

### THE ELECTRIC RAILWAY BETWEEN CHICAGO AND ST. LOUIS.

Among other wonderful novelties promised us in connection with the World's Columbian Exposition is an electric railway of high speed between Chicago and St. Louis. The projectors expected to have the work completed in time to carry passengers to the great Fair; but they have been disappointed, and although it was announced some time ago that the roadbed was under contract and a considerable portion already constructed, still, for some reason or other, the enterprise has remained very quiet of late and we fear has come to a halt. We are indebted for the following description of the novel system and the great expectations of the projectors to the *Graphic*, of Chicago.

The Chicago & St. Louis Electric Railway Company, a corporation organized under the laws of Illinois "for the purpose of constructing, maintaining and operating a complete electric railway system between the cities of Chicago and St. Louis, with suitable and necessary spurs and branches connecting with the towns and cities along said road, for the accommodation of local and through passenger and high-class freight, express and mail traffic, and for the further purpose of supplying citizens and cities on the route of the road with light, heat and power, for State, county,

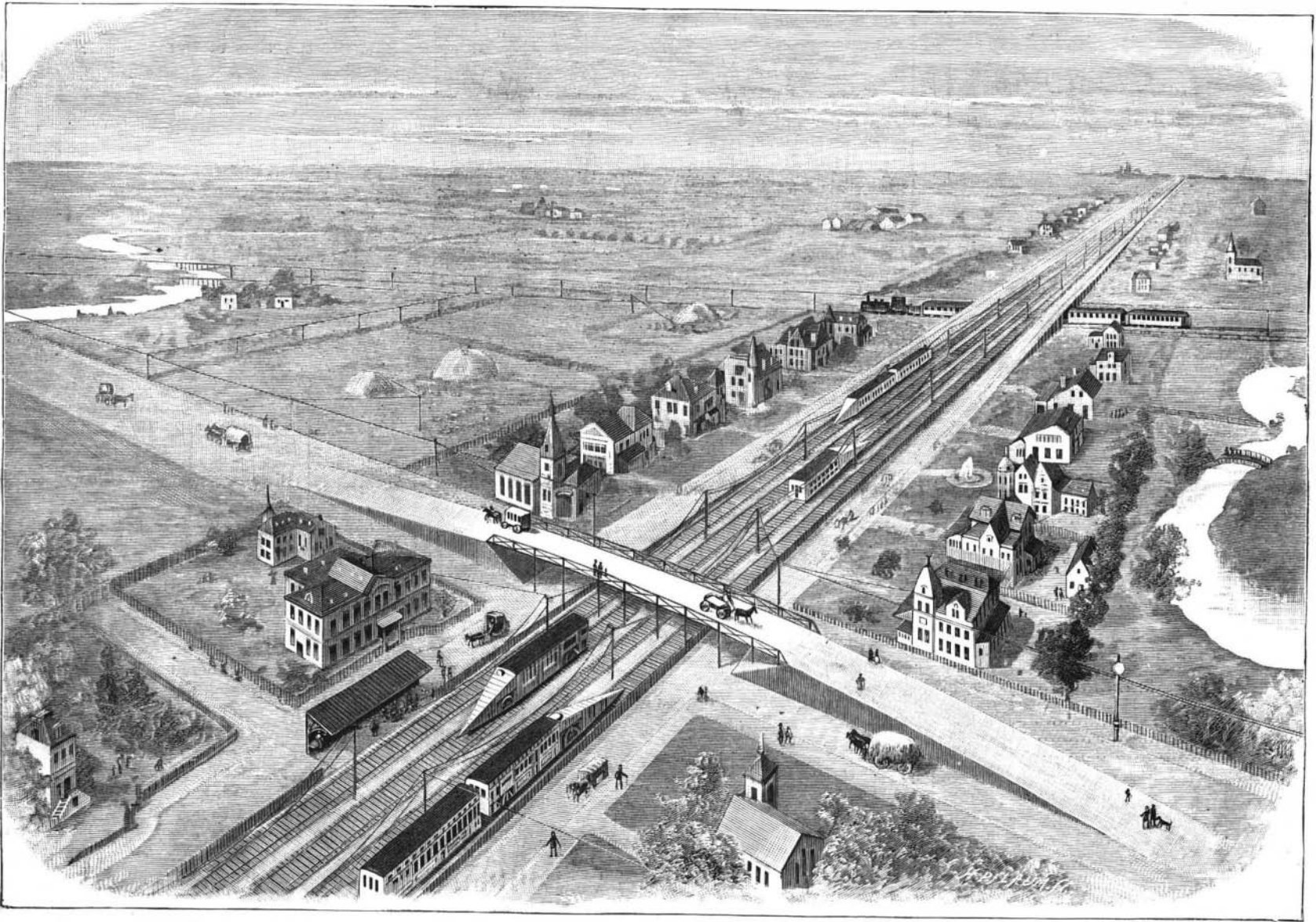
making a minimum of 500 revolutions a minute, which would give the car a speed of more than 100 miles an hour. The large size of the driving wheels makes the revolution of the axle only about the same speed as that of the axles under an ordinary passenger coach moving at the rate of 50 miles an hour, and therefore the friction will be no greater. The axles of the electric car also turn on roller bearings which do not require the use of oil.

