

BEVELING AND SILVERING MIRRORS.

The making of glass mirrors for commercial purposes was probably first developed in Venice. Looking glasses in large sheets were exported from Venice in the last part of the 17th century. Mirrors became articles of household furniture in the early part of the 16th century. Previous to that time small pocket mirrors were carried at the girdles of ladies. They had no covers, but were furnished with a short handle. The old process of amalgamation is about done away with. The process of silvering was first introduced in 1840, through a discovery made by Baron Liebig. A horizontal double-bottomed metallic table is used, which is heated with steam to from 35° to 40° C.

The glass to be silvered is cleaned thoroughly with wet whiting, then washed with distilled water and prepared for the silver with a sensitizing solution of tin, which is well rinsed off immediately before its removal to the silvering table. The table being raised to the proper temperature, the glass is laid and the silvering solution at once poured over it before the heat of the table has time to dry any part of the surface of the glass. The solution used is prepared as follows: In ½ liter of distilled water 100 grammes of nitrate of silver is dissolved, to this add liquid ammonia (sp. gr. 0.880) 62 grammes. The mixture is filtered

Castle stone wheel about 30 inches in diameter and about 3 inches in thickness. This wheel smooths the surface of the beveled edges and is ready for the first polishing wheel. The polishing wheels are 34 inches in diameter, 3 inches thick and made of poplar wood. It revolves in a perpendicular position, the attendant pressing the beveled edge against the face of the wheel, adding now and then a quantity of water and powdered pumice stone. This wheel leaves the edges a little cloudy from the pumice stone. To make the edges transparent they are run over another similar shaped felt-covered wheel, the surface of which is covered with rouge.

A number of sheets of glass can be polished at the same time, by laying a number of the sheets on a long cloth-covered table over which, connected to a square horizontal shaft, are a number of iron frames. Inside of these frames polishing blocks are placed, the bottoms of which are covered with felt and rest on the surface of the glass. These blocks are made of wood and filled with lead and weigh about 20 pounds each.

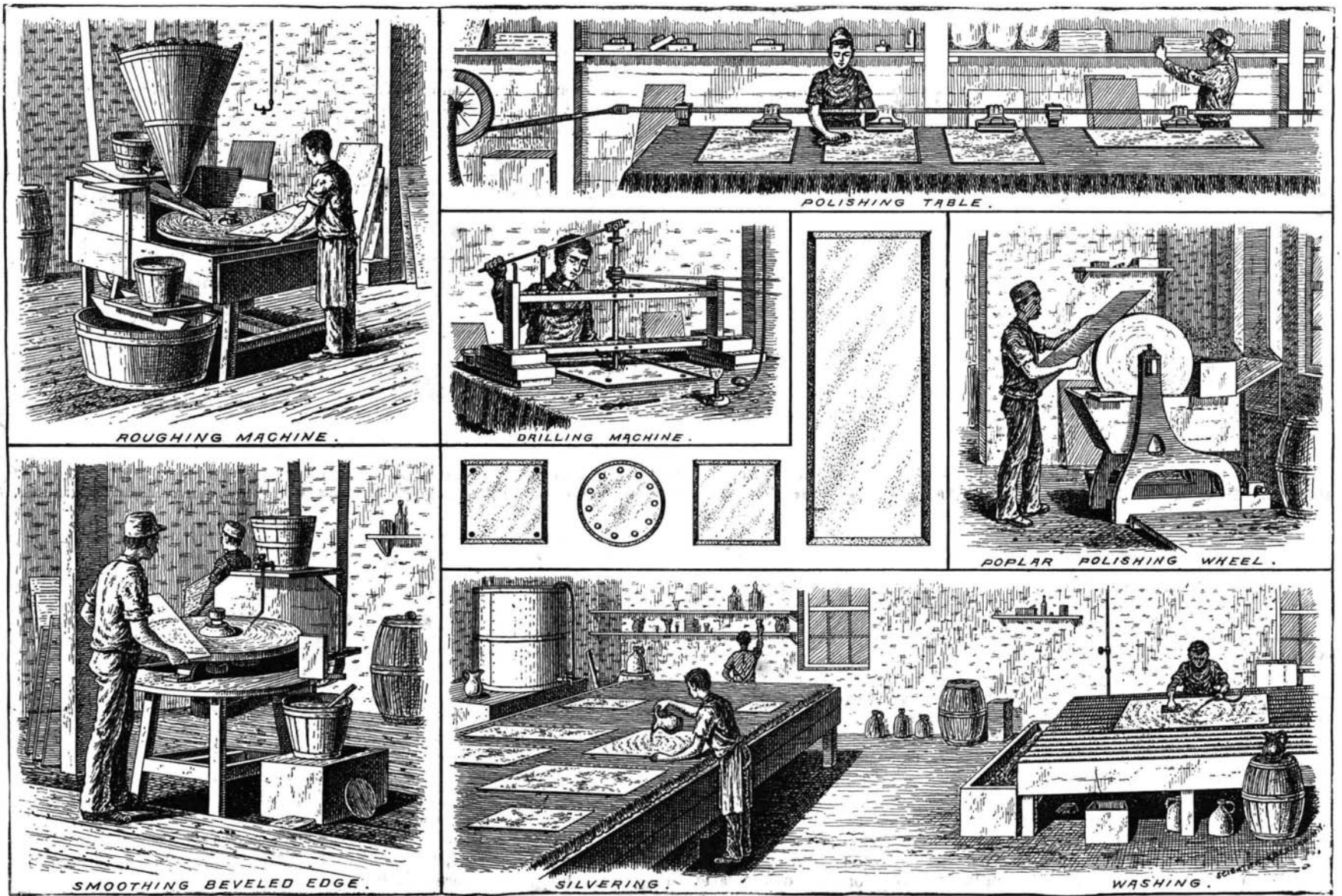
The shaft which moves the blocks over the surface of the glass is set in motion by means of a crank attached to a wheel on the main shafting.

