ELECTRO-METALLURGY.

CLEANSING AND PREPARING OBJECTS FOR ELECTRO-PLATING.

The first and most important operation in the electro-deposition of one metal upon another is to effect a thorough chemical cleansing of the surface of the metal upon which the coating is to be deposited, for if this is not accomplished the deposited metal will not adhere to the surface.

In cleansing, different metals usually require a somewhat different treatment.

The surface of most metals when clean soon become coated with a film of oxide when exposed to the air, especially when the surface exposed is wet, and to avoid this it is usually necessary to proceed with the plating immediately after cleansing.

Before proceeding to cleanse the articles they are usually "trussed" with copper wire to avoid the necessity of handling them during the operation or afterward, until the plating is finished. A very slight contact with the hand is often sufficient to make a second cleansing necessary.

If the article to be plated presents a smooth-finished or polished surface the deposit will be "bright." If, on the contrary, the surface is rough or unpolished the deposit will ordinarily have a dead luster. If left too long in the acid dips used in cleansing, a polished surface is apt to have its finish deadened.

No interval should be allowed between the various operations of cleansing.

CLEANSING COPPER AND COPPER ALLOYS.

Potash, caustic	1 pound.
Water, soft	1 gallon.

Heat nearly to boiling in a cast iron pot provided with a cover.

Brush to remove any loosely adhering foreign matters, truss, and suspend for a time in the hot lye; usually a few minutes will suffice if the article is not heavily lacquered. If any of its parts are joined with solder it should not be allowed to remain too long immersed, as the caustic liquid attacks solders and their solution blackens copper. On removing rinse thoroughly in running water.

If the articles are much oxidized, pickle in a bath composed of—

Water	1 gallon,
Sulphuric acid	1 pint,

until the darker portion is removed. Rinse in running water and dip in the following solution:

Water, soft	1 gallon.
Cyanide of potassium, common	8 ounces.

Remove from the bath, and quickly go over every part with a brush and fine pumice stone powder moistened with the cyanide solution. Some electroplaters prefer to give the articles a preliminary "brightening dip" in nitric acid, or a mixture of nitric and sulphuric acids and salt, followed by rinsing in water; but the cyanide, aided by the mechanical action of the pumice and brush, does very well without it in most cases. After the scouring dip the work momentarily in the cyanide solution, rinse quickly in running water, and transfer immediately to the plating bath.

Where the article is to receive a deposit of gold or silver its surface is usually softened by slightly amalgamating it with mercury, to insure perfect adhesion of the deposited metal.

The amalgamating is performed by dipping the article, after the cyanide scouring operation, for a few seconds in a solution of—

Mercuric nitrate	½ ounce.
Sulphuric acid	½ "
Water	1 gallon.

Stir until the solution becomes clear before using. Rinse the work quickly on coming from the mercury dip, and transfer to the plating solution.

The acid, cyanide, and mercury dips may be kept in glass or stoneware jars (avoid jars with lead glazing) provided with covers to prevent evaporation.

A "dead luster" is imparted to articles of copper or copper alloy by dipping them for a few minutes in a bath composed of

Nitric acid (36°)	20 pounds.
Sulphuric acid (66°)	10 "
Salt	1/16 pound.
Zinc sulphate	1/16 "

Mix the acids gradually, add the zinc salt, then the salt, a little at a time (out-of-doors to avoid the acid vapors), stir well together, and let it get cold before using. Rinse thoroughly, and pass through the cyanide before putting in the plating bath.

CLEANSING CAST IRON.

Cast iron is freed from grease, etc., by dipping in hot alkali solution used for a similar purpose with copper, and after rinsing thoroughly is pickled in water containing about one per cent of sulphuric acid for several hours; then rinsed in water and scoured with fine sharp sand or pumice and a fiber brush. It is then rinsed and returned to the acid pickle for a short time, rinsed again, and put into the plating bath directly. If more than one per cent of acid is used in the pickle the time of immersion must be shortened, otherwise the iron will be deeply corroded, and the carbon which the metal contains, and which is not affected by the acid, will not yield without a great deal of labor to the sand and brush.

Cast iron does not gild or silver well by direct deposit. Copper or bronze deposits are better, though not perfect; but if the iron is tinned the coat is adherent and will readily receive the other metals.

CLEANSING WROUGHT IRON.