The cars are to be run one section apart, and no current will be permitted to flow in the intermediate section, making it wholly impossible that cars should come within less than 10 miles of each other, and preventing absolutely the possibility of collisions. The top of the electric car will be only 9 feet from the rail, which is 3 feet lower than the ordinary street car. The center of gravity is thus brought very low, and quite near to the track, practically eliminating the possibilities of the car jumping the track. The front of the car is wedge shaped, and will cut the atmosphere in a way to very materially decrease the atmospheric resistance. The motorman stands just behind this wedge-like nose, and between his department and the rear wheels is the passenger compartment. After the passenger coach is a separate compartment for mail and high class express matter. An overhead electric

erected if required. The possibility of transmitting power electrically over long distances with economy was demonstrated at the last Frankfort Exposition, where 300 horse power was sent by electricity over a distance of 108 miles with an efficiency of 75 per cent.

The road will have double tracks at first, but the line will eventually build four tracks—two light-weight outside tracks for local traffic and high class freight and two heavy-weight inner tracks to be used exclusively for through passenger traffic, mail and express. The standard schedule time of through trains will be 100 miles an hour, the trip from Chicago to St. Louis being made in two hours and thirty minutes. No passenger trains, it is said, will be run at night, or at least not later than 9:30 P. M.; and the track will be employed during these hours by cars carrying freight, mail and express matter. The cars will be lighted and warmed by electricity, and will be provided with all the comforts of the modern car. A through train will be run every hour, or oftener, as may be required, and accommodation trains will be run every half hour, as soon as tracks are provided for this purpose. The line of the road will be illuminated by incandescent electric lamps for one mile ahead and one mile behind every car while running at night.

The economy proposed in the matter of fuel is an



BIRD'S EYE VIEW OF THE CHICAGO AND ST. LOUIS ELECTRIC RAILWAY AND BOULEVARD.

municipal, domestic, farming, manufacturing and other purposes," has perfected plans for the construction of an electric line which will satisfy the most zealous enthusiasts on the subject of rapid and cheap transportation.

The patents under which the new system will be operated were applied for by Dr. Wellington Adams in 1883, and granted to a Missouri company known as the Adams Electric Company in 1884, and were the first patents ever issued covering the essential elements of an electric railway. These patents were subsequently assigned to the Adams Electric Railway Company, and later conveyed to the Chicago & St. Louis Electric Railway Company.

The line between the two cities will be divided into 25 sections of 10 miles each, and will be operated from power stations located at coal mines belonging to the company along the route. The electric coach or car to be run is a long, low, compactly and strongly built car of very light weight; its weight being an important feature in the economy of operation. The car has two pairs of driving wheels, each of which is driven by a separate and distinct electric motor. The entire weight of the car, with its passengers, and of the two motors comes upon these two pairs of driving wheels, and consequently is all serviceable for adhesion between the rails and the wheels, through the agency of which the car is propelled. The driving wheels are 6 feet in diameter, and are estimated as capable of

construction will be used, consisting of central poles and cross arms, with a trolley wire running along the side of the car. Motors operating under this system require no commutators or brushes, and may be so constructed as to be water and fire proof.

