MANUFACTURE OF STEARIN CANDLES.

Candles are cylindrical rods of solid fatty or waxy matter inclosing a central fibrous wick, and designed for giving light. The raw materials mostly used for candles are tallow and palm oil. Ordinary tallow candles are made from the fat of sheep and oxen. It is taken as soon as possible from the carcass of the animal, sorted, cut to pieces and melted. Tallow consists of palmitic, stearic and oleic acids, with glycerine, a substance which is uninflammable. The melted tallow is run into large barrels or casks holding about 1,300 pounds and taken to the candle manufacturers, where they are rolled on a trough about 25 feet in length, 2 feet in width, and about 6 inches in depth. The cask is placed on the trough with the bung hole underneath. A steam pipe is then inserted into the hole, the steam turned on, causing the tallow to melt and run down into the trough, thence through the flooring to a large tub below. This tub is connected by means of a 4 inch pipe to what is called the "blow-up," which is 14 feet in length and 5 feet in diameter. The melted fat, to the amount of 7,000 pounds, is drawn from the tub and run into this apparatus. About 35 pounds of lime is then dissolved and added to the mass, which is then heated by steam until thoroughly mixed, forming a soapy mixture which separates the acids and the glycerine. It is then blown out by steam into a decomposer. This apparatus is made of copper, 32 feet in height and 4 feet in diameter. Steam at 100 pounds is then turned on and the acids allowed to boil. The water, which is always at the bottom of the mass of fat, is constantly drawn up by the aid of a steam pipe passing down through the center of the cylinder. The water, when it reaches the top, falls down on and through a perforated diaphragm containing about 300 small holes to the inch, where it immediately passes to the bottom. The heat and pumping operation continues for about 10 hours, which separates the glycerine from the acids. It is then tested. If the material when cooled becomes crystallized, it is ready for the next operation.

The dissolved glycerine and water is drawn off and the acids pass to another tub, where, by the means of sulphuric acid, the fatty acids are set free from the lime. Boiling water is then used to free the fatty acids from the sulphuric acid. The liquid then passes into large circular tubs called chargers. From the chargers the acids pass into a still, circular in shape and made of copper. It is 6 feet in height, about 7 feet in diameter, and holds about 5,000 pounds, under which a fire is kept constantly burning and a temperature of 550° given to the still. From the still it is then condensed and run down into pans to solidify. The cakes, which are about 12 x 20 inches in size and one inch thick, are then wrapped in camel's hair cloth and put into a hydraulic press, which, with a 6,000 pound pressure to the inch, squeezes out the oleic acid. The cakes are then remelted and ready to be formed into candles. Each moulding machine contains about 96 moulds.

