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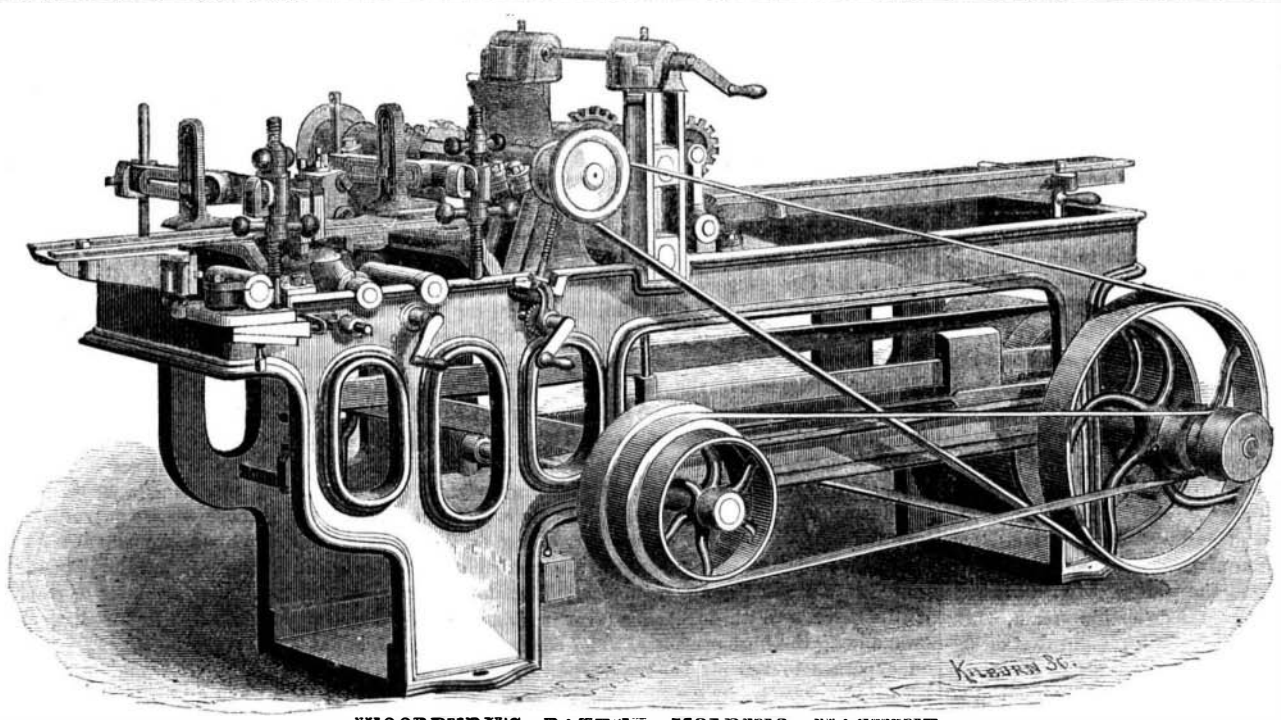
Wood Molding Machine.

Our engraving illustrates another important wood-working machine, manufactured by Mr. S. A. Woods, manufacturer of the wood planer, illustrated and described on page 90, current volume.

In this molding machine, the side spindle frames are attached to, and are moved from one side of the machine to the other by means of a screw applied to each of the spindle frames which slide upon round bars, and are so constructed that by simply tightening a thumb or hand screw, which holds or clamps the cap of the box firmly to the bar, all side-tremble, or lost motion—backlash, is entirely obviated. This is considered a great improvement over any other method, as it is well known to practical men that much difficulty is experienced in this particular.



WOODBURY'S PATENT MOLDING MACHINE.

The top cutter-head is not covered up with cumbersome machinery, but can be approached from either side of the machine. The yoke or cutter-head frame, to which the cutter-head boxes are fixed, is turned down between the side pieces of the machine; thus it will be seen that the boxes are always in line with each other, leaving the head which holds the cutter-frame to be "get at" with wrenches, etc.

The under cutter-head frame is also set upon sliding wedges, so that it can be moved up and down at pleasure (without stopping the machine), by simply adjusting the wedges. This is done by means of a set screw applied at their ends.

Balance pulleys are used upon the top and side spindles, adding very much towards regulating the balance of the cutters, when they are not precisely of the same weight, and making a steady cut.

This machine will also match and work sheathing or flooring.