The line of the road will be practically straight, and there will be no railroad or country road crossings at grade or on a level with its own line. The tracks of the electric road will be elevated above the crossing tracks of other railroads by means of iron bridges, and the country roads will be thrown up over the track of the electric road by means of wooden bridges.

It is estimated that there will be about 250 of the latter to construct and 17 of the former. This will give the line a roadway completely protected from interruptions of all kinds, and insure against the occurrence of the many accidents common to other railways. There will not be a frog, a switch nor a draw-bridge on the entire line.

The weight of the whole car, with its equipment, will not exceed 15 tons, eliminating the great difficulty encountered by steam railroads, which have so large an amount of dead weight to draw. In the case of these roads there are hauled 19 tons of non-paying weight for each ton of paying passenger weight. In the electric road this will be reduced to the ratio of 1 to 5.

It is thought that two power houses may be sufficient to provide the necessary force, but more will be

important feature. The company has secured coal lands suitable for its purposes, and will operate its own mines by means of electric mining locomotives, electric drills and electric cutters, largely cheapening the cost of mining the coal. The good coal will be sold and the waste, dust or slack, which is a complete loss under the present methods of mining, will be utilized in the engines which develop the power for operating the road and the mines.

The entire line of the road has been surveyed and the location definitely settled. A large percentage of the right of way has been acquired, and valuable terminal facilities and entrances have been secured in both Chicago and St. Louis. At the latter city the road will cross the Mississippi River on the Merchants' Bridge and run over the new elevated structure of the Merchants' Terminal railway into the Union Depot. At Chicago it will enter the city over the elevated structure now being built for the Chicago Elevated Terminal Railway Company, and run into its station at State and Twelfth Streets. Work was recently begun at Edinburg, Ill., where power house No. 1 of the company is located, and is being actively prosecuted under supervision of Chief Engineer Hughes. Over 8 miles have been completed since work was commenced, and they have every assurance that the road will be completed and carrying passengers during the World's Fair in 1893. The new electric line, it is claimed, will afford a much needed link between the large number



of Southern and Western railway lines centering in St. Louis and the Northern and Eastern lines centering in Chicago, and will do a very large proportion of the passenger, express and mail traffic of these systems between the two cities. The enterprise is backed by some of St. Louis' leading financiers."

Since the above was written there must have been important changes in the expectations and means of the company, for we cannot learn that any definite progress in the work has been realized.

**MANUFACTURE OF MACARONI.**

Our illustrations are taken from the plant of the Columbia Macaroni Manufacturing Company, New York City. Macaroni is a preparation of wheat originally peculiar to Italy, in which country it is an article of food of national importance. The same substance in different forms is known as vermicelli, spaghetti, Italian pastes, taglioni, etc. These substances are prepared from hard, semi-translucent varieties of wheat. Hard wheats are richer in gluten than the soft and tender wheats. These wheat preparations styled macaroni are met with in various forms, such as fine thin threads called vermicelli, from its thread-worm-like appearance, thin sticks and pipes, stars, disks, ribbons, tubes, etc. In the manufacture of