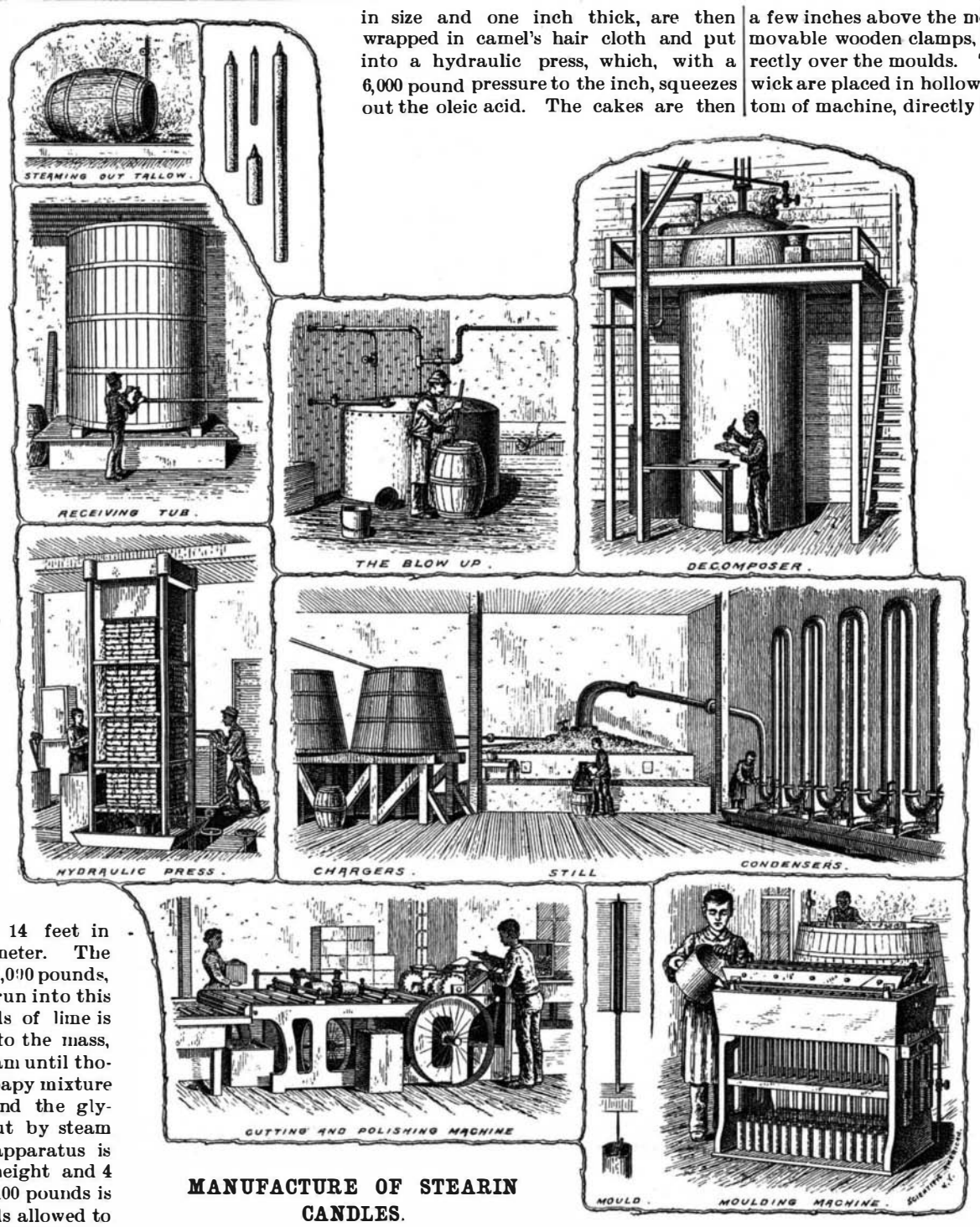
They are made of a composition of lead and zinc and rest in an iron bed, surrounded by water for cooling purposes. Underneath each mould is a hollow tin tube the upper end of which is conical shaped, and fits inside the lower end of mould. The bottom end rests on a movable platform. Connected to the machine a few inches above the mould beds are two perforated movable wooden clamps, the holes of which come directly over the moulds. The spools of cotton yarn or wick are placed in hollow circular tin boxes at the bottom of machine, directly underneath each tube. The wick is passed through the tubes and moulds and through the clamps above, where it hangs in the center to a piece of candle lying across the holes on the upper side of the clamps. When the moulds are ready to be filled the attendant pulls the wicks taut from the bottom, which causes them to hang directly in the center of the moulds. The melted material is poured in the beds at one end until the moulds are all filled. They are then allowed to cool about 15 minutes.

The movable platform containing the tubes is raised, which in turn shoves the candles upward out of the moulds and up into the clamps. The moulds are then refilled as before, and when cool, a knife is run along the top of the bed, cutting loose the first batch of candles, which are taken away and thrown into a tub of water to cool. The same operation is performed over and over again until 100 yards of wicking is run out.

