For the Scientific American.

The Voltaic Battery.---Electrotype.

NUMBER VII.—(CONTINUED.)

The adhesion of the deposit to the metallic basis, or mould, cannot be said to be an anomaly in the deposition of the metals by the voltaic current, for it is on this very property that the plating art is based. But why the opposite conditions of those which produce adhesion in plating, are not always effective in producing non-adhesion, is not known; but it is now well established that a mere film of heterogeneous matter between the mould and deposit cannot be relied on to prevent adhesion.

The most simple of all the methods proposed for preventing adhesion by the interposition of a heterogeneous film consists in taking advantage of the film of air, which adheres so firmly to polished metals, as to prevent them from being wetted for some time after first immersing in water. To gain this film of air on the plate to be electrotyped, after making all attachments to the plate for connecting it to the battery, it is to be placed for several days in a cold cellar; after this the plate is to be attached to the battery and immersed in the bath; taking care not to touch the plate with the fingers, and making sure that the act of immersion completes all the arrangements, and leaves no time for the solution to attack the plate. The surface of the electrotype made by this method, when examined with a magnifier, appears undulated, which shows that the air film was waved while being covered with the copper.

Another method is to heat the plate to the temperature of boiling water, and then to smear it with olive oil; every particle of the oil is then to be wiped off by a crumb of fresh bread, and a piece of beeswax is then held to the edges of the hot plate; the melted wax instantly flashes over the plate, giving it a a thin and pretty uniform coating, if the operation has been dexterously performed. Any excess of wax is to be wiped away with a fine linen cloth. After the plate has been cold for a few hours it may be put into the precipitating bath; and here again we must make sure that the immersion completes the voltaic arrangements. This method of preparing the plate is not so liable to fail as by the film of air, but the operation is tedious, for, with the utmost care, some of the finer lines will be choked up; and after we have done our best in preparing it, after immersing it in the bath for the battery action, perhaps we shall never see its face again.

It has been proposed to silver the plate to prevent adhesion, it having been observed that the liability to adhesion was less when a dissimilar metal intervened between the plate, from which it was inferred that the attraction of copper for silver was less than the attraction of copper for copper. This inference is, however, erroneous, for copper can be precipitated on a plate of silver, so firm that the chisel cannot separate it. But when a piece of copper is silvered by chemical affinity, the substance holding the silver in solution, forms a compound with the copper, and on this the silver is deposited. This was explained as a cause of non-adhesion in the number on Plating. Not much reliance can be placed on this method.

There is yet one more mode of preventing the adhesion, which is altogether based on different principles from those described above. This method has been applied a great many times to very large and costly plates, and has not once failed. The operation is performed in a minute, and there is nothing to choke up the fine lines. This process will soon be patented, and therefore a description of it in this place would be improper.

The solution to be used in electrotyping is made of six pounds of water, one pound of sulphate of copper, and six ounces of sulphuric acid.

Evening Lectures.

New York City is at present deluged with lectures, many of which are the rankest trash in the world. There is but a very small amount of philosophic taste in our city in proportion to the population.

Building for the World's Industrial Exhibition.

This building is altogether a most stupendous affair. The architect and designer of the fabric, is a Mr. Paxton, whose plan differs from that originally proposed by the Committee, and gets rid of the fifteen millions of bricks and the immense and impracticable sheet-iron dome contemplated by the latter. Iron, glass, and lumber are his materials, which are prepared in different parts of the kingdom; and the contractors, Messrs. Fox, Henderson & Co., have engaged to put them together and cover the whole edifice in by the 1st of January next.