The cleansing of wrought iron, if much oxidized, is effected in the same manner as cast iron; but it will bear a stronger pickle and a longer exposure. Whitened, filed, or polished iron may be treated like steel.

CLEANSING STEEL.

Dip in the caustic lye used for copper, etc., rinse thoroughly, scour with pumice powder moistened, rinse, and pass through the following dip:

Water	1 gallon.
Hydrochloric acid	4 pounds.

Rinse quickly (but thoroughly) and plunge in the bath.

Clean wrought iron and steel gild well without an intermediary coating in hot electro-gilding baths. It is difficult to obtain an adherent coating of silver on these metals without interposing an intermediate coating of copper or brass, which renders the further operation of silver plating easy.

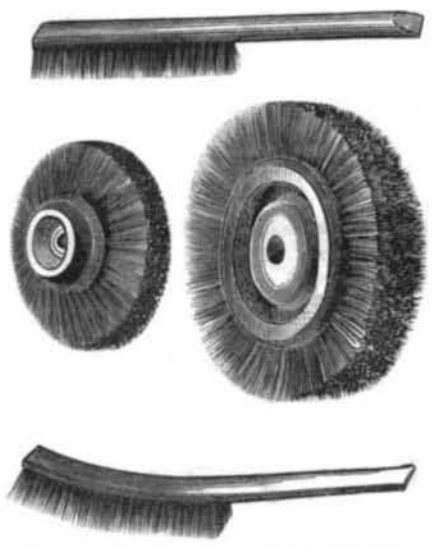
CLEANSING ZINC, TIN, AND LEAD.

Zinc is cleansed by dipping for a few moments only (as the alkali quickly attacks the metal) in the hot potash lye, rinsing, and dipping into water containing about ten per cent of sulphuric acid for a few minutes. Rinse in plenty of hot water, and, if necessary, scour with pumice stone powder and a stiff brush, moistened with a weak cyanide solution, or scratch brush. This last operation is especially useful when parts have been united with tin solder.

Tin, lead, and the alloys of these metals are more difficult to cleanse perfectly than zinc or iron. Scour rapidly with the hot potash and brush, rinse quickly and brush, or dress with a piece of soft clean wood. It is very difficult to obtain a satisfactory deposit of gold or silver directly upon these metals or their alloys. The results are much better if a coating of pure copper is interposed.

SCRATCH BRUSHING.

The scratch brush is often resorted to to remove the dead luster on or to impart a smooth surface to an object. They



are usually made of brass or steel wire, and of a variety of shapes to suit the object. Some of the forms are shown in the figure.

The wheel brushes are used on the lathe, the objects being manipulated in contact with the rapidly revolving brush. The brush is usually kept moistened by a small stream of water while in use.

Ancient Works in New Mexico.

New Mexico is perhaps the most noted country in the world for research. The historian, the wealth seeker, and the "curious" can here find a rich field and reward for their labor. The Abo and Gran Quivira counties are perhaps the most renowned in the Territory for research. In the former there are evidences of great volcanic eruptions which overwhelmed cities and buried the inhabitants in ashes and lava long ages ago. It is evident that these people, who are perhaps older that the Aztecs, were a prosperous race, with not a little advance in civilization, as the Abo ruins in the Manzana Mountains indicate; also some indications of fine art; rude figures and the images of animals being found upon the interior of the walls of the structures beneath the *débris*.

It is evident that this non-historic race were seekers after mineral, and evidences also exist that mineral was obtained by them in paying quantities, there being the ruins of many old smelters and acres of slag found near Abo. Here mines are found with the timbers so rotten with age that great difficulty is experienced and danger incurred in going down into the old shafts, where shafts are formed.

One of our informants gave as his belief that either the flow of lava or falling leaves and dust had filled many of the shafts up, and the sand, earth, and leaves so completely covered the ground that great care is required to find them, with but one or two exceptions—the Mount of the Holy Cross (so named) being about the only one that could be easily discovered.

One especially was found where human hands or lava or falling leaves and dust had filled it level with the earth, no shaft being discernible, and would not have been found, perhaps, had not an old trail been discovered. This was dug into, and at a depth of twelve feet a man could, in places, thrust his arm in up to the elbow between the granite walls of the mine and the earth which filled the old shaft. The mineral, unlike our White Oaks country, does not seem to outcrop, but seems to be deep in the earth; no float having been found as yet except near the shafts or around the old smelters. On the eastern slope of the Manzana Mountains no quartz has been found excepting in a very burned and blackened condition. This part of the country will perhaps yield immense mineral wealth in time, and further developments and prospecting are awaited with great interest to many.