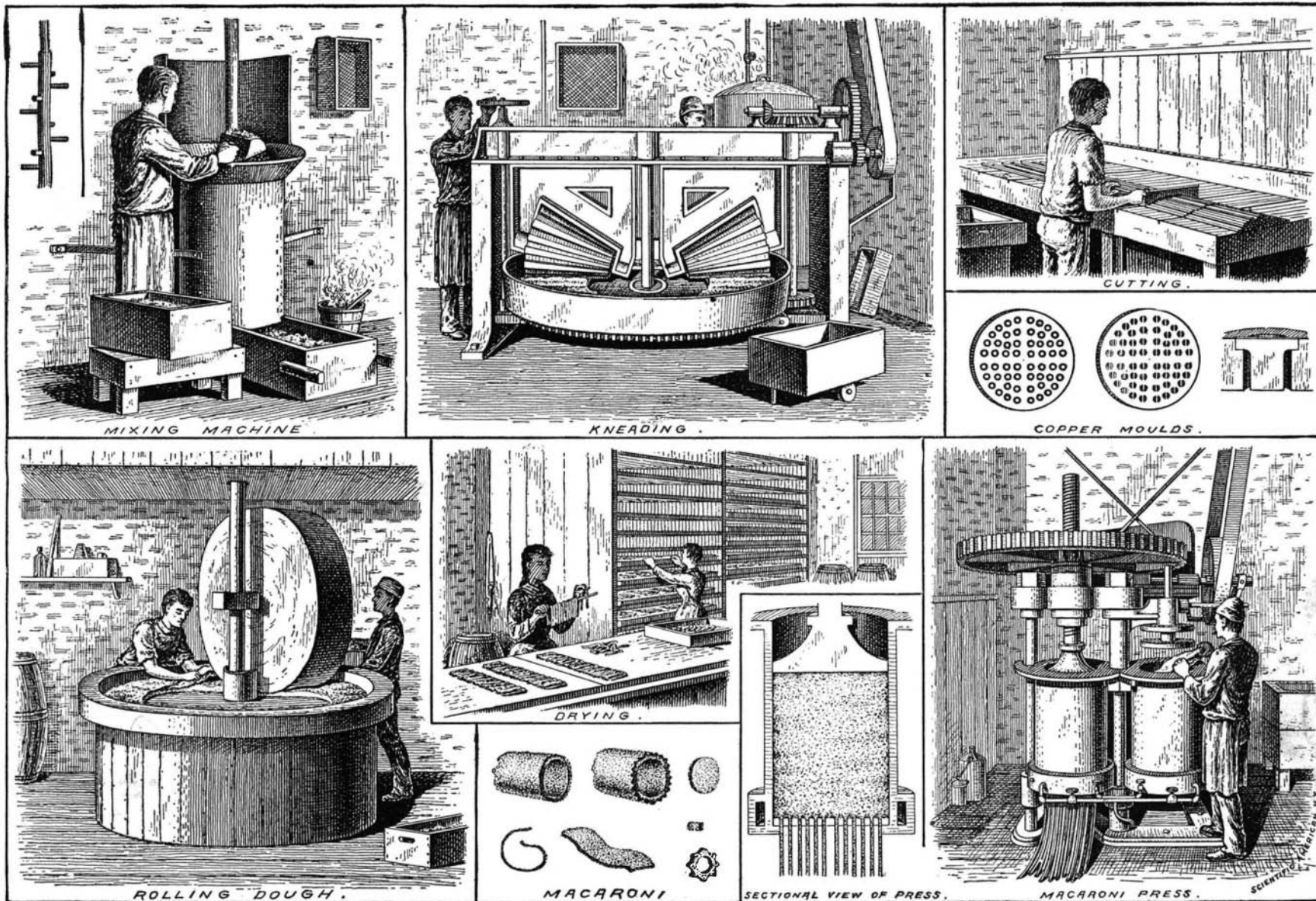
means of a circular piece of copper held in place by a pin running across the center of the hole on the inner side of the mould. As the dough is pressed over the pins it divides in the center and unites itself again as it passes out of the mould. About 100 pounds of dough is placed in the cylinders at a time, which is pressed out through the moulds by means of an accurately fitting plunger or piston. One thousand pounds pressure is used, the cylinder emptying itself in about 45 minutes. As the pipes of macaroni pass out of the mould they are cut off into 10 foot lengths and taken to the cutting table, where they are recut into small lengths for drying. The macaroni is then placed on pasteboard and racked away for eight days to dry, in a temperature of 80 degrees, when it is placed in boxes and is ready for market. The company employs about 125 Italian hands and turns out about 3,500,000 pounds yearly.

Having thus described the method of manufacturing macaroni in New York, we will now give an account of the way the article is made by hand in Italy.

The hardest and flintiest varieties of wheat are selected, first washed and then thoroughly dried in the sun. This wheat is then coarsely ground and run through a revolving sieve to separate the starch from the bran and flinty portions. It is then successively

through these holes in the shape known to us as macaroni. At this stage of the process it is, of course, soft and flexible, and in order to keep the various little strings of dough from sticking together, it is constantly fanned by a boy, so that the current of air thus made may slightly dry the outside of the strings and prevent them from adhering. It is then cut off and hung on racks or frames made of bamboo to dry. As it hangs on the frames the different pieces are of unequal length, and a boy passes rapidly over them, wringing off the longer ends to make them uniform. The drying has to be done in the shade and in a place not exposed to the wind; for, if dried too quickly, or if the slender pieces were blown against one another, they would be apt to break. When sufficiently dry it is removed from the frames and packed in boxes such as are familiar to all grocers.

