

DESCRIPTION OF THE DISTILLERY OF MESSRS. GOODERHAM AND WORTS, TORONTO, CANADA WEST, APRIL, 1863.

SECTION FIRST.

*Introductory; Members of the Firm; their Emigration from England to Canada; First efforts; Toronto then and now; the Windmill; the outward appurtenances; Cattle feeding; the first steam engine.*

I AM about to describe an establishment which cost the proprietors one hundred and fifty thousand dollars in its construction, in the years 1859, 1860 and 1861, and upon which they pay to the government of Canada a tax of one hundred and fifty thousand dollars a year for permission to work it. It is the distillery of Messrs. Gooderham and Worts, at Toronto, Canada West.

In the county of Norfolk, England, on the London Mail Coach Road, at the second stage from the city of Norwich, where eight stage coaches down, and eight up, changed horses daily, two families resided who in 1831 decided on emigrating to Canada. Mr. Worts was the head of one family, Mr. Gooderham of the other. Mr. Worts came out first; he was father of the gentleman who is now one of the firm of distillers, and grandfather of the accomplished young girl whose portrait was published in No. 21 of the Canadian Illustrated News, April 4, 1863, as the first prize skater at Toronto. He reached this country in 1831, as pioneer of the party, having left a portion of his family in England. In 1832, Mr. Gooderham, whose name stands first in the firm, came out, bringing his own family and the remaining members of that of Mr. Worts.

They began business as millers and distillers in a small way; fifteen bushels of grain and malt being the extent of consumption in the first essays at distillation. Toronto, so lovely, so diversified, so noble in its public buildings and street architecture now, containing nearly fifty thousand inhabitants, with mechanical appliances executing the heavy labor of the arts of industry, equal in productive strength to at least half a million of men, was then a town of boarded frame houses, only a very few dwellings or other structures being stone or brick.

The present distillery buildings and appurtenances therewith connected, including the handsome dwelling house of Mr. Gooderham and its garden, and the site of a malt-house about to be erected, occupy nine acres. There is also an old windmill tower, on which the hopes and fortunes of the firm once rested, but whose machinery, dependent on the capricious, the wild, the weird gales of wind sweeping from Lake Ontario, could not be made by any human contrivance to work peaceably in the face of the sudden tempests of Canada. The tower now serves the two-fold purpose of a landmark to mariners entering Toronto Bay, and a still house to purify 'common' whisky into 'old rye.' The nine acres likewise include, on the opposite side of Trinity Street, at the east side of the distillery, housing for four hundred fattening cattle, and an elevated tank to which most of the cow-keepers of Toronto come for the farinaceous and saccharine off-pourings from the stills, so well relished by bovine cattle whose additional food is hay, straw, turnips, mangel wurzel, and other esculent roots.

The first effort of Mr. Gooderham to obtain a steam engine of "Canadian manufacture" presents a notable contrast with the condition of mechanical science and resources of the province now. The best blacksmiths then in Toronto made it, but they could not induce it to work when made. A party of the Sappers and Miners was in the neighborhood (the corps now called Royal Engineers). Select men of the Sappers gave their assistance for several weeks; and so careful was every person concerned to conceal the mystery of steam engine making, that they worked with doors locked and windows secured; but their engine was not a success. Had it been pirated, the pirate would have been sorry for what he did. That now in use was made by Baillet & Gilbert, of Montreal. It ranges somewhere between

eighty and a hundred horse power, and approaches perfection as nearly as advancing improvements have yet reached to in their workshops or elsewhere.

The larger illustrations show on page 282 the south front, looking upon the bay of Toronto. And the rear on page—looking from the north. This latter includes a portion of the new malting house now in course of erection, three stories high, and a part of the old wind-mill tower, both seen on the spectator's left hand. On the right hand is part of a cooperage house for repairing and cleaning such of the barrels as are returned by customers. The cooperage at which new barrels and puncheons are made is at a place half-a-mile distant. About forty men are employed in that department. The chimney-stalk, seen here, is one hundred and fifty feet high. The door of the boiler house, No. 1, illustration of the interior, is open to receive coals. A water tank is visible, which receives water pumped from the lake and gives it out for the use of the establishment. The elevation of the main building shows four principal floors in front and rear, but when we ascend the interior the fifth floor, immediately under the roof, will be found to contain portions of machinery important in the mechanical economy of the establishment.

The wharf, shown in the illustration on page—is separated from the south front of the distillery by the Grand Trunk Railway main track, and by a side switch built for discharging grain from railway cars into the distillery building and receiving into other railway cars barrels and puncheons filled with rectified spirits of the different qualities to be carried to the Montreal, Quebec, and other markets, of which detailed particulars will be given presently. The wharf contains storage rooms and an elevator for lifting the grain from ships, which together can hold in stock eighty thousand bushels. The south front, including the prolonged structure of one story is three hundred feet from east to west. That low building consists, however, of two floors, one the fermenting room, as will be seen during our perambulation. A perspective view of its interior is shown in cut No. 7. Over the fermenting room and adjoining it are a store-house, and bonded warehouse, the latter under the exciseman's lock and key, but with a sparred partition so thin that a child might enter from the free to the bonded side. With these general remarks I may proceed to notice the preparations for distillation.

