THE ROYAL GARDENS AT CASERTA, ITALY.

Most of our readers are familiar with the chief features of the Italian school of landscape gardening, the broad plateaus, the artificial lakes and waterfalls, and especially the formality of shape shown in trimming the edges and rows of trees. Of the pleasure grounds attached to the palace of Caserta, the country residence of the late King of Naples, we herewith publish a view. extracted from *The Garden*. Our contemporary, in describing the scene, says: "You enter through a huge royal palace, which seems admirably suited for accommodating several regiments of life guards, when the scene depicted in the illustration meets the eye—the huge cascade facing a distant hill covered with evergreen oak. Good as the engraving is, it can give little idea of the enormous length of these garden waterworks, long and well constructed stone reaches of deep clear water, broken here and there by falls, which are embellished by a rich display of sculpture and statuary. But, before reaching the waterworks, we have to traverse a very large space by habit called a garden, but which is simply a huge expanse of turf, on which stands clumps and squares, and avenues of trees. We have to approach these closely to see what they are composed of, for all are either clipped or mown, or in some way mutilated, till they lose all individual character, and merely form irregular walls of vegetation. Under one of the falls, there is a vast covered way, with well constructed rocky walks and walls, and here the maiden-hair fern grows everywhere as freely as meadow grass; it ventures out from the moist and shaded grottoes, and creeps into the eyes and ears of the spouting sea monsters outside in the sun—the only trace of life or Nature near. The distressing effect of all this gradually passes away, for one of relief, as the base of the great irregular (but also artificial) cascade is reached, till the eye dwells happily on the hills around, densely garlanded with evergreen oak. All this kind of art comes from allowing the space intended for a garden to be converted into an open air gallery for the exhibition of architecture, sculpture, etc., mostly of a mediocre, and often of a feeble or ridiculous character. Let us not, however, delude ourselves into the belief that, in creating such scenes, on either a large or small scale, we are making a garden. There is at Caserta, however, an example of one phase of real gardening which will repay the visit. It is what is called the English garden, a large piece of diversified pleasure ground, with many trees allowed to assume their natural development. Towards the end of the last century this garden was planted, and with a very happy result. The great geometrical district, so to say, gives one an idea that the region is not a fertile one; this is at once dispelled on entering the English garden. The cedars, cypresses, and deciduous trees have attained great size and beauty, and grow in stately groups, with open spaces between, so that their forms may be seen. Here is the first camellia ever introduced into Italy, where the plant is now so abundantly grown, and whence we get most of our new varieties. It is a specimen of the single red, now in full bloom, and about 20 feet high and 15 feet through. The camphor tree is seen in fine health here, in specimens nearly 50 feet. The garden is enriched by some grand cork trees, which may give many visitors a fair idea of what a noble tree this oak is when fully developed. The trees are huge in stem, picturesque in their branching, and about 80 feet high. Some of the scarcer pines attain much perfection here, as, for example, the Mexican (*p. Montezuma*), which is 60 feet high.

The Possibilities of Future Discovery.

A striking illustration of the popular lack of scientific reasoning is to be found in an editorial which recently appeared in the New York *Herald* as follows:

"The wildest imagination is unable to predict the discoveries of the future. For all we know, families in the next century may pump fuel from the river and illuminate their houses with ice and electricity. Iron vessels, properly magnetized, may sail through the air like balloons, and a trip to the Rocky Mountains may be made in an hour. Perhaps within fifty years American grain will be shot into Liverpool and Calcutta through iron pipes laid under the sea. By means of condensed air and cold vapor engines, excursion parties may travel along the floor of the ocean, sailing past ancient wrecks and mountains of coral. On land the intelligent farmer may turn the soil of a thousand acres in a day, while his son cuts wood with a platinum wire and shells corn by electricity. The matter now contained in a New York daily may be produced ten thousand times a minute, on little scraps of pasteboard, by improved photography, and boys may sell the news of the world printed on visiting cards, which their customers will read through artificial eyes. Five hundred years hence a musician may play a piano in New York connected with instruments in San Francisco, Chicago, Cincinnati, New Orleans and other cities, which will be listened to by half a million of people. A speech delivered in New York will be heard instantly in the halls of those cities; and when fashionable audiences in San Francisco go to hear some renowned singer, she will be performing in New York or Philadelphia.