The different sizes are made by changing the movable bottoms of the press and employing different sized perforations. Each of these perforated holes has a core or center around which the dough has to pass, and this produces the hollow which is a characteristic of the macaroni. The reason of this arrangement is, if the macaroni is made solid, it would take very long to dry when hung upon racks, and also when dried it would be very difficult to cook it without a great deal of



THE MANUFACTURE OF MACARONI, NEW YORK.

macaroni about 100 pounds of semolina or granulated wheat is first put into a circular iron mixing machine 3 feet in depth and 2 feet in diameter. A quantity of boiling water is then added and the substance mixed up into a stiff dough by a revolving shaft armed with circular teeth which runs down through the center of the machine. The dough is then taken out and placed in a circular wooden rolling machine, 3 feet in height and 8 feet in diameter, over which for 40 minutes travels a revolving granite roller 5 feet in diameter, 18 inches in width, weighing 3 tons. After the dough has been thoroughly rolled and pressed, it is placed in a kneading machine. A layer of dough about 4 inches in thickness and about 8 inches in width is placed around the outer edge of a circular revolving pan 6 feet in diameter and 18 inches deep. Attached to the framework of the machine across the center of the pan are two loose cone-shaped gearing wheels. As the pan revolves around, the dough is passed under the cone-shaped wheels, which in turn revolve, burying their teeth into the dough. This operation continues about 20 minutes, thoroughly mixing and kneading the substance. It is then placed in the cylinders of the macaroni press. These cylinders are about 2½ feet in length and about 15 inches in diameter, on the inside of which, resting on a flange at the bottom, is a copper mould. These moulds are about 1 inch thick and perforated with holes through which the pipes of macaroni are pressed. The pipes are made hollow by

passed through a series of six hand sieves, each a little finer than the preceding, for the purpose of separating the flinty portions from the bran. This apparently simple process requires considerable skill, and a certain knack which it takes time to acquire. The motion which is given to the sieves by the sifters is half rotary and half up and down, with an indescribable side motion, which can only be characterized as a "boomerang," for it throws the mass which is being sifted in an opposite direction to that taken by the sieve. Every few minutes each sifter pauses and skims off the bran which has worked to the top and center of the sieve, and after these various manipulations there remains a clean, flinty farina, known as semolina. This is then mixed with warm water into a stiff dough, and this dough is thoroughly kneaded by means of a long prism-like, hardwood lever, so adjusted that the spring of the timber may be utilized in alternately raising and depressing it upon the mass of dough, which is then pressed and kneaded into the required consistency. It is rather amusing to see two or three men sitting on the end of this lever and bobbing up and down so as to throw their weight at one instant on the lever, bringing it down into the dough, and then allowing it to spring up again, in order that it may be brought down in a new place.

After it has been thus mixed and kneaded for about an hour, the dough is put into presses with perforated bottoms, and, pressure being applied, it comes out

boiling, and impossible to do so uniformly. So important is this considered, and so defective do the Italians regard the product if not thus perforated, that a proverb has arisen in Italy to the effect that "A foolish person is like macaroni without any hole in it."

Vermicelli is made from the same material and in the same way as macaroni, except that it is not hollow, it being so small that it is neither practicable nor necessary to make it so.

**Photographic Work in France and Belgium.**

M. De Saint Florent has communicated to the French Photographic Society a method of printing with salts of iron, by which he says colors may be faintly reproduced—the red, yellow, and green being more distinct than the violet and blue. A gelatino-bromide plate is taken, and the silver is removed from the film by fixation in the hyposulphite bath, and, after washing, the plate is dried. The film is now sensitized in the following:

Water.....	100 parts.
Ferric chloride.....	10 "
Tartaric acid.....	5 "

After rinsing, the plate is dried and exposed for rather a long time under a colored original—as, for example, colored glasses or gelatines. It is next washed with warm water, by which some of the more soluble parts of the gelatine are removed, and it is finally dried.