The under cutter-head is slotted, and the table through which the under cutters project can be enlarged so as to admit of the use of molding cutters. This is very convenient in rebating, beading, or "springing" moldings. The table is hinged, and can be swung one side, which allows the operator to "get at" the cutters to adjust and sharpen them.

The machines have three changes of feed and vary in size from 2,000 to 3,000 pounds, working 8, 10, or 12 inches wide.

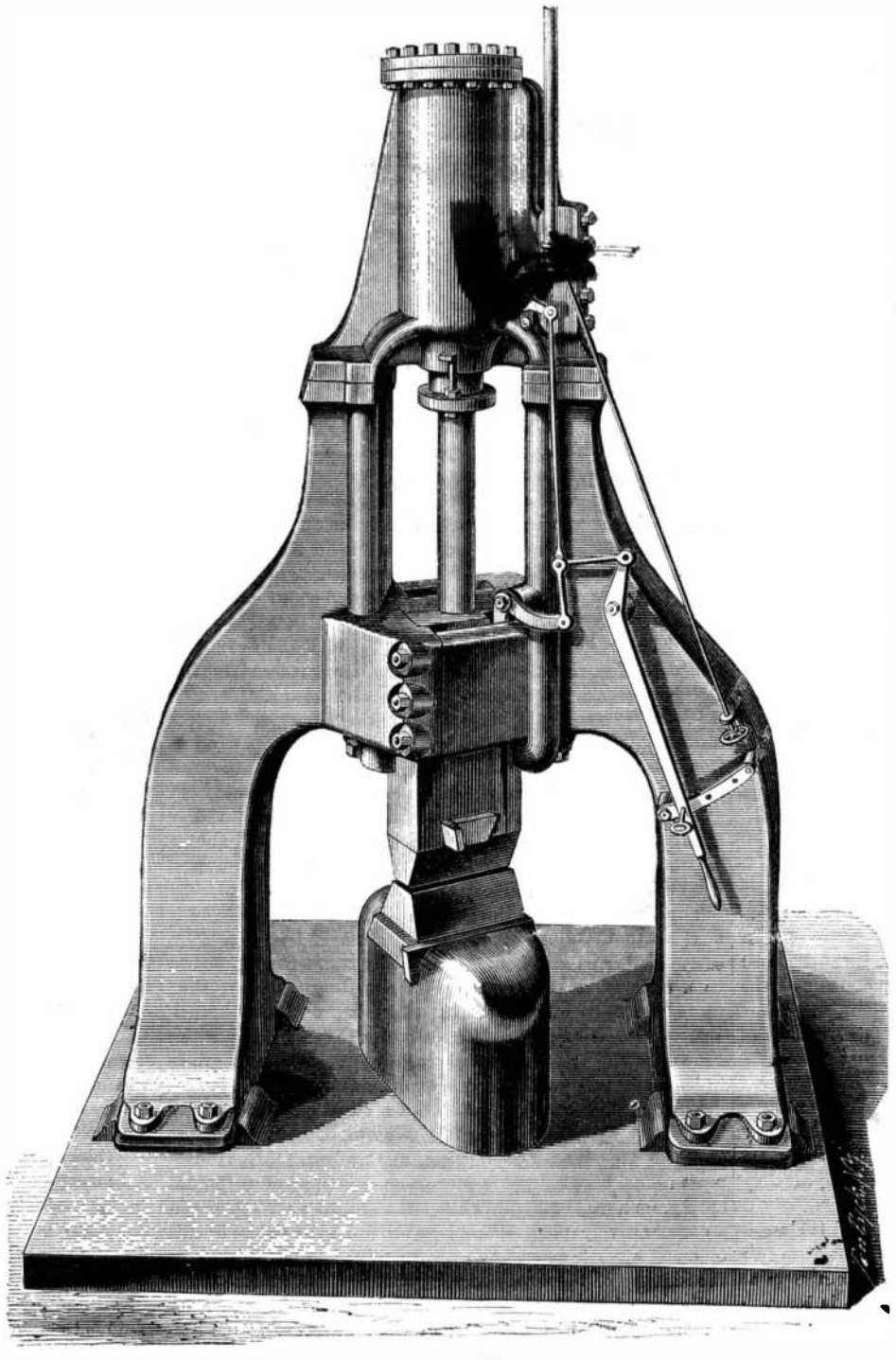
The machines are very compact, and easy to adjust in all of their parts. A gold medal was awarded to this molding machine, at the Massachusetts Charitable Mechanics' Association Fair, 1869; and also first premium at the American Institute Fair, New York, 1869.

