PHOTOGRAPHIC ENGRAVING.

The great advantage of the process for obtaining photographs on copper plates, which we described last week, consists in the circumstance that photographs so obtained may be readily "bitten in," so as to enable the plate to be printed from just as though they were ordinary engraved plates—the result, however, being a far more perfect reproduction of the original photographic picture than could be obtained by the most skillful mechanical engraving. When it is desired to etch a photographic picture obtained on a coppar plate by this process, the plate, after having been dried must be varnished on the back and sides, but not on the face, must have all the black dust composing the shadows of the picture carefully removed, must next be well washed under a strong jet of water, and must then, without first drying, be plunged into the liquid to be employed as a mordant. A suitable mordant is one consisting of one part of nitric acid, two parts of a saturated solution of bichromate of potash, and five parts of water. Where more convenient, the nitric acid may be replaced by sulphuric acid. The quantity of this mordant used in the first instance should be simply enough to completely cover the plate, but from time to time, as the liquid turns blue, more should be added, the action of the mordant being continued for a whole day, or for even longer, according to the temperature. The mordant acts only on the bare copper, and does not affect those parts of the plate which are covered by silver, so that the result is an incised engraving, fit for printing from. If, instead of treating the plate as thus described, the black dust composing the dark parts of the original picture be not rubbed off, and the mordant used consist of iodine associated with either bichromate of potash or nitric acid, an engraving in relief will be obtained, the iodine acting only on the parts of the plate on which there is a deposit of silver, and from this engraving in relief a reversed proof, suitable for printing from, may be procured by the galvano-plastic process.

PEROXIDE OF HYDROGEN.

Professor Schonbein has discovered a new and very ready method of procuring the peroxide of hydrogen. It consists simply in agitating, in a large flask, to which air has access, amalgamated zinc, in powder, with distilled water. Oxygen is then absorbed by both the zinc and the water, with formation of oxide of zinc and peroxide of hydrogen. The peroxide of hydrogen obtained by this method, unlike that obtained by the ordinary process, is quite free from acid, and so may be kept for a long time without decomposition. It does not contain, moreover, a trace of either zinc or mercury, but is absolutely pure. This new process has therefore great advantages over the old process of preparing peroxide of hydrogen, both as being far simpler and more expeditious, and as yielding a much purer product; but it is almost as far as the old process from yielding peroxide of hydrogen cheaply enough for use in the arts.—*Mechanics' Magazine.*

GLEANINGS FROM THE POLYTECHNIC DISCUSSIONS.

THE GALVANOMETER—MEASURING MAGNETIC CURRENTS—TELEGRAPH INSULATORS—DEEP GULLIES.

Prof. Tillman:—There is a great want for means of measuring the stength of magnetic currents. Every current will deflect a magnetic needle which it passes near, and the stronger current will deflect the needle more; but a current twice as strong will not deflect a needle twice as much. Now what is the law? There is room for invention here. The various European savans have attacked the problem, but as yet the world is without a galvanometer which will give mathematically the proper relations. Gen. Lefferts and Mr. Farmer, of Boston, have succeeded in manufacturing coils of small wire which will give uniform amounts of resistance to currents passing through. Dr. Bradley, of Jersey City, has recently combined a very compact and effective instrument, using a quantity of these coils or spools of wire.

Dr. Bradley:—Weak currents, which deflect the needle a little, produce deflections which are proportional to their force; a current twice as strong, producing twice the deflection. This law holds good only for small angles of deflection. As the angles increase, it requires a greater addition to the current to add an equal amount to the deflection. A magnetic needle points to what we call the magnetic pole, near the north pole of the earth. The artificial current to be measured is carried under such needle in the direction parallel to it. The tendency of all currents is to induce the needle to stand at right angles thereto. A weak current will produce a deflection—it will pull the needle to one side—but no current can be made so strong as to pull it quite around at right angles to the magnetic meridian. De La Rive conjectured that the tangent of the angle of deflection of the needle was an approximate measure of the force of the currents. There are strong reasons for believing that the tangent of the angle is an exact measure of the force of the currents. But the speaker had based his instrument on no such supposition. It was well determined that an equal force would produce an equal deflection. The Bradley instrument is constructed on that principle alone.

The series of Leffert's and Farmer's resistance spools were arranged like a grocer's weights so as to give any resistance desired. The unit of resistance was that due to the traversing of a mile of number eight galvanized-iron wire, well insulated. By switching a number of these spools together he could make a resistance of six hundred miles, or could subdivide it down to hundredths of a mile.

The chief practical importance in the present state of the arts of an exact measure of resistance is to select and adjust telegraph instruments Send the current through one, and measure the deflection of the needle produced by the current which passes that resistance. Then send the current through the resistance measure, and switch on or take off the resistance spools until the needle is deflected the same. Then read the result on the switch levers, as accurately as you weigh a lot of hay on the best Fairbank's platform scales.

Actual telegraph lines always impose more resistance and loss than the theoretical standard miles; but are rarely if ever so bad as to offer double the standard resistance.