"The building will be 1,848 feet long, by 408 feet broad and 66 feet high. The long line is crossed by a transept 108 feet high, which will inclose a row of elm trees, now standing at a point so near the centre as to divide the length into 948 feet on one side and 900 feet on the other. In addition to the timber for joists, flooring, &c., the glass and supports of iron comprise the entire structure. The columns are similar in form throughout. The same may be said of each of the sash-bars and of each pane of glass. The number of columns, varying in length from 14 feet 6 inches to 20 feet, is 3,230. There are 2,244 cast-iron girders for supporting galleries and roofs, besides 1,128 intermediate bearers or binders, 358 wrought-iron trusses for supporting the roof, 34 miles of gutters for carrying water to the columns, 202 miles of sash-bars, and 800,000 superficial feet of glass. The building will stand on about 18 acres of ground, giving, with the galleries, an exhibition surface of 21 acres; but provision will be made for a large increase of galleries, if necessary. The gallery will be 24 feet wide, and will extend nearly a mile. The length of tables or table space, for exhibiting, will be about 8 miles. An idea may be former of the unprecedented quantity of materials that will be employed in this edifice, from the fact that the glass alone will weigh upwards of four hundred tons. The total cubic contents of the building will be 33,000,000 feet. The total amount of contract for use, waste, and maintenance, is £79,800; or very little more than nine-sixteenths of a penny per cubic foot. The total value of the building, were it to be permanently retained, would be 150,000*l.*; or rather less than one penny and one-twelfth of a penny per cubic foot."

Special precautions have been taken by the architect to provide for the complete ventilation and drainage of the vast pile. To effect the latter purpose, the glass roof is so contrived as to consist of a series of 'ridges and valleys' exactly eighty feet wide. Along the sloping sides, without and within, the water is conducted into gutters at the head of each column, whence it escapes through the columns themselves. In no instance has the water further than twelve feet to run before it is delivered into the valleys.

For the purpose of ventilation, the whole building, Mr. Paxton says, will be fitted with louvre, or luffer, boards, so placed as to admit air but exclude rain. In the transept alone there will be 5,000 superficial feet of ventilators provided. It is intended to cover the roof and south side of the building with canvass, which will substitute a gentle light for glaring sunshine; and, in very hot weather, says the Athenæum, it may be watered and the interior kept cool.

By late news, the building was proceeding rapidly. Nearly the whole of the columns in the transept have now been fixed, and considerable progress has been made in the glazing of the roof of the first and second stories of the building, upwards of twenty thousand square feet having been completed. The glass, which is of the weight of sixteen ounces to the square foot, is four feet in length, ten inches in width, and one-eighth of an inch in thickness. The glass is brought to the ground in boxes, each one containing fifty sheets. A machine is used for cutting the sash bars and their ends of the exact length and angle required. The sash bars—of which it may be remembered 202 miles in length are required—are four feet one inch in length, and as they are intended to be placed in what is termed "ridge and valley" style, it is necessary that their ends should be cut to exactly the same angle. The enormous amount of time which would be occupied in thus cutting by hand 266,000 distinct sash bars—for such is the number required—has led the contractors to the construction of this machine, with which, by a very simple process, the object is completely attained. A large number of the sash bars are placed securely upon a frame set in motion by a steam-engine, and the ends of the sash bars, which project over either side of this frame, are brought into contact with circular saws, also worked by steam, and placed on either side of the stage upon which the frame traverses. Upon one side the saw is placed obliquely, and, in revolving, cuts the ends of the sash bars at precisely the angle required; while upon the other side two circular saws, one being of less dimensions than the other, cut the bars to the exact length, and their ends to the form required. About fifty sash bars can thus be sawed accurate and completely within the minute.

The painting of such a vast quantity of sash bars has also been provided for by means of a "painting machine." This machine contains a well, rather longer than the sash bars, about one foot in depth and the same in width into which the paint is poured. Some thirty or forty of the "sash bars" are then thrown into the well and covered with the paint. One of the bars is then taken from the well, and passed through a small frame, the interior of which is fitted, on each side and at the top and bottom, with brushes, upon a plan similar to that adopted in the "knife-cleaning machines." The superfluous paint is taken off the bar in its passage through the machine, by coming in contact with the brushes, which are made coarser towards the point of entrance, and gradually increase in fineness to the point from which the bar is removed; the paint which is brushed off drains into the well. Every part of the bar is well covered by this process, and it presents none of that irregular appearance which is to be seen in cases where the material is painted by hand. Each of the sashes are to receive three coats of paint, the last of which will be white.

There is also a machine on the ground for filling with putty the grooves into which the glass will slide. A number of "glazing carriages," constructed to run along the "Paxton gutters," and under the roof, afford the glaziers an opportunity of proceeding with their work in wet weather. Two or three hundred carpenters are employed under those portions of the roof which are glazed, in the preparation of the wood for the external facing of the ground story, of which about 300 feet has been completed.