It is manufactured by S. A. Woods, of 91 Liberty street, New York, and 67 Sudbury street, Boston, Mass., to whom communications may be addressed.

Improvement in Steam Hammers.

One of the most important instruments in the orginal manufacture, and, subsequently, in the multifarious forging of iron and steel, is the steam hammer. Any real improvement, therefore, which simplifies its construction and increases its efficiency, is sure to be acceptable to all who are engaged in this extensive branch of industry.

The most successful steam hammers hitherto, are of two well-known and distinct types, or classes, both of English parentage; namely, those whose "ram," or "hammer head," or "tup," or "drop"—by all of which names it is variously called—is guided by the frames or standards below the cylinder, in the manner originally invented by James Nasmyth, of Patricroft, and those in which the hammer bar or piston rod is guided by bearings on or in the cylinder itself, or above it, as designed by Robert Morrison, of Newcastle.



FERRIS & MILES' STEAM HAMMER.

They are commonly referred to, for the sake of brevity, as hammers with guides and hammers without guides, the latter meaning those which are guided in the cylinder. They could be better designated, however, by the names of the inventors. Both Nasmyth and Morrison have had the usual host of imitators, and many important modifications and improvements have been made in the original forms and gearing, but the types have always remained entirely distinct. Each has its respective advantages and of course its advocates.

The Nasmyth system insures greater accuracy and less strain upon the working parts, while the Morrison design leaves the anvil more open to the workmen.

Our illustration represents an improved steam hammer manufactured by Messrs. Ferris & Miles, of Philadelphia, Pa., which combines in a great degree the security of the Nasmyth frame-guide with the convenient openness of the Morrison cylinder guide. It has also two valuable improvements for which patents are being solicited through the Scientific American Agency:

The first relates to the arrangement or design. The second to the valve gearing.

It is well known that in the more generally adopted Nasmyth system the "ram," or "drop," being set flatwise and parallel with the frames, and guided by a rib or groove planed in or on them, it becomes necessary for most kinds of work to employ diagonal, or as they are technically called, "skew" dies (or bitts), whose corners, however, must fall within the edges of the ram whereby their area is much diminished as compared with that of the end of the ram.

It is to be remarked that ample "die," or "bitt," surface is a consideration of the first importance in steam hammers.

In this improved arrangement the ram itself, which is of oblong horizontal section, is placed diagonally to the frames, or "on a skew" and guided by them without either groove or rib. So that a plain oblong die of the full size and shape of the end of the ram can be keyed under it and will pass up through the guides. This gives at once the required "skew die," while at the same time it affords the amplest extent of die surface for any operation that can be performed under the hammer.

In consequence of placing it in this position the ram is only required to be made of the breadth and thickness corresponding to the largest die, and can be made much longer than usual without exceeding the proper weight. This obtains a greater bearing on the guides, which can therefore be placed much higher than usual above the anvil, leaving it nearly as unobstructed as in the Morrison system.

The anvil, which is of oblong section with semicircular ends, is also placed diagonally to the frames but at right angles with the ram. The portion above the floor is made perpendicular for convenience in shouldering down, and in forging a bent or crooked piece of work. The lower die, also of simple, oblong shape, is keyed directly across the top of the anvil; its face corresponding with that of the upper one, and its greatest length being the thickness of the anvil, which is equal to the

greatest breadth of the ram, or nearly one half greater than can be obtained by the parallel arrangement.

The simplicity and numerous other advantages resulting from this double-diagonal construction, will be at a glance appreciated by all familiar with the operation of these machines.

The valve gearing is of the utmost simplicity. A rock lever or bell crank is pivoted on a stud in the frame, one arm of which, A, is connected by three links to the valve spindle, B, and hand lever, C. The other arm, partially hidden behind the guide plate, rests lightly against the face of the ram, but entirely independent of it and not attached in any way. An incline is planed in the full length of the ram (which is longer than the stroke of the hammer), in order to operate this rocker arm when the hammer is in motion.

The valve is perfectly balanced. Its weight, and that of the links resting on the horizontal arm of the rocker, hold the vertical arm against the inclined plane in the ram.

The hand lever serves to alter the relative position of the valve to the piston, so as to work it by hand when required, and to adjust the stroke to the thickness of the forging. By it the force and length of the stroke can be changed in an instant, a single blow can be struck, the metal can be squeezed upon the anvil as long as desired by the force of the top steam. The hammer ram can be raised to the very top of the stroke, held there as long as desired, then brought down gently or violently, as preferred, and by a slight gesture sent up again, etc.

