## OUR CANADIAN INDUSTRIES.

II.

THE CANADIAN RUBBER CO., OF MONTREAL.

Continuing our programme of illustrating, as often as our space will admit, the great industrial works of Canada, not only because they represent, both pictorially and descriptively, the great energy and ability of our Canadian capitalists, whose money, applied to the encouragement of home production has raised up these fruitful sources of wealth that give employment to thousands upon thousands of our people, distributing among them that wealth which, without such industries in our own country, would go to purchase from the foreigner what we are now manufacturing for ourselves, being the means, also, of developing and retaining on our own soil men of talent and genius, and, particularly, the youth of the Dominion, who, without other means of gaining a livelihood would be forced to seek for work in a foreign country. Among the foremost of the great industries of Canada stands the Canadian Rubber Company.

But before giving a description of these mammoth works a short amount of the history of the plant from which the raw material is obtained will be interesting.

The uses and value of the rubber plant were known to the Peruvians and Chinese from a very early date. What is termed India rubber includes the sap of all the rubber producing plants and trees throughout the globe. These plants and trees are found in almost every land within from four to six hundred miles north and south of the equator, and vary very much in rubber-producing qualities in the different countries where it grows. The best comes from Para, in South America, also from the neighbourhood of the Amazon River. Inferior grades come from Carthagenia. Central America, Assaue, Java, Borneo, Africa and other places, and are exported to our markets very much adulterated with sand, clay, and even stones, as the natives are paid for their labour by the weight of the rubber they produce.

Rubber appears to have been first brought to the notice of scientific men early in the 17th century, when a traveller, M. Candamine, who had made some experiments with it during a voyage down the river Amazon, brought the subject before the Academy of Sciences in Paris. He stated that the natives were using it for bottles and shoes. After this mention was made of it from time to time by other travellers, but no practical use of the gum was accomplished nntil about the year 1770, when it was first used in England for erasing pencil marks, and commanded a price of about four or five times its own weight in coined silver.

About the year 1825 a waterproof clothing manufactory was started in Glasgow, Scotland, by Charles Mackintosh. The firm is still carrying on a very extensive business in the city of Manchester, England, under the name of Charles Mackintosh & Co., so well known throughout the civilized world.

Rubber was first used for overshoes in its pure state, the gum being moulded into shoes by the natives upon clay forms, but after the invention of Goodyear for curing and vulcanizing rubber, its importance as an almost invaluable industry was soon recognized. By this process the raw material undergoes a chemical change without losing its elasticity, and will retain the shape in which it was vulcanized, it also becomes more durable, and is unaffected by either heat or cold. To this invention we owe also all the varieties of useful elastic forms into which it can be manufactured combined with cloth, such as clothing, boots and shoes, tubing-valves, etc., etc.

Another form into which rubber is manufactured is called "Vulcanite," an invention also of great importance. By this process it is made into combs, pipes, canes, surgical instruments, jewellery, and a great variety of other useful articles.

The Canadian Rubber Company of Montreal is by far the largest rubber manufacturing industry in Canada. representing annually in their Montreal and Toronto wholesale establishments over two-thirds of the entire amount of rubber sales made in Canada, and they exceed $3,000,000,

All their stock is made in this city by their immense plant, the company for whose organization it was established being capitalized for $2,000,000.

This mammoth factory is 800 x 60 feet, four stories high, including finished and working basement, giving a grand aggregate of 200,000 square feet of floor area on which to manufacture and otherwise handle the enormous business of the company.

Aside from this building, they have their engine and boiler houses, wash and drying rooms, varnish and cement house, and heaters, also a three-storey repair shop, 40 x 100 feet, in which a large staff of machinists, carpenters, steamfitters, etc., are constantly employed.

Employment is given to one thousand hands, who are paid over one-quarter of a million dollars annually for wages.

The products of the Canadian Rubber Company are chiefly boots and shoes, which are made by the most improved machinery from first quality stock. They are also very large belting and hose, wringer rolls, engine packing, rubber mould work, carriage cloth, buggy aprons, tubing, etc. manufacturers.

When the crude rubber is received it is necessary to cleanse it from the bark sand and other impurities before entering into the manufacture of boots and shoes. To accomplish this the rubber is passed between the wash mills, which consist of heavy grooved iron rolls set in a powerful frame, over which a stream of water is kept constantly running, t us effectually removing all impurities, and flattening the rubber into sheets, which are then hung in hot rooms to dry.

When the rubber is thoroughly dry it is then ready for mahufacturing purposes. On passing on to this stage, the first process being to again work it through heavy roller mills, but unlike the washing mills, these rolls are smooth and heated by steam, the rubber is thus worked until in a plastic state, and then the chemicals for its vulcanization are added and thoroughly worked into the rubber by continually passing through the mill.