Almost every process connected with the erection of the building is now going on in different parts simultaneously. Foundations are being dug in one part, columns and girders raised in another; here the frame-work of the flooring is being laid, and there the roof is being glazed; carpenters are "guttering" and sash making; smiths, fitters, and rivetters are employed in putting together the trusses and girders; painters are painting the columns and frame-work of the building; bricklayers forming the drains and branch sewers; in a word, there are workmen of almost every trade, upwards of a thousand in number, each with the most perfect order and regularity, doing his part towards the erection and completion of this truly wonderful building.

Change in Relation to Procuring English Patents.

"The Attorney General, with the assent and concurrence of the Solicitor General, hereby gives notice, that every person applying for a patent after the second day of November, 1850, will be required to deposit in the office of the Attorney or Solicitor General, an outline description, in writing or drawing, to be approved by the Attorney General or the Solicitor General, before any report will be made on such patent."

The effect of this order will be to prevent a large amount of that fraud which not unfrequently took place under the recent system, in consequence of the applicants describing to the Attorney General or Solicitor General, inventions differing from those which they afterwards specified. The prospect of being able to glean from the articles exhibited in the great exhibition a great variety of novelties might have induced many persons to make applications for patents with tales studiously vague, and as they could not be compelled to complete their specification within six months, or even within a much longer period, they would have the opportunity of including within it any inventions or improvements which they might see, and which could by possibility be included under the title which they have given to their inventions.

As a consequence of this, the ingenious and confiding inventor and exhibitor would have probably found, when too late, that the results of his labors, and his expenditure of time and money, had been included in another person's patent, and probably the first notice which he would have received of this act of approbation would have been an injunction to prevent him from proceeding either with the manufacture or sale of his invention. By compelling applicants, however, to deposit an outline description in writing or drawing, to be approved by the Attorney General or Solicitor General, this monstrous fraud will be prevented, and the rights of the exhibitors, so far as priority of invention is concerned, to a certain extent secured. The British Government must come marching up the hill to the plan pursued in America for securing patents, which with some little alterations, is the best of all—nearly equal to that of France.

Report on Wilder's Lee-way Indicator.

WASHINGTON, Dec. 3, 1850.

HON. THOMAS CORWIN, Sec'y of the Treasury,

SIR—The undersigned, at your request, have examined the operation of the instrument invented by Mr. Wilder, called the Lee-way Indicator, and respectfully report as follows:—They studied the action of the instrument while it was attached to a sail-boat, on the Potomac; the boat was furnished with a movable centre-board, by means of which the amount of lee-way could be increased or diminished at pleasure. The vessel moved with a uniform velocity under the action of a strong wind. In all cases of observation the instrument acted promptly, and indicated each change in the position of the centre-board, the index returning to the same degree when the board was restored to its first position. From the trial it is evident to us that the indications of the instrument are little affected by friction, and from the simple mechanical principle on which it acts, we have little doubt that it will indicate the true course of a ship, and thus furnish the means of determining the lateral motion. We do not apprehend that any different result would be produced if it was attached to a larger vessel, though it is not impossible that difficulties would be found of a practical nature, which do not occur to the undersigned. With much respect we have the honor to be, your obedient servants,

JOSEPH HENRY,
Prof. Smithsonian Institute.
JOS. SAXTON,
Machinist of the Coast Survey.

[In connection with the above, we would state that we have seen a letter from Lieut. M. F. Maury, of the National Observatory, to Com. Skinner, Chief of Bureaux, wherein he says, that under-currents, friction, &c., do not appear to him insuperable difficulties to the correct action of Mr. Wilder's Indicator. This is high, authority the only supposed obstacle being under-currents. Com. Skinner, reporting to the Navy Department, states that the instrument would be useful in running along coasts and in foggy weather. Commodore Morris, in reporting to the Secretary of the Treasury, says that he believes "it will accomplish all that is claimed for it." These are important opinions about this invention.

Copper when reduced to hydrogen at a heat below that of redness, on exposure to the air becomes converted throughout into a mass of protoxide, and it then produces flame when pounded for some time with sulphur in a mortar.