A thousand blows can be struck all alike, or each one can be varied at will. It is always in gear for self-acting motion, while never out of gear for hand working. The two are parts of each other and inseparable.

The working of the self-acting motion is as follows: When the steam is turned on the hammer rises, the incline plane pushes outward the vertical arm of the rocker, which, of course raises the horizontal arm and with it the valve. The position of the hand lever determines at what point the steam is reversed from below to above the piston. When this happens the hammer descends, driven by the top steam, while the valve has only its own weight to lower it and that of the links and horizontal arm of the rocker. But this weight is partly counterbalanced by that of the rocker's vertical arm, and thus the descent of the valve is momentarily delayed—the ram gets the start of it and strikes the anvil before the piston takes steam under it.

A peculiar feature about it is that as the throttle is opened admitting more steam, while the force of the blows is increased in a regular ratio, their rapidity remains about the same or rather diminishes, so that in actual practice it runs rather faster when striking light blows than when striking heavy ones. This new feature gives time to turn the metal on the anvil, and avoids the complaint made against almost all steam hammers of the self-acting kind; namely, that when a full head of steam is turned on they run away, and the full power of the machine is therefore unavailable.

The *rationale* of it is, that as the steam is turned on, the up stroke quickens and gives more momentum to the valve and links upwards. It takes them a little longer to recover from this momentum and fall. Hence the slower blow and the greater force of it.

By the arrangement of the gear, the speed of the hammer can be varied while running from the slowest dead-blow to the quickest "pick-up" that the most insatiable steel maker could desire.

As the rocker glides easily upon the incline plane during the whole up stroke, and, at most barely overtakes it on the down stroke, no jar can come upon any part of the valve motion, nor can any lost motion affect it as the wear is constantly taken up by the weight of the parts. They must rest upon each other during the up stroke and they fall themselves of their own weight.

These hammers are manufactured of different sizes from 100 pounds up to 2,000 pounds. Some are made with double and some with single standards or frames. In the smaller sizes the hand lever is dispensed with, the links are differently situated, and a simpler arrangement effected. They can be seen in operation at the manufacturers' works, N. E. corner Twenty-fourth and Wood streets, Philadelphia, Pa., where any further desired information can be obtained.

[For the Scientific American.]

YAUPON TEAS OF CAROLINA---MATE OF PARAGUAY.

BY PROF. H. E. COLTON.

All along the Atlantic coast, south of Norfolk, grows an evergreen shrub tree, but in the greatest luxuriance and extent in eastern North Carolina. The people there call it Yopon, and from time immemorial its leaves have been used as a tea. The Indians thus used them, and the people of the colony planted by Sir Walter Raleigh, and their successors learned its use from them. Lawson, in his quaint history of the Carolina colony (1707), states that every spring the Indians would come down from the hill country to fish, and that it was also their custom to prepare a strong drink from the leaves of the "Ebpen" shrub, whereof they drank until they were made sick, and purged and vomited until their systems were cleared of all foul matter; thenceforth for the year they were free of sickness.

This plant belongs to the Ilex (holly) family, and is classed by some *Ilex cassena*, by others *Ilex euponia*. There are two varieties; one bearing a red berry close to the main stem of the branch. This has a small leaf about one inch in length; the other has no berry, and the leaf is longer. In the rude parlance of the country they are classed as female and male. The leaves of the latter are those usually used for tea. In South America there are two similar shrubs, one classed *Ilex Paraguayensis*, the other *Ilex Songonha*. It has ever been our opinion that they are the North American plant altered by climate and soil, and careful investigation confirms us in this opinion.

The Yopon contains tannin and a volatile essence, but probably a smaller proportion of the first than Chinese tea. The Paraguay tea has about the same characteristics. Medicinally, the yopon is a sedative sudorific, and anti-febrifuge, and possesses greater invigorative powers than any Chinese tea, at the same time it leaves no feeling of exhaustion either in the system or the stomach; it is aperient, and, when taken in very strong and large doses, produces vomiting. These are exactly the qualities of the Paraguay tea. That tea is eagerly sought for and used by the inhabitants of South America, and is by some thought to possess properties equivalent to both bread and meat. Laborers required to undergo severe exertion are said to accomplish more work by its use than by the use of any other beverage. It is a well-known fact in eastern North Carolina, that the laborers of that section, especially raftsmen and sailors, find more nourishment and refreshing qualities in the yopon than in any of the imported coffees or teas. Captains of the coasting and sound vessels have told us that it had all the exhilarating effects with none of the bad consequences of spirituous liquors.

