made by the French works for the Swedish Government.

The good welding quality of the Swedish steel, as well as the skill of the blacksmith, was demonstrated in a most interesting manner by a piece of steel in the shape of a cube, the end sections of which showed nine small steel squares of different hardness. This effect had been obtained by a perfect welding together of nine square steel bars, with carbon ranging from 0.2 to 1.0 per cent., after which this composite bar had been cut in pieces and polished.

In order to show to what great expense the Swedish ironmaster is prepared to go in order to gain even the slightest advantage in quality of product, it is interesting to note that at some of the works using the purest ores obtainable, they are actually killing out the birch wood, and in its stead planting pine, solely on account of that shade of a difference in amount of phosphorus present in the hard wood, over and above that in the soft wood. But as the trade gives preferences to him who can show the absolute lowest percentage of phosphorus in the steel—if even a difference of .001 per cent.—the wis ironmaster will go even to such a sacrifice—cost what it may, as long as the importer is willing to pay for it—and this England, at least, is always prepared to do for *the very best* material.

Peculiar to the Swedish iron works are their large number of dwelling-houses owned by the companies, but, generally, furnished rent free to the workmen Although both expensive to build and to maintain, at most of the works this rather patriarchal system is adhered to, instead of allowing the men to buy their own plot and house. Generally, these are neatly built cottages of brick or logs, and pleasantly situated in some park or the woods surrounding the works, and give the impression of prosperity and comfort.

METAL IMPORTS FROM GREAT BRITAIN.

The following are the sterling values of the imports of interest to the metal trade from Great Britain during March and the three months ending March, 1897, 1898:—

	Month of March.		Three months ending March.	
	1897	1898.	1897.	1898.
Hardware and cutlery	£4.955	£2,113	£12,018	£5.418
Pig iron	10	639	455	2.541
Bar, etc.	830	78	3.031	2,285
Railroad	3.295	....	3.847	6.922
Hoops, sheets, etc.....	2,700	869	6.311	3,653
Galvanized sheets	2 615	1,916	5.841	4.549
Tin plates.....	23.141	7.034	61,542	25,549
Cast, wrought, etc., iron	2,252	2,162	7,004	6,133
Old (for re-manufacture)	96	323	572	403
Steel	5,302	5,295	10,235	15.935
Lead	791	1,121	2,070	2,703
Tin, unwrought	947	2,087	5.444	3 476
Alkali.....	2,606	2,617	4.522	5,516
Cement	750	81	1,843	1,988

MONTREAL ISLAND BELT LINE RAILWAY.

We described at some length in our last issue the Montreal Island Belt Line Railway. The following additional details of the equipment have kindly been supplied us by C. H. Wright, electrician, and R. Weisford, engineer of the company: The generator is the well-known Canadian General M.P. 200 belted dynamo, and runs at a nominal pressure of 550 volts. The switchboard is the standard marble generator panel, made by the same company, and furnished with its circuit breaker, switches, etc., while the indicating instruments are of the Weston switchboard pattern. The four closed cars are mounted on Taylor double trucks, and equipped with G E. 1.000 motors. The two 45-feet cars are mounted on Taylor double trucks, with G.E. 1.200 motors. The five 30-feet cars are mounted on Brill single trucks, with G.E. 800 motors. The cars are made by the General Electric Company and the Ottawa Car Company. They are lighted with about 225 candle power of incandescent lamps. The line is 00 trolley, with a parallel feeder of 0000 bare wire from the power house, and tapped every 1,000 feet to the end of the line. Bracket construction is used, and the trolley wire is 22 feet from the ground, soldered ears and Crayhead brackets make the overhead work very durable. The bonding is 0000 solid wire, with malleable iron thimbles sweated on. Rails were drilled in the pile with upright hand drills. The cars are controlled by a non-inductive telephone system from the superintendent's office at the power house. The car sheds are located at the power house, so that all the operations of the line are controlled from this central point. The line is completely fenced with Page steel wire fence. The River Side power house of the Montreal Belt Line Railway is situated on the banks of the St. Lawrence, and in the middle of its line. The power house is built of pressed brick of the Ormstown manufacture. The size of the building is 44 feet by 84 feet. The engines and boilers are made by Goldie & McCulloch, Galt, Ont., and consist of one double tandem compound Automatic Cut-off engine, size 13 x 24 x 36 inches. The wheel, 16 feet 6 inches, is belted directly to generator. The boilers are made from the best homogeneous steel, and are double riveted with 84 tubes in each, and tested to 180 lbs. pressure. The condenser pumps and boiler feed pump are made by Northey of Toronto, whose wares are well known to manufacturers. Size of condensers are 6 x 12 inches, and 9 x 12 inches. Size of boiler duplex feed pump 6 inches, 4 inches x 7 niches. The horse power of the engines is 300.

JAMES KINOCH, CHIEF ENGINEER CANADIAN GENERAL ELECTRIC COMPANY.

Jas. Kinoch was born at Blair Gowrie, Perthshire, Scotland, in 1866. The greater part of the years spent in securing his education were passed in London, where he attended the City of London Middle Class School. His technical education was completed at the City and Guilds of London Institute, under the tuition of such able instructors as Profs. J. Perry and W. E. Ayton, and Sylvanus P. Thompson. He graduated from the Institute with great credit to himself.

After completing his technical studies Mr. Kinoch entered the employ of the Globe Electric Engineering Co., where he remained for three or four years. He then became secretary of the Orient Electric Light Co., which position he retained for nearly two years

JAMES KINOCH.

After two years' experience as chief assistant to Killingworth Hedges, Mr. Kinoch came to Canada in October, 1891, and entered the service of the Edison General Electric Co in Toronto. When this company combined with the Thompson-Houston Electric Co., and the Canadian General Electric Co. was formed to carry on its business in the Dominion, Mr. Kinoch was employed as estimating clerk. He filled this position, except for a short time spent with the construction staff on the road, till he was appointed assistant to the chief engineer, and last month received the appointment of chief engineer to the Canadian General Electric Co.

THE STEAM ENGINE.

Editor THE CANADIAN ENGINEER.

SIR,—In a former paper to your readers I drew their attention to the horse-power or duty, and to Newcomen's atmospheric and steam engine which Watt repaired for the University of Glasgow. His attention was directed to improvements which he saw could be made, and he and Dr. Roebuck went to work to make a new one of a useful size for the Doctor's mine, in his house and in his Carron iron works he fitted rooms for the purpose, there we left him, getting his patterns and casting ready. They had undertaken a big job, as all their tools had to be planned and made. We will now follow him into his room, where he had his steam engine working. Herewith I present a sketch of the engine that was in his mind some time before. The condenser is below the steam cylinder, in a tank of cold water to help the spray or jet of water inside, also he had two pumps connected to the main beam to draw the water out of the tank, and also to fill the boiler feed tank. Here, you may observe, his engine worked with steam both sides of the piston. It was made to work any machinery, as well as pumps in a mine. This condenser formed a better vacuum than could be formed before, and his engine made about fifteen to twenty strokes per minute and ran much higher pressure steam, and by making the vacuum in the condenser as good as possible, so that he might gain 12