In the year 1900 a man may put on his inflated overcoat, with a pair of light steering wings fastened to his arms, and go to Newark and back in an hour. All the great battles will be fought in the air. Patent thunderbolts will be used instead of cannon. A boy in Hoboken will go to Canada in the family air carriage to see his sweetheart, and the next day his father will chasten him with a magnetic rebuker because he did not return before midnight. The time is coming when the *Herald* will send a reporter to see a man reduce one of the Rocky Mountains to powder in half a day. Skillful miners will extract gold from quartz as easily as cider is squeezed from apples. A compound telescope will be invented on entirely new principles, so that one may see the planets as distinctly as we now see Staten Island. Microscopes will be made so powerful that a particle of dust on a gnat's back will appear larger than Pike's Peak. And marvelous progress will be made in psychological and mental sciences. Two men will set in baths filled with chemical liquids. One of them may be in Denver and the other in Montreal. A pipe filled with the same liquid will connect the two vessels, and the fluid will be so sensitive that each may know the other's thoughts. In these coming days, our present mode of telegraphing will be classed with the wooden ploughs of Egypt, and people will look back to steamships and locomotives as we look back to sailboats and stage coaches."

MEDICAL NOTES.

Cholera.

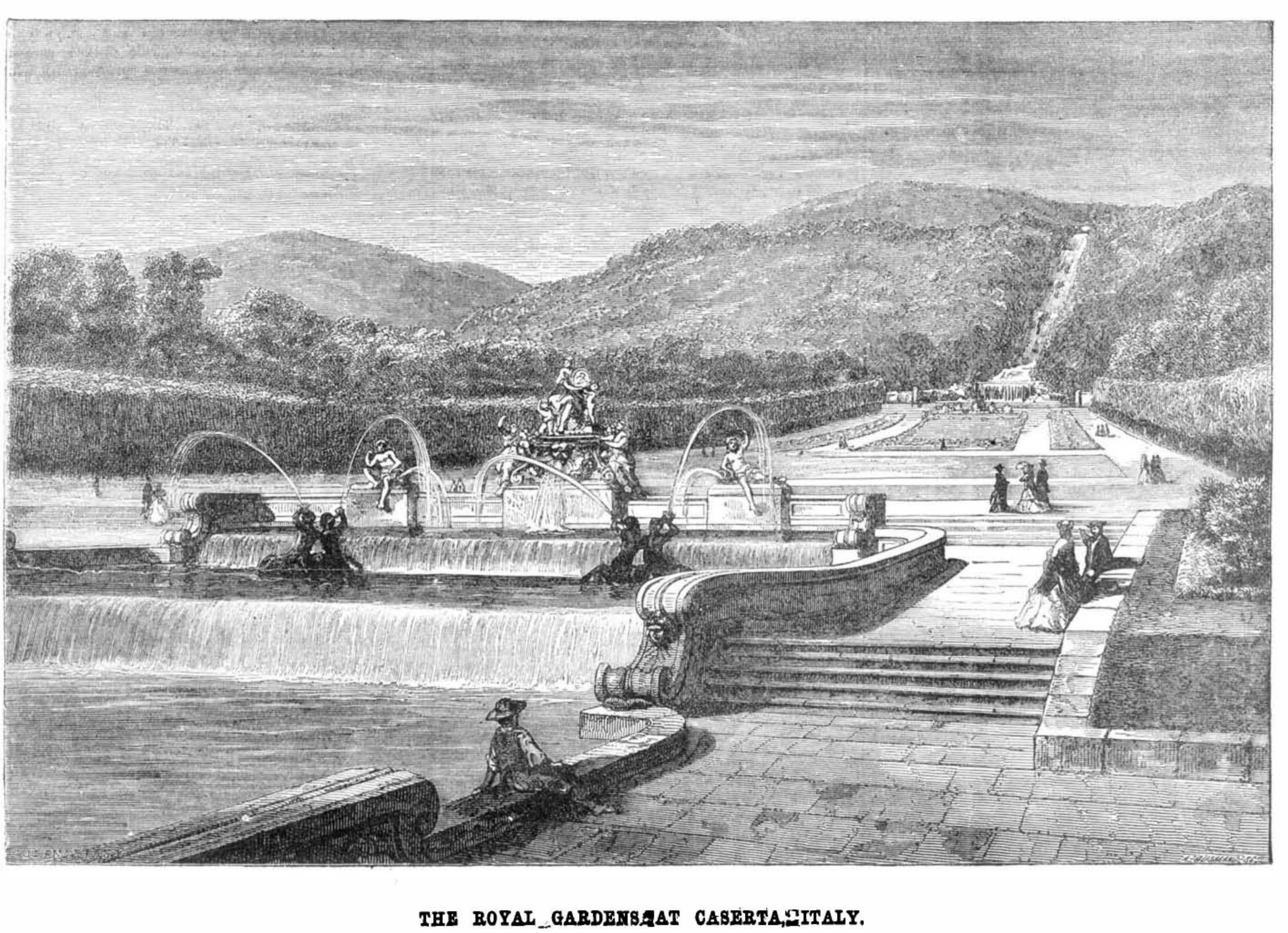
There may come another cholera scare this year; certainly there will come one before many years. Some doctors think the scare worse than the disease. At any rate, the nervous depression produced by reading and hearing alarming stories is a well proven semi-cause of death, by diseases which affect the nervous system, whether alone or conjointly with other disorders; and sometimes light ones are aggravated to the bitter end by imaginary fears. Knowing the force of this fact, as all experienced people do, it seems a happy thing to find an antidote, as far as cholera scares are concerned, in the following statement: Dr. Blakiston says, in the London *Medical Times and Gazette*, that it has been fully proved in the Paris hospitals that cholera is not communicable by the breath of the patient, or by contact with his body during life or after death. Most of the "stiffs," as they are called in technical vulgarity—that is, the subjects of dissection—were for many months victims of cholera in Paris, and yet no doctor and no student caught the disease. Therefore let no timid person have any fear about the infection of air or touch, but remember that the germs of cholera have been proved to be propagated through the *dejecta* (voidings in any way) which come in contact with water or food, possibly with air much breathed, though this is not fully shown.