The *Ilex Paraguayensis*, from which the Paraguayan mate, or tea is made, grows in the interior of Paraguay and Brazil to the extreme hight of fifteen feet. Its full-grown leaf is from 2½ to 3 inches long, serrated, with flower and fruit on the stem at the foot of the leaf. The bark has a smooth surface and a grayish color. The tea is gathered mostly by the Indians, employed by contractors. The leaves are dried in rudely constructed kilns, then powdered and put in skin bags for market. The trade is known to amount to $2,000,000, or more per year. It is used mostly in the powdered state. A quantity of this, greater or less, according to the desired strength, is put in hot water and allowed to steep a short time. It is drunk through a tube called *bombilha*, from a cup with a cover. With ice it is a favorite drink in summer, even among the higher classes. The covered cup is used, as on exposure to the air the tea turns very dark—this is especially the case in strong decoctions.

The yopon, or, as Lawson calls it, yaupon, grows near the coast on a poor sandy soil. It is claimed that there are several distinct species of it, but we think the distinction is due to difference of soil. It is a beautiful evergreen, and is cultivated for hedges on some of the coast plantations. We have been told that it is also found on the Gulf coast, and we know that it is cultivated as an evergreen in some of the gardens of Louisiana. It grows readily 40 or 50 miles inland, but efforts to cultivate it on the upland red clay soils have not been successful. The extreme length of leaf is nearly two inches. It grows wild in large thickets, but nearly every plantation and farm has what is termed a yopon nursery. Hogs and cattle are very fond of the young tender sprouts and leaves. To prepare the tea the leaves and small sprigs are picked indiscriminately. They are put in a wooden trough or mortar, and chopped with a spade or ax. They are then placed in a covered pot over a slow fire, the cover occasionally removed to stir the leaves. When they begin to smoke, which indicate sthat they are properly dried, they are taken out and packed way for use. Some give them a further drying in the sun; others sprinkle salt over them while in the pot—this no doubt from a foolish notion that it helps to keep the tea. If carefully prepared and then tightly barreled, it retains its proper aroma and good qualities for several months; but, like all teas, the package should be air-tight to keep for any considerable length of time.

The trade in it has never been of any consequence. A small quantity was sent to Norfolk and Baltimore, and the captains of the coasting vessels bought small lots for their own use. During the fishing season on the Albemarle and Pamlico sounds a great deal was consumed. The price was from 75 cents to $1 per bushel; about 5 or 10 cents per pound.

The leaves can be gathered at any part of the warm season, or if one chooses in winter; but tea gathered in the spring is considered the best. The made tea turns dark on exposure to the air; if very strong, this takes place almost immediately. This has been attributed to the roasting in iron pots, but the same effect occurs in the South American article, and hence it may safely be assumed to result from some chemical property of the tea itself. From this peculiar change of color it was called black drink by the Indians. It is erroneously stated by some botanists to have been used by the Creek Indians.

The Tuscaroras were the great tribe of the Carolinas, and it is in North Carolina that it chiefly grows, and in which the early historians mention its use. The name is supposed to be a corruption of Yeopim, from a tribe of Indians thus named, who lived in the section where it grows most luxuriantly. The supply is practically inexhaustible, and the growth of the tree can be indefinitely increased, as it grows in its native soil from a sprig set out in early spring.

We, perhaps, have not made out a clear case of identity between the yerba, or *Ilex Paraguayensis*, of South America, and the yopon, or *Ilex Cassena*, of Carolina. My readers must remember that the former grows in a land of perpetual spring, on a different soil, while our Carolina shrub grows in a comparatively poor soil, and has to meet the rough breath of many a northeaster. We are sustained in our opinion of the identity of the two plants by the Rev. Dr. Hanks, in his "History of North Carolina," Vol. II., page 218; also by Messrs. Kidder and Fletcher, in their "Brazil and the Brazilians." They state that the town of Paranagua alone exports every year a million dollars' worth of mate. I quote the following, with which they close their article on the subject:

"He found in this out of the way port of Brazil an American woman engaged in the delightful art of preparing *peijoes* and *toncinho* (pork and beans) for the natives and foreigners who patronize her establishment. In conversation with her in regard to the maté, she exclaimed, 'Why doctor, this is the same truck we use in Carolina to make tea.' Here was a most striking confirmation of the true conclusion of science."