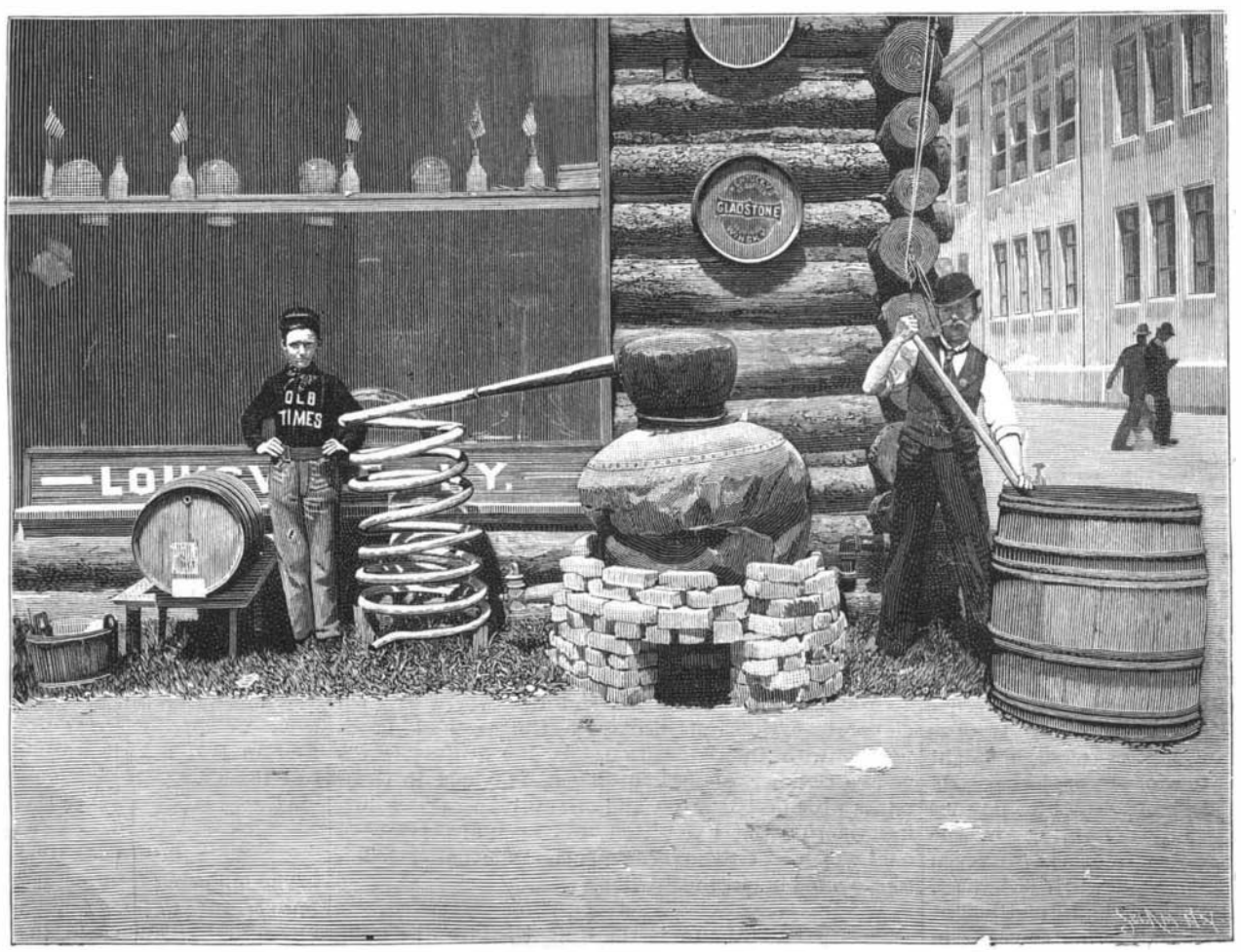
The candles, when taken out of the water, are passed through the cutting and polishing machine. The attendant places the candles on a slotted wheel, which carries them to a fine circular saw about 6 inches in diameter, with ½ inch teeth, which cuts them the right length. They are then carried along and dropped on to a movable bed to be polished. This bed consists of a number of circular iron bars or rods ¾ of an inch in diameter, 1½ inch apart, and connected to a chain on each side of the machine.

Connected to the machine and running across the movable rods are two circular revolving bristle brushes making about 120 revolutions per minute. The brushes are about a foot in length and about 8 inches in diameter. As the candles leave the saw they drop down in between each rod, which pushes them ahead, causing them to revolve. They are then drawn under the brushes, which gives them a polished appearance. They are then packed into boxes for shipping.

Candles in large quantities are shipped to South America and Mexico. They are also used by grocers, plumbers, and miners; 39 hands, with 40 moulding machines, can turn out about 8,000 candles per day. They run in size from about 5 inches to 24 inches in length. Our sketches were taken from the manufactory of A. Gross & Co., N. Y.



MANUFACTURE OF STEARIN CANDLES.



THE COLUMBIAN EXPOSITION—A "MOONSHINER'S" PLANT.