Valerian in Diabetes.

Dr. Bouchard says extract of valerian is a powerful agent in diminishing the elimination of urea and waste of tissue seen in diabetes. He adds a curious fact, observed in long practice among the Indians of Lower California. The warriors, before entering on an expedition, go through a course of valerian regimen for a month, to get themselves into a fatigue-supporting condition. This fact suggests another, concerning the Peruvian Indians, who are able to go without food for five days, under a burdensome journey, when well supplied with the juice of the plant, so extensively used in that country, called coca. It seems to us that coca and valerian might be used in thickly settled countries as articles of medical nutrition, to say nothing of their possible value as substitutes for food of the common sort among the very poor.

Poisoning by Hydrate of Chloral.

In the case of a man who took six drams of chloral to commit suicide, electricity was first used to induce regular



THE ROYAL GARDENS AT CASERTA, ITALY.

© 1874 SCIENTIFIC AMERICAN, INC.

breathing, and then subcutaneous injections of nitrate of strychnia to stimulate the heart's action. Finally the patient awoke, quite refreshed, thirty-two hours after swallowing the chloral.

A Good Disinfectant.

A very weak solution of permanganate of potash is an excellent disinfectant for light purposes, such as rinsing spittoons, neutralizing the taint of diseased roots, cleansing the feet, and keeping the breath from the odor of tobacco smoke. Permanganate is not poisonous.

A Preventive for Lead Poison.

Any soluble salt of lime (if plaster of Paris or gypsum is used, there should be added a little saltpeter or sal ammoniac) in the most minute quantity prevents the oxidation of lead in contact with water. Therefore it would be well to put a little chalk into wells which have leaden pipes, also in leaden beer pipes and other conduits, if people will use them. Perhaps it would be better to dip leaden pipes in a moderate solution of sulphuric acid (oil of vitriol) before using, and to dip the common soldered tin cans for fruit in the same, in order to form an insoluble coating of sulphate of lead. For, all wiseacres to the contrary, every good chemist knows that lead is easily oxidized by pure water, and still more so by water containing carbonic acid; and since lead is a cumulative poison, a very little of it at a time, taken into the system for weeks, months, or years, will be sure to produce some ugly disease, like neuralgia, painter's colic, hardened liver, or paralysis, the frequent foe of the aged.