Any person who will turn to this work will find still stronger confirmation in the general description of the Paraguay shrub, and the preparation of the tea. It is a matter to be regretted that the botanical characters of either have not been thoroughly investigated. We do not claim exact identity of the plants botanically, but the same chemical qualities of the prepared tea. We have stated our belief as to the alteration of the plant by soil and climate, and all are well aware that nearly every plant and tree is subject to such changes under such circumstances. The use of tea and coffee is an acquired taste, and in fact, perhaps all tastes are acquired, except that for the mother's milk; the use of yopon may be distasteful to some at first, but we think not more so than their first taste of Chinese tea. It has been said that any drink which affects the nervous system will become a popular drink. If this be so, yopon must sooner or later take a high place among infused beverages, as it has sedative qualities superior to any of them. At the risk of being laughed at for want of aristocratic taste, or for preferring a thing entirely American, we say that we prefer it to any tea, coffee, or stimulating or sedative drink that exists; and we know of remarkable instances of its beneficial effects on the decaying systems of the aged, and the shattered nerves of the feeble. One old lady used to tell us "Why, laws me, it's the greatest truck! it's kept me out of heaven these twenty years!"

Even admitting that it has no qualities superior to the best Chinese tea we get, only that it is as good, the question arises, why cannot this tea be made a new article of trade and commerce from the South? If the people there will not enter this new field, let Northern capital and enterprise occupy it. Once introduced, a ready sale might be found for it at 25 cents per pound, and if more carefully prepared, as high as 50 cents. It would be not only a source of profit but of benefit, and a blessing to that large class of our population who now drink those vile, low-priced adulterations called coffee and tea. The cheapness of the article detects the fraud. But if nature must have some such beverage, why not the truly beneficial yopon of the Carolinas?

[For the Scientific American.]

PLATINIZED LOOKING-GLASSES.

BY C. WIDEMANN.

NO. 1.

A long time ago the French sanitary commissions had founded a prize to reward the successful inventor who could obviate the use of mercury in applying tin to looking glasses. The consumption increasing daily, the diseases caused by the absorption of mercury have increased in proportion. Many engineers had devised a remedy for these evils by successful ventilation in the extraction of the ore. The manufacturers themselves, in view of the disorders and sickness caused by the use of mercury in their works, encouraged every attempt made to obviate it, and, in 1836, the celebrated chemist, Liebig, had already called the attention of scientists to the application of silver on glass.

Encouraged by some successful experiments, Messrs. Drayton, Petitjean, and Tourasse, and lately, Mr. Brosette, obtained at last industrial results.

Little by little this operation was simplified, and is now conducted on a large scale. I shall describe the process used at present as giving the best results.

In order to obtain a silver coating on glass so as to obtain a reflecting surface, two liquids are used.

First solution—100 grammes, nitrate of silver; 62 grammes, liquid ammonia, from 870° to 880° density; 500 grammes distilled water.

This mixture is filtered and is afterwards mixed with 16 times its volume of distilled water, in which 7 grammes and 50 centigrammes of tartaric acid have been added, dissolved in 30 grammes distilled water, care being taken to stir the whole violently. This forms solution number one.

Solution number two is prepared in the same way, and varies only in the proportion of tartaric acid, which is increased to 15 grammes.

The operation of silvering is carried on as follows:

After having carefully cleansed the surface of the glass to be coated with very fine tin pulp and water, applied with a chamois skin, it is then washed over and left to dry. It is then rubbed with a dry chamois skin and with a fine rag. The glass is then laid on a wooden grate, and all the dust that might have fallen on it during the former operations is removed by an india-rubber cylinder dipped in distilled water. The glass plate is then laid upon an iron table, heated by steam to from 40° to 50° Centigrade; this table is covered with a varnished or oiled cloth. The plate being placed horizontally, as much of the solution number one is poured over it as the capillarity of the glass will retain (say almost 3 millimeters thickness) without running over the sides. In about 7 to 10 minutes the deposit takes place; and in about 15 to 20 minutes afterwards this part of the operation is at an end. The plate is then lifted upon one side and washed with a chamois skin, and luke-warm water is poured over it in order to remove the non-adhering dust which may have fallen during the process, which occupies about 25 minutes. The plate is then immediately replaced in the horizontal position, and solution number two is applied in the same way as the first. In 12 or 15 minutes after the operation the application