After polishing the glass is taken to the silvering room and washed and silvered as stated above. Some

cucumbers, cauliflowers, and cabbages, while on spinach leaves kept in a damp atmosphere they were still present after twelve days. A three per cent infusion of black Chinese tea destroyed them within twenty four hours, and in a four per cent infusion no trace could be found at the end of sixty minutes. In the case of coffee a two hours' immersion in a six per cent infusion sufficed for the destruction of the organisms. Beer of various kinds was equally fatal, one to three hours being the limit; but wines acted best of all, vitality being extinguished within twenty minutes by red wine and within five minutes by white.

The New Rifle for the Navy.

The navy has made a new and radical departure in the manufacture of small bore arms. The recommendation of the Chief of the Ordnance Bureau, founded on the report of the Newport Board, has been approved by Secretary Herbert. The new caliber is 0.234 of an inch. This is the smallest caliber regularly adopted by any government. The caliber of the French Lebel rifle is 0.315; the German Mannlicher is 0.311; the Danish Krag-Jorgensen is 0.315; the English Lee-Speed 0.303; the Swiss Schmidt 0.295, and our new army model 0.30. The board recommends the 0.234 caliber, as they consider that it will give higher veloc-



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and made up to 8 liters with distilled water, and 7.5 grammes of tartaric acid dissolved in 30 grammes water are mixed with the solution. About 2.5 liters are poured over the glass meter to be silvered. The metal immediately begins to deposit on the glass, which is maintained at about 40° C. (104° Fah.), and in a little more than a half hour a continuous coating of silver is formed.

The silvered surface is then cleaned by very cautiously wiping with a very soft chamois rubber and treated a second time with a solution like the first, but containing a double quantity of tartaric acid. This solution is applied in two portions, and thereafter the glass is once more carefully cleared of all unattached silver and refuse and removed to a side room for backing up. The plate glass before silvering is first beveled on the roughing machine. To bevel the edges the sheet of glass is held up slightly on the edge by the attendant on to a horizontal revolving iron wheel. This wheel is about 30 inches in diameter and about 1½ inches in thickness and is slightly curved on top. Water and white Rockaway sand is added from a large wooden cone-shaped hopper, which causes the wheel to grind down the edges of the glass.

The wheel is capable of beveling one foot in about twenty minutes. From the rough beveling machine the glass is run over a 30 inch emery wheel. This cleans and takes out the sand from the pores of the glass. From the emery wheel it passes to a horizontal New

silvering tables are made of hard wood, being about 1½ feet in depth, with a metal top. The interior contains about six inches of water, heated by coils of pipe laid across the bottom. The tables are about 12 feet in length and 7 feet in width. Iron slabs are laid over the top of table and covered with Canton flannel, on which the glass is placed to be silvered. It takes about 2½ hours to dry and then the backs are painted. Some silverers use hartshorn and Rochelle salts in their solutions. The sketches were taken from the plant of A. Vogeley, New York City.

Distribution of Cholera.

Though there is little reason to doubt that the distribution of cholera is mainly due to the use of impure water, in certain cases its communication has been traced to various articles of food, and Mrs. G. C. Frankland, in *Nature*, give a summary of recent researches on the subject by Friedrich. More than fifty different articles were specially studied, including fruits, vegetables, milk, tea, coffee, cocoa, beer, wine, caviar, biscuits, bonbons, tobacco, and snuff. In the case of solid substances the cholera bacilli were both rubbed on the outer surface and inoculated on to slices. Under the former condition the vitality of the microbes depended chiefly on the degree of moisture present in their environment, but the acid in the juices of fruit caused their destruction on the slices in from one to six hours. The bacilli survived for several days on

ity, greater range, greater penetration and greater accuracy than the 0.30, with the added advantage of allowing the men to carry a greater supply of ammunition. The disadvantage is the lack of interchangeability of ammunition between the two services. The figures given above for the guns adopted by the foreign nations are the latest. In the last few years the reduction in caliber has been phenomenal. The English Martini and the old Springfield rifles were 0.45, the famous Chassepot of France 0.433, the Russian Berdan 0.42. The number of rifles needed by our navy is small, but the department will, if necessary, furnish the barrels for the manufacturers to apply the breech mechanism.

The nickel alloy has become famous in the manufacture of our armor plate, so that it is, therefore, not surprising to learn that the 0.234 barrels to be furnished to the competing inventors of magazine guns will be made of nickel steel alloy. We shall look for the competitive tests with great interest.

High Speed on the Pennsylvania Railroad.

Engine No. 225 of the Pennsylvania's new class P, with 78 inch wheels, did some fine running a few days ago, having reached the speed of 90 miles per hour, and averaged over 87 miles per hour for several miles. It also ran 65.2 miles (including six slow-ups) in 63.75 minutes, and from a standstill at Bay View it ran to Chacee, 11.4 miles, in 9 minutes and 39 seconds.