Improved Mustard Poultice.

The *Medical Brief* says: In making a mustard plaster, use no water, but mix the mustard with white of egg, and the result will be a plaster which will draw perfectly, but will not produce a blister, no matter how long it is allowed to remain.

Anæsthesia.

At Bellevue Hospital, bromide of potassium, 30 grains previous to administering sulphuric ether and the same dose as soon as the patient can swallow after the administration, is now regularly resorted to. The effect is to prevent the vomiting which so commonly follows the use of ether.

THE CONVENTION OF THE CIVIL ENGINEERS.

The sixth annual convention of the American Society of Civil Engineers was recently held in Tammany Hall in this city. About 100 delegates appeared, representing the principal cities in the country. Colonel Julius W. Adams, President of the society, presided; and in the course of the proceedings, a memorial was adopted urging upon Congress the necessity and importance of a series of complete tests of American iron and steel. We give below abstracts of the papers read.

Captain James B. Eads said that

UPRIGHT ARCHED BRIDGES

can be more economically constructed for railroad purposes than is possible with the suspension system, no matter what the length of span may be. He said that it is entirely practicable to brace the upright arch more effectually, and with equal, if not greater, economy, than is possible by any known method of stiffening suspension bridges. By any method of girder construction hitherto known, it is impossible to span a clear opening of 500 feet with less than three times the dead weight of the arch in the proposed system, with equal strength of girder and with the same material and allowable strain.

The objection to the combination of wood and iron in bridge construction, owing to the difficulty of repairing the bridge, does not exist in this method. In all others, the wood is either under tension or compression, and therefore difficult to be removed without endangering the stability of that arch, or of any other one of the series; for it is plain that, if any temporary weight were placed on the floor which would equal the weight of the cords to be removed, the equilibrium of the whole series would be undisturbed by their removal so long as the whole bridge remained unloaded. In repairing, it would never be necessary, however, to remove any one cord entire at once, but only to replace such pieces as were found defective.

Mr. Francis Collingwood read a paper on the

ANCHORAGE OF THE EAST RIVER BRIDGE.

The front face of the Brooklyn anchorage is 930 feet back from the center of the tower. The length of the base is 132 feet, and extreme width, 119 feet 4 inches. It consists of a timber platform of three feet thickness, thoroughly bolted. Below this platform are bearers, placed longitudinally with about nine feet spaces, the bottom of these being at the level of high tide in the East River. The extreme size of the excavation at the bottom was 122 feet 4 inches wide at the rear, 112 feet and 4 inches at the front, and 135 feet long. This space had to be excavated entirely to a uniform level before the foundation could be started; and the problem was to so support the banks as to effectually prevent damage to surrounding property, and at the same time not have the bracing interfere with the free movements of workmen, or with lowering or placing the timber and stone in position.

All materials for the anchorage had to be brought 1,000 feet through crowded streets from the dock at the river, and it was also desirable to transport the same from the excavation to the yard at the pier for storage.

The form of the masonry throughout is in plan the same as that of the foundation, the stone work being set back 18 inches all around from the edge of the platform. There are a series of offsets at the bottom, but its general form in elevation is that of a truncated pyramid with sides battering above ground half an inch per foot rise The top of the masonry is also the grade line of the bridge, and has an elevation of 89 feet at front, and 85 feet 9 inches in the rear. The front portion is divided into three parts. The central of these will support and contain the two central anchor chains. Between this and the two exterior walls are spaces arched over to support the roadway above. Since diagonal braces could be used, this determined the use of two lines of through longitudinal bracing and six lines of through transverse bracing. At the intersections of the main lines, square timber piles were driven, before the excavation was begun, to a depth of about three feet below tide. The excavation was then started at the highest point, and the first stringer, etc., put in. After this was well under way, the second range of sheeting was started on the opposite side and ends, and before the pressure had become severe the braces between the heads of the piles were put in in each direction. In this way the work was carried down progressively, the excavation in the central portion being in every case the last removed.

THE EXCAVATION.