THE COLUMBIAN EXPOSITION—A "MOONSHINER'S" PLANT.

In a corner of the grounds of the Columbian Exposition, in the part called the "back yard," stood one of the most cu-

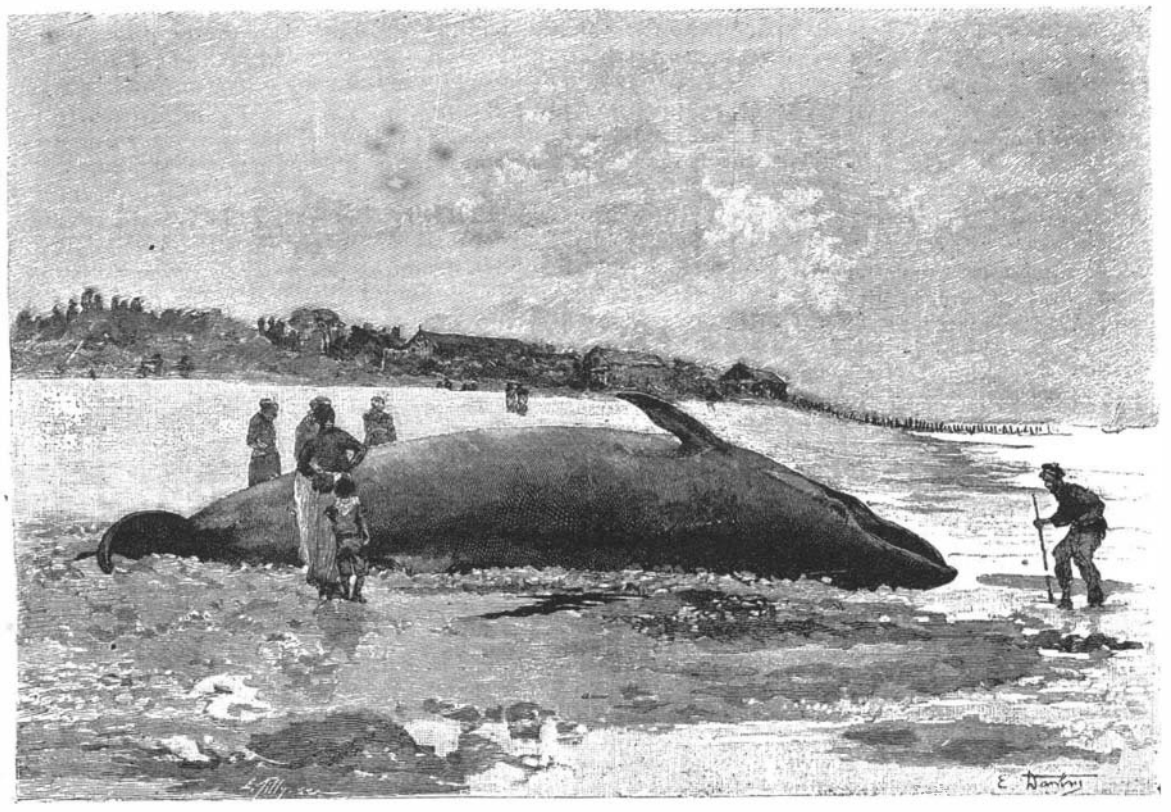
rious exhibits at the Fair—the plant of an illicit distillery. We illustrate the battered still and worm which was exhibited by the Old Times Distillery Company, and which is claimed to be the only distilling plant brought away from the mountains. The plant of an illicit distiller, or in cant phrase "moonshiner," is very seldom preserved when captured. Either the still is destroyed before the seizure or it is destroyed by the revenue officers, as in many cases the distillery is located on the top of rugged mountains, which makes the transportation of the seized articles difficult.

There is very little of the romance of crime left in America. The gentle art of holding up a coach is now practically a thing of the past. So that there is little left in the way of exciting adventures, except the too frequent train robberies and the occasional disturbance of the half-nomadic people of Kentucky, Tennessee and some other States, who gain a precarious livelihood by the illegal distillation of ardent spirts. Though the literature in regard to moonshiners is very limited, two or three novelists have used the stills in the mountain fastnesses as a foundation around which to weave their plots.