SECTION SECOND.

*Historical review of distillation, the art not known to the nations of antiquity; Supposed to have been discovered by the 'barbarians' of the North of Europe; Raymond Tully carried the secret to the South; How Starch becomes Sugar; Curious items of Chemical history relating to Sugar and Starch; Flavor of Rum; Flavor of Whisky; We follow the Grain from Grand Trunk cars through the Distillery; The Millstone Floor No. 4; Machinery Floor No. 3; The Grain converted to Meal; Curious travels of the Meal; The Mashing Tubs; Hops and Yeast.*

The name whisky is said to be a variation on the Irish Celtic word Usquebaugh. The term distillation is applied to the manufacture of ardent spirits, through the agency of heat applied to a vessel called a still, which contains the fermented liquor from which the spirit is to be extracted; and the spirit as it is vaporized is condensed in tubes from which it distils, or falls in drops into the vessel placed to receive it. Hence the terms distillation and distillery.

Little is known of the antiquity of this manufacture. To the nations of antiquity it seems to have been unknown, at least there is no distinct account of its preparation. Certainly the old world in its early ages never saw, as the new world in this age has not before seen, any distillery more perfect, and but few if any equal in all respects to that of Gooderham and Worts at Toronto.

Distillation is commonly believed to have been invented by the 'barbarians' of the north of Europe, as a solace to their cold and humid climate, and to have been made known to the more southern nations by Raymond Tully, of the Island of Majorca, in the Mediterranean. At the present day there are few nations above the condition of savages who do not manufacture an ardent spirit by the process of distillation. Whether these are prepared from the expressed juices of fruits, from the natural or expressed juices of trees and plants, or from infusions of grains or of roots, chemistry has made known that they can alone be prepared from sugar, or from principles which during the process of infusion and fermentation, are converted into sugar.

In Britain the larger proportion of the ardent spirit is prepared from barley, which in its natural state contains no sugar; and in Canada from barley, rye, oats, and largely of maize or Indian Corn, which likewise in their natural state contain no sugar; but by the process followed the large quantity of starch which these grains severally contain is converted into sugar. After which, the saccharine infusion being fermented the sugar becomes converted into alcohol, which is obtained from it by distillation.

There are five kinds of sugar known to chemists, two of which by fermentation are suitable for the distiller: cane sugar and grape sugar. It is from the latter that the most of the ardent spirit in Britain, Canada and North America is produced.—The grape sugars embrace many varieties, procured from different sources, yet all having the same chemical composition. These embrace the sugar of the grape, honey, and the sugar of most of our fruits, and the sugar made from starch. All the juices containing naturally grape sugar are more or less acid, and the chemical reason for this is, that acid possesses the property of converting cane sugar into grape sugar, in like manner as it converts starch into grape sugar. These sugars do not crystallize so readily as cane sugar, but they ferment with extreme facility, and furnish on distillation the ardent spirits known by the names of brandy, whisky, gin and others.

When these sugars are dissolved in water, as in the mash tubs (illustration No. 6) and fermented as in the fermenting tubs (illustration No. 7), they become resolved into carbonic acid gas, which escapes, and alcohol which remains in the fluid. It is this alcohol (spirit, or spirit of wine, 'high wines' in Canada) which is the substance producing the stimulant and intoxicating property in all the forms of ardent spirit; and it is the separation of this from the large quantity of water and impurities with which it is mixed in the fermented liquid which constitutes the art of distillation.

The several flavors peculiar to each kind of ardent spirit, and which serve to distinguish them from each other, are supposed to be owing to the presence of an essential oil derived from the ingredients employed in the manufacture. It is a singular fact that these peculiarities of flavor or of odor, are only imparted to the spirit when distilled from the fermented juice itself; for, when fermented infusions of the sugars prepared from these juices are subjected to distillation, no peculiarity of odor is manifested.—Thus the fresh cane juice when fermented and distilled yields the high flavored spirit called rum; but sugar and molasses fermented and distilled after importation, yield only plain spirits—whisky.

From whatever ingredient the spirit is to be derived the processes through which it must pass before being distilled are virtually the same. The saccharine juices or infusions, whether derived from the grape, sugar-cane, date, barley, rye, oats, maize, wheat or other grain or seeds; or from potatoe, beet, or other roots, must first be fermented to change sugar into alcohol. The fermented liquor must then be put into a close covered vessel called a still, to which is attached a convoluted tube or worm, the end of which terminates in a vessel or receiver. The worm runs through or is placed in a large vessel called a worm-tub or refrigerator, which receives a constant and plentiful supply of cold water. Fire or steam is then applied (steam in that under description) to the still, when the spirit being more volatile than water, rises as vapour, passes through the worm where it is condensed and runs in a fluid state through the safe into the receiver.