In driving the lowest range of sheeting, great difficulty was found in penetrating the fine, compacted sand below the water line. After trying several devices, it was decided to use a water jet. For this purpose a small rubber hose was provided, having a three quarter inch jet from pipe four feet long for a nozzle. This was attached to the city works, and by its use the planks were forced down very readily. Six inches below tide was the average depth driven. To overcome the last two feet of the excavation, it was necessary to pump the water out of the pit; and the question arose as to the size of pump required. To solve the question appropriately the following experiment was tried: A piece of 18 inch sewer pipe was set down into the sand at the bottom of the pit. The sand was then removed from the interior and the water bailed out. The time and depth below and top was then noted, and when nearly filled the time was again noted, together with the increase in hight. The average head under which the water entered did not exceed six inches, and it was thought that this would probably be as great as it could ever be around the sheeting, and, taking the relative perimeter of the two as a basis, to be pumped about 80 gallons per minute. At a time afterwards, when the pump was in regular working, the amount discharged was found to be 60 gallons per minute. This method would no doubt be safe in similar cases where no springs in the bottom were to be apprehended. The maximum pressure upon the sand underneath, caused by the complete structure, will be about 4 tuns per square foot.

The only remaining point of interest was the method taken to lower the four anchor plates into the pit. These were massive castings, 17½ feet by 16 feet and 2½ feet deep (over all), and weighing 53 tuns each. For this purpose, an excavation 20 feet wide, with slope of two to one, was made in the rear, and a hole cut through the sheeting. In this timber ways were laid, and two sticks were also bolted to each of the plates, for sliding pieces. They were then lowered by tackle without trouble.

Abstracts of several other interesting papers will be given in our next.

Metallic Bedsteads.

The works of Mr. S. B. Whitfield are situated in Watery lane, in the Coventry road, Birmingham, Eng. They are called the Gladstone works, and occupy about 3,000 square yards, of irregular parallelogram, and are built on three of the sides.

First, we go into the cutting shop. Here the angle iron, round irons, and rods are cut into the lengths required for the parts of the bedstand. As many as 200 or 300 different lengths are required for the various parts. The rods are brought in bundles, and are cut by a machine worked by steam, as many as five rods being cut by one movement of the cutting press. These are for scrolls and other ornamental parts of the bedsteads. When the angle rods have been cut, they are then stamped straight by hand-worked presses. They are next passed to lads by whom they are studded, and on these studs the laths are put when the bedstead is made up. All these processes are executed with great precision, as all the parts of the same kind of bedstead are interchangeable, and the greatest exactitude is required in every part of the work.

From the cutting shop we pass to one of the galleries, of which there are two overlooking the casting shop. In the first gallery the rods, having been cut and studded, are brought to be bent into the various forms required by the pattern. This process is exceedingly simple. The pattern for the scroll or other design is placed in a vice and the rods are placed around it, the iron lengths used being either plain or bended, according to the design. In this gallery the iron is bent into shape for the bands or the bottoms of the bedsteads. In every case the work has to be done with great nicety, as every one must correspond with the rods with which they are to match. This department is very properly named the bending gallery, and every visitor will be struck with the beauty of many of the curves produced, and the elegance of many of the designs and patterns.

After having been bent, the various parts of the head and foot are taken into the casting shop, which is, of course, on the ground floor. These are placed on a frame, and the end of each of the parts is placed in a chill; in some elaborate patterns more than twenty chills are used. Into these chills is poured the molten metal, and from the pattern cast in them is produced the flowers, knobs, and other ornaments which are seen at the various points of jointure. As soon as this process has been performed, we have a head or foot, as the case may be, completely produced. This is the method of casting all the parts together, the invention of which produced quite a revolution in the trade. As soon as the metal is poured in, the chills are opened, and the work is ready for chipping. This process is done by hand, and by it the casting is cleaned of all superfluous bits, and thus made ready for the next operation. In this part of the premises all the casting is done. The sockets, into which the dovetails and ends of the angle iron are placed, are cast on the corners of the posts. This is done while the parts are still in the frame. The furnace is funnel-shaped in the inside, and is charged with coke and pig iron in the proper proportions, and the metal is taken from it in pots and carried to the various parts required by the casters. The casting finished, and the work chipped of the bits of metal which are left by the casting, it is ready for japanning and painting.