The walls of some of the old ruins at Abo are six feet of solid stone—lime and red sand—the walls in places are yet six feet in height and in a state of perfect preservation. In the ruins are found vessels of various designs and sizes made of pottery—some representing birds and animals. Stone hammers are found here, but no indications that sharp-edged tools were used in this ancient period. In digging down one place the remains of an old aqueduct was found, which was probably used, as in the present day, by the Mexicans for supplying the inhabitants with water.

It is thought and believed, by specimens of ore found, that gold, silver, and copper were found in paying quantites. All the rock is more or less copper stained, and some of it is so much so that some of the "country" rock has run as high as 37 per cent copper.

Surely our bright, sunny land has been enjoyed long before the Anglo-Saxon made his appear once upon the scene. The future of New Mexico can only be surmised. Every day new evidences of untold wealth are thrust upon us, and the day is not far distant when the multitudes of the East will flock to our borders and assist in the development of the greatest mineral region in the world.—*Era.*

The Brush Electric Light in London.

Very remarkable progress continues to be made with the installation of the Brush electric light by the Anglo-American Electric Light Company, says *Engineering*. The Great Western Station at Paddington has been most successfully lighted by thirty-two Brush lamps, and we believe this company proposes to light up their goods station at Smithfield as well as the principal stations along their line by the same system. The Charing Cross Station of the Southeastern Railway Company has been now lighted for more than a week by sixteen Brush 2,000 candle lamps worked by a dynamo-electric machine in the Anglo American Electric Light Company's Works in Lambeth. The globes used at Charing Cross are very similar to Sugg Albatrine globes, and give a very soft light, of which, however, far too much appears to be lost by diffusion toward the roof. Some other large metropolitan terminal stations will also be shortly lighted by the same system. In the provinces Messrs. John Bright Brothers, of Rochdale, Messrs. Horrockses, Miller & Co., the Blaina Iron Company, and Messrs. Courtauld, of Bocking, in Essex, are among the most recent users of the Brush system. The Bristol municipal authorities completed a series of experiments on Saturday last, to which we refer in more detail in our Notes from the Southwest, with a view to lighting the main streets of that city with the same system: the results obtained were in all respects satisfactory. Similar steps are being taken by the municipal authorities of several large continental towns, and also of towns in India with the same object. In Palace Yard Westminster, the number of Brush lights will be increased in a few days. There can be no doubt that this system fully merits the favor thus being so widely extended to it.

The New Orleans Cotton Exchange Building.

The attention of architects is invited to the professional opportunity offered in the competition of plans for a cotton exchange building in New Orleans, advertised in another column. The building is to be four stories in height, with an attic or mansard, absolutely fireproof as to elevator shafts and stairways, and as nearly fireproof elsewhere as can be without the use of iron.

The cost of the building, complete, is not to exceed $150,000. The nature of the cotton business and the peculiarities of the climate of New Orleans necessitate large window spaces for light and ventilation, and a plan of building adapted to strong architectural effects. A premium of $1,000 is offered for the design chosen (to be submitted on or before March 15, 1881), with $500 additional for details and specifications in case they may be required. Particulars with suggestive sketch-plans may be had on application to Henry G. Hestor, secretary of the New Orleans Cotton Exchange, New Orleans, La.

Preservation of Meat by Dextrine.

In the *Comptes Rendus* of the French Academy for December 6, there is a note by M. J. Seure on some experiments made by him in drying and preserving meat by means of dextrine.

Of the three specimens exhibited before the Academy the first was a slice of lean meat which had been buried in dextrine and left exposed to the air on a shelf in a closet for twenty months. The meat had become mummified; but, on putting it in water, it separated from the dextrine and assumed its original physical character. The second was meat which had been chopped up coarsely and mixed without any particular care with dextrine, so as to obtain a thick paste. This paste was dried in the air, and retained its properties like the former. The third was meat beaten to a fine pulp with dextrine and run into a mould, the result being a very hard, dry, homogeneous cake of a handsome appearance. Each of these specimens when exhibited had been preserved for the same length of time—twenty months.