So far that is a very brief explanation of the principle, but the actual operation of the still in the establishment before us is more complicated, and will be presently described more fully. Let us proceed to trace the grain from the Grand Trunk Railway cars, or the wharf projecting into Toronto bay, through the hoppers, elevators, millstones, weighing and distributing conduits to the mashing tubs, thence to the fermenting vats, and from these by the elevating pumps to the top of the building to be let run into the still. After which it will be followed to the rectifying vats, and to the racking off into barrels or puncheons.

The grain pours from a railway car down into bins, the mouths of which are lower than the stone flags of the lowest floor.—These bins are in the south-east and north-east corners of the room, marked in the illustrations, 'No. 3; Machinery, first section.' An elevator, which is an endless belt with small buckets or lifters attached winds over a cylinder among the grain in the lowest bin, and over a distributing cylinder, on some of the upper floors at a suffi-

cient height to be conducted down the metal spouts which pour it into the hoppers of the whirling, grinding millstones, eight of them in one room, four in a row, as seen in the illustration No. 4. (For a detailed account of grain elevators with pictorial views, see No. 23 of the Canadian Illustrated News, April 13, 1863.)

Four of the runs of stones in that room are intended for the manufacture of flour or a grist trade, but the bolting machinery is not yet introduced. The wheels in No. 3 group below the mill-stones receive their motion from the steam engine which forms illustration No. 2, in the next apartment behind the wall at the spectators' left hand. These wheels, spurs and pinions, horizontal and vertical shafts all work as smoothly as a happy family; their swift, soft motion is like music. The massive iron frames in which they work, stand on plat forms of solid masonry five feet in height; a solid iron plate, four inches thick binding the masonry. An apparatus easy of reach and of action can at the will of the skillful attendant (Mr. Rimmer, I believe) throw the wheels and the whirling stones above into or out of motion in a breath of time.

The meal descends in covered spouts through that wheel-room, No. 3, and is delivered to elevators which convey it right away to the highest floor of the house, each elevator delivering its meal into one of several bins arranged in rows, each kind of meal being kept separate.

After being elevated to the required height, each kind of meal is laid hold of by a screw lying within long horizontal troughs. Each of these screws, termed a conveyer, carries its own kind of meal to an opening in a spout leading to a hopper appropriate to receive it. In the room immediately beneath those hoppers—a long apartment lighted by the fourth row of front windows, seen in the south front view of the building, is a tramway. A bin travelling on wheels, which is also a weighing machine, is moved to underneath any one of the hoppers from which it is desired to draw the due proportion of the kind of meal it contains for a mash—barley raw, barley malted, rye, oat-meal, or maize meal. When filled it is moved along its tramway until its bottom is over the mouth of another hopper. A valve in its angular bottom being drawn allows the meal to fall into the lower hopper; and a valve in the bottom of that being withdrawn by a lever in the mashing room below (illustration No. 6,) one or other of the four mash tubs there receives the different allotments of meal into a bath of hot water. The degree of heat requisite is carefully observed by gauges in a room above the mashing tubs where one of Mr. Gooderham's sons presides. The mash tubs are lined with bright copper. In each a central shaft working in a box carries round a plunging rake; an instrument with two outstretched arms which agitate the mash. The diameter of each tub is fifteen, depth seven feet.

The mash is drawn from the tubs, two emptying at a time, and two filling, and conducts itself in troughs made for it along the fermenting cellar (illustration No. 7). The troughs are above the level of the tubs there and have valves to be opened into spouts conducting into each as it requires to be filled. There are fourteen, each fifteen feet in diameter, and seven deep. The mash remains in about four days to ferment. When in a proper condition it is drawn out, and raised by pumping to the fifth or loftiest floor, and there conducted into a vat whose mouth is on that floor, and whose bottom allows the fermented 'beer' to descend into the head of the still the height of which is forty feet above the still room to which we shall presently resort. But before leaving the fermenting cellar it should be related that when aloft on the fourth floor observing the weighing and apportioning of the different kinds of meal to the mash, the aroma of hops induced inquiry as to whence it came. In a closed place the hops were in process of boiling, at that lofty eminence hot water and cold being conveyed in pipes to wherever required, their product of liquor to be associated with malt to become yeast. The hops are obtained, some from Buffalo, the state of New York, but mostly from the county of Prince Edward, Central Canada, where cultivation over many years has led to the production of a prime bouquet. The partial culture of the plant near Hamilton has not yet, it is said, succeeded so well.

The yeast is added to the mash when agitated in the mashing room. When the fermenting tubs are emptied, which they are in groups of four, they are scalded with streams of boiling water, then rinsed with cold water, and purified with lime. Scrupulous cleanliness prevails everywhere.

Let us now review and describe the process of distillation.