There appear to be three distinct classes of people who engage in illicit distilling; first, the common criminals; second, old confederate soldiers; and third, the descendants of the men who engaged in the post-revolution whisky insurrection, men who regard revenue laws as unjust and oppressive. Rye is one of the principal cereal crops in many of the States in which illicit distilling is carried on. Rye is bulky, cheap, and therefore not convenient or profitable to transport over the wretched roads But once converted into whisky, it can easily be transported on horseback, and the commodity can be readily disposed of near home.

To men coming of a whisky-making, whisky-loving people, the laws of the federal government enforced by the Treasury Department seem tyranny. It is stated that whisky can be made where rye is cheap for twenty cents a gallon. The internal revenue tax is now ninety cents a gallon. So that it will be readily seen that large profits may be made if the whisky can be sold without having to pay the tax. When attacked, the moonshiners defend themselves, and as they are expert marksmen, the pursuit of the moonshiners is extremely hazardous; but they are not as bloodthirsty as they are usually painted, and it is a significant fact that most of the revenue officers who are murdered are shot in the back. As soon as a moonshine still is broken up in one place, another is started a few miles away. The border of North Carolina and Georgia is a very bad spot for illicit stills, the people traveling from one State to the other when necessary.

The still is in form nearly always of the crudest shape, like the one illustrated, which is really a very good example of a better class still. Some of the makeshifts resorted to by these curious people are really amusing, and many of the stills are made of common wash boilers. The grain is, of course, hand-mashed. The market is generally local, seldom being outside of the State. The moonshiner is a curious outgrowth of the revenue laws, and his history forms a very curious picture of the primitive condition of border life.



A STRANDED WHALE.

A WHALE STRANDED AT VILLERVILLE.

A whale that had strayed into the mouth of the Seine went ashore Saturday, October 21, upon the coast of Calvados, under the herbage of Criquebœuf, near Villerville, between Honfleur and Trouville. It was perceived at about six o'clock in the morning by some fishermen, who at first took it for a capsized boat, but were undeceived when they saw it spout water to a height of eight or ten feet. Having adventured too near the coast at a moment when the tide was falling very rapidly, it was caught on the beach, and, despite its efforts, was unable to regain the open sea. It struggled for seven hours, giving formidable blows with its tail from time to time. It ceased to live at one o'clock in the afternoon.