Before passing to this part of the works, we visited the stock room. This is not so called from its containing the stock in the ordinary name, but in a technical sense. A stock in a bedstead manufactory is a die or pattern, for producing the ornaments for the tops of the pillars and other parts of the bedstead. In fact a chill may also be called a stock, as both are patterns and dies by which the ornamental parts are produced.

In the top gallery, folders, chairs, and cabinet bedsteads are made. Here we saw some which would either serve for a chair, a sofa, or a bed. As a chair, you can, by adjusting a small check, obtain any inclination you wish. By a very simple arrangement, you can unfold it and make it into a bed. Having used it, it can be folded up into so small a space, and is withal so light and portable, that a not very strong man could carry his chair and bed about with him wherever he pleased.

PAINTING AND JAPANNING PROCESS.

We now pass into the japanning and painting. This work is carried on in separate shops, each mode of decoration requiring stoves of a different temperature. The common, or black japanning, is done on the ground floor. The bedsteads are taken from the casting shop, and then covered with a coating of black japan and placed in large stoves, or rather heated iron rooms, where they are subjected to a temperature of 250°. In the second or upper room, a better kind of work is done, and a green, a maroon, and other colors are employed. In this work the heat required for fixing purposes is still very intense, but much less so than for black japanning. In the top room the more artistic painting and ornamentation is done, and a still lesser temperature is required, often not exceeding 100°. This is a very pretty process. The designs in metal are made on slips of paper, which are fastened on the scroll, or pillar, or rail, to be ornamented. The pattern is then washed, and the paper comes off, leaving the design in gold and colors on the bedstead. The ornamentation is in gold and colors, and some of the designs are very beautiful and elaborate. Some of the work is decorated by hand. After the painting, the parts are placed in the oven to fix the colors.

From the painting and japanning rooms, the articles, now finished, are taken to the wrapping rooms. The best goods are wrapped in paper, the head and the sides and laths being made into different parcels. The inferior work is only partly prepared, and then banded up with straw, and sent away to various destinations. The more delicate work is packed in skeleton cases. Every bedstead is put together and tested before it leaves the works.

One very careful kind of work is stamping the holes in the laths for making the iron racking. These are flat slips of iron cast to the required length. The hole at one end is stamped out by a hand press. In stamping the hole at the other end great accuracy is required, and it has to be done by gage. If this were not most carefully executed, the result would be that the latter would not fall into the studs on the sides or angle irons. They invariably do so, however, so nice is the adjustment of the parts. This done, the stud has only to be screwed down, and the bed is made, no keys being used in putting up metallic bedsteads.

From the wrapping rooms we passed to the fitting shop, in which also all the stocks and chills are made. This is one of the most important departments of the works. Here the design for the pattern of a stock is made in wax, then the model is taken in plaster of Paris, and from this the stocks are made. The utmost care is required in planing, turning, and cutting the various parts of a stock; for unless everything is made to fit and work into the nicest exactitude, the stocks will not close on the ends of the different parts which are to be joined together by casting. It is in this shop, in fact, that the bedstead is made. The various parts of a head or foot are placed on a frame, and then the stocks are tried, and every defect removed, until each one is in perfect working order. Here also are made the molds in which are cast the dovetail joints for the corners. In this room the nick in the top of the studs is cut, and the machine employed in this work acts with such facility and ease that the work is done by a girl.

TREATMENT OF BRASS FOR BEDSTEAD WORK.

Up to this time we have been engaged with the manufacture of iron bedsteads; we now turn to brass work, which is a distinct part of the trade. It is most interesting to witness the various processes through which this work passes. The framework of the bedstead is of iron, and the pillars, tubes, rails, and other parts are covered with a brass casing of not more than 1-64 inches in thickness. Some of the ornaments of the brass work are exceedingly elaborate and beautiful. A preceding writer has somewhat minutely described one part of this work; and as any account would be only a repetition of his words, we prefer to quote them. He says: "Entering the yard from Watery Lane, we find, in an open shed facing us, one stage in the manipulation of or

© 1874 SCIENTIFIC AMERICAN, INC.