After this preparation the rubber is ready for the Calender; this machine consists of three heavy rolls set horizontally in a frame, which rolls can be raised or lowered by screws, this being necessary to regulate the various thickness required. With the aid of this machine the rubber is run on either the cotton or woollen linings, or run off in pure sheets, with which it is necessary to cover the various parts of the shoe when lasted.

The figured upper now so common in rubber shoes, also the soles, are obtained by adding a fourth roll on the Calender, on which the design is engraved, and the rubber passing between this and one of the smooth rolls receives the impression.

Among our illustrations the reader will see one of the three rooms in which the above processes are carried on in the Canadian Rubber Company's works.

From the mill-room the treated fabrics and sheets of rubber are sent to the cutting room where they are cut into a variety of parts requisite to make up a rubber shoe. When it is to be remembered that there are never less than twelve pieces in any shoe, and that there are fifty different lengths, and three widths, not to speak of the various styles, the quantities of dies and patterns may be imagined.

The cutting being done, the pieces are handed over to the shoemaker, who cements them together on the last, after which the shoes are varnished and loaded on iron cars which are run into the "heaters," these consisting of air-tight rooms, which are heated to the necessary degree of heat to turn the plastic materials into the rubber shoe of every day use.

From the heaters the cars are run into the packing room, where they are unloaded on to tables, the lasts are then drawn out and the shoes paired and packed into cases.

After reading the foregoing, our readers will see that a rubber shoe, like a pin, has to pass through a great many hands before finally finding its way into the markets.

In the manufacture of mechanical rubber goods the rubber is prepared in the same manner as for boots and shoes, after which it enters into the innumerable articles comprised in the above heading' and which space would not permit us to enumerate. We will, however, give a few particulars of the mode of manufacturing the principal article made in this department, viz: Machine Belting, which, as most of our readers are already aware, is used in nearly every factory, saw-mill, threshing machine, etc., in the universe, to transmit power from a main engine by the means of shafting and pulleys, to machines, etc., located in any part of a building. It is often said that "money makes the mare go," but what is more important, belting makes the mills go.

Belting is composed of plies of specially woven heavy cotton duck, which is covered with rubber on the calender and then cut into strips to form the plies on a machine containing sharp knives, which are adjusted to cut any width necessary. After this is done the plies are laid upon one another, and when the requisite number have been added another piece of duck double the width, which is called the cover, is folded over, uniting exactly in the centre, the join being covered with a strip of pure rubber to keep it from opening out when in use. The above work which used to be done by hand, is now done by a machine in a much more thorough manner. After putting the pieces together the belt is passed through a pair of heavy rollers, which press the plies firmly together and drive out any air which might have lodged in making up. The belt is then taken to the press-room where it is placed between the plates of a powerful hydraulic press, 20 feet in length, and having a pressure of 2,500 lbs. per square inch, these plates are hollow and heated by steam at a high pressure, which heat serves to vulcanize the belt while pressing it. Any length of belt may be vulcanized in this manner as it is pulled through from end to end. This completes the belt, which is then rolled up, marked with size, thickness and length and is then ready for shipment.

Another article very much used and largely manufactured by the Canadian Rubber Company is hose. Rubber hose is made on iron rods of the same diameter as the hose is required to be. First a sheet of pure rubber, called the tube, is put around the rod, being first dusted with whiting to keep the rubber from sticking to it, then the duck and another sheet of pure rubber to form the outside is connected together side by side, one edge of the duck is attached to the tube, the rod is then placed between three long iron rollers which, when revolving, roll the hose up. It is then wrapped in cotton by the means of a like machine, and then placed on trucks and run into long boilers which are closed up and filled with steam, vulcanizing the hose in something of the same manner that dry heat does the shoes.

This process has given the name of "steam-heat" goods to any articles cured thus.

Moulded goods are made by placing the unvulcanized rubber in iron moulds, which are then placed between the heated plates of hydraulic presses, and the rubber is thus pressed into the requisite shape, at the same time vulcanizing it.

The plant for this class of work is very extensive and entails immense outlay of capital, moulds costing from $10 to $50, and being absolutely necessary for making all solid rubber work.

Our readers will, perhaps wonder where all the power comes from to drive all the immense calenders, mills, etc., and also where such an amount of steam is generated as is required to carry on the work of this huge factory, but when they hear that 12 boilers, 25 feet long, and engines developing 1200 horse power are required they will admit that after all, a fully equipped rubber factory is rather an interesting place.

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He is indeed the wisest and happiest man who, by constant attention of thought, discovers the greatest opportunities of doing good, and with ardent and animated resolution breaks through every opposition, that he may improve those opportunities.—*Doddridge.*

Brother-men, one act of charity will teach us more of the love of God than a thousand sermons: one act of unselfishness, of real self-denial, the putting forth of one loving feeling to the outcast and "those who are out of the way," will tell us more of the meaning of the Epiphany than whole volumes of the wisest writers on theology.—*F. W. Robertson.*