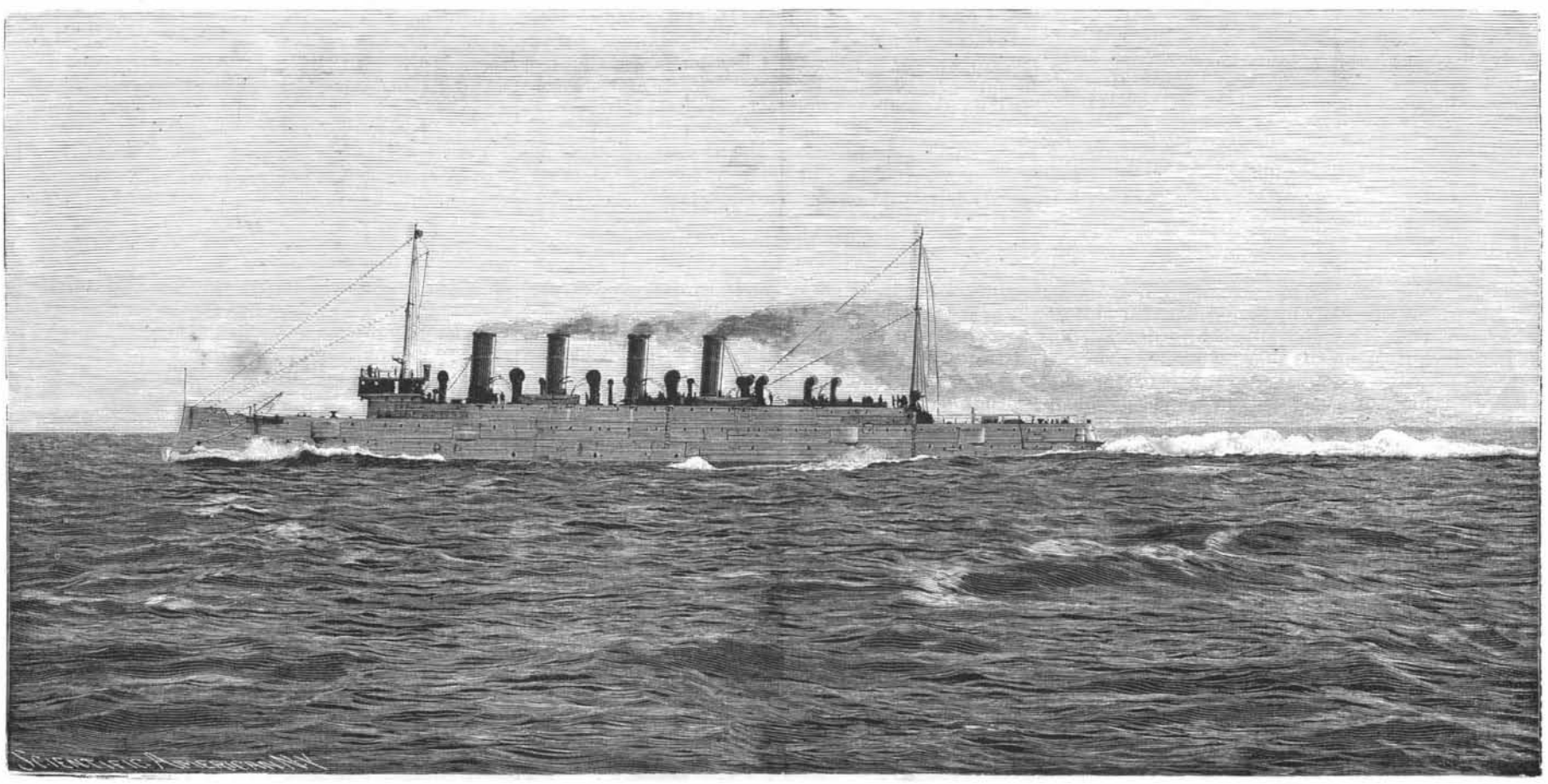
It was 10·5 meters in length. Its vertical diameter was 1·3 meter and its horizontal diameter was 1·75. Its jaw was 1·15 in width. Its flippers were 1·2 meters in length and the fin on the back 0·75 meter. The width of the tail was 1·3 meters.—*L'Illustration.*

OUR PHOTOGRAPH OF THE COLUMBIA.

We give this week an engraving of the new war ship Columbia, taken when the ship was running at highest speed on her recent official trial. It will be noticed there is an absence of undue wave. The three propellers at the stern throw up the water considerably, and form a rather wide cataract ten feet high, which subsides gradually, and no heavy waves are formed. The bow waves are comparatively light, and in this respect are in strong contrast to some other war ships. The Columbia is one of those poetic vessels that seem to "walk the water like a thing of life."

The Columbia is 412 feet long on the load water line, 58 feet extreme beam, 22 feet 6½ inches normal draught, and displaces 7,350 tons. Her power consistsof three three-cylinder vertical inverted triple expansion engines, having about 22,000 collective indicated horse power and driving three screws, one on the middle line, as in single screw ships, and the other two under the counters, as in twin screw vessels. This power is calculated to produce a speed of 21 knots an hour, which the contract for the vessel calls for, the builders to receive a bonus of $50,000 for every quarter knot the vessel makes over the required twenty-one knots. On the official trial she made a mean speed of 22·81 knots, thus netting for the fortunate builders, Messrs. Cramp & Company, the handsome bonus of $350,000 above the contract price.

Notwithstanding the above successes, it cannot be said the speed of the Columbia is commensurate with her great power. We believe she is the highest engined boat of any ship afloat of her size, but not the fleetest. Her displacement is 7,350 tons, with 22,000 horse power, or 3 horse power per ton of displacement. The two new Cunard ships, built to serve as war cruisers, are of 12,500 tons displacement, 30,000 horse power, twin screws, showing $2\frac{2}{5}$ horse power per ton of displacement. These boats have made the Atlantic voyage of nearly 3,000 miles at an average of 21·3 knots per hour. It would doubtless be impossible for the Columbia to make such a voyage at that rate. Smaller ships, with higher engine power in proportion to dis-



From a photograph by W. H. Rau.

THE NEW WAR SHIP COLUMBIA.