Mr. Stetson:—Bad insulation in wet weather is another great difficulty to be met by inventors in telegraphy. The webs of insects extending across, become so good conductors when wetted by storms as to seriously impair insulation. This is the main cause which prevents the success of otherwise excellent inventions, for insulators. Who can overcome the mighty obstacle imposed by a spider's web to the progress of invention in this line?

Dr. Stevens:—The wearing or gullying away of the earth by the action of streams is familiar to all; but the immensity of this influence in modifying the surface of our globe is rarely appreciated except by the professed geologist. The Niagara has excavated a valley or narrow ditch with perpendicular sides, so deep that the surface of the water for about twelve miles below the falls is some three hundred and fifty feet below the adjacent country. The Ohio river between Pittsburgh and Cincinnati, runs some seven hundred feet below the natural level. It has excavated a valley to that depth. But such instances of the sinking of streams much below the general level of the country through which they pass, though comparatively rare east of the Mississippi, are very common in the great territories of the West; there they are the rule. Canons of immense depth seem to be the natural accompaniements of the water courses. The most remarkable instance in the world is the Black Canon, where the Colorado river flows through the Black Mountain region. The land lies in elevated plateaus. For a little distance the general level of the land immediately adjacent is six thousand feet above the surface of the river. At one point there is a perpendicular precipice forming one bank of the river which is one mile high as measured and verified with ordinary care by repeated observations by the anaeroid barometer.

Lacquers.

Lacquers are used upon polished metals and wood, to impart the appearance of gold. As they are wanted of different depths and shades of colors, it is best to keep a concentrated solution of each coloring ingredient ready, so that it may at any time be added to produce any desired tint.

1. *Deep Golden-colored Lacquer.*—Seed lac, three ounces; turmeric, one ounce; dragon's blood, a quarter of an ounce; alcohol, one pint. Digest for a week, frequently shaking. Decant and filter.

2. *Gold-colored Lacquer.*—Ground turmeric, one pound; gamboge, an ounce and a half; gum-sandarach, three pounds and a half; shell lac, three-quarters of a pound (all in powder); rectified spirits of wine, two gallons. Dissolve, strain, and add one pint of turpentine varnish.

3. *Red-colored Lacquer.*—Spanish anatto, three pounds; dragon's blood. one pound; gum-sandarach, three pounds and a quarter; rectified spirits, two gallons; turpentine varnish, one quart. Dissolve and mix as the last.

4. *Pale Brass-colored Lacquer.*—Gamboge, cut small, one ounce; cape aloes, ditto, three ounces; pale shell lac, one pound; rectified spirits, two gallons. Dissolve and mix as No. 2.

5. Seed lac, dragon's blood, anatto, and gamboge, of each a quarter of a pound; saffron, one ounce; rectified spirits of wine, ten pints. Dissolve and mix as No. 2.

The following recipes make most excellent lacquers:—

1. *Gold Lacquer.*—Put into a clean four-gallon tin 1 pound ground turmeric, 1½ ounces of powdered gamboge, 3½ ounces of powdered gum-sandarach, ¾ of a pound of shell lac, and 2 gallons of spirits of wine. After being agitated, dissolved, and strained, add one pint of turpentine varnish, well mixed.

2. *Red Lacquer.*—2 gallons of spirits of wine, 1 pound of dragon's blood, 3 pounds of Spanish anatto, 4½ pounds of gum-sandarach, 2 pints of turpentine. Made as No. 1 lacquer.

3. *Pale Brass Lacquer.*—2 gallons of spirits of wine, 3 ounces of cape aloes, cut small, 1 pound of fine pale shell lac, 1 ounce of gamboge, cut small, no turpentine varnish. Made exactly as before.

But observe that those who make lacquers frequently want some paler, and some darker, and sometimes inclining more to the particular tint of certain of the component ingredients. Therefore, if a four-ounce vial of a strong solution of each ingredient be prepared, a lacquer of any tint can be procured at any time.

4. *Pale Tin Lacquer.*—Strongest alcohol, 4 ounces; powdered turmeric, 2 drachms; hay saffron, 1 scruple; dragon's blood in powder, 2 scruples; red saunders, ½ scruple. Infuse this mixture in the cold for 48 hours, pour off the clear. and strain the rest; then add powdered shell lac, ½ ounce; sandarach, 1 drachm; mastic, 1 drachm; Canada balsam, 1 drachm. Dissolve this in the cold by frequent agitation, laying the bottle on its side, to present a greater surface to the alcohol. When dissolved, add 40 drops of spirits of turpentine.

5. *Another Deep Gold Lacquer.*—Strongest alcohol, 4 ounces; Spanish anatto, 8 grains; powdered turmeric, 2 drachms; red saunders, 12 grains. Infuse and add shell lac, etc., as to the pale tin lacquer; and when dissolved add 30 drops of spirits of turpentine.

Lacquer should always stand till it is quite fine, before it is used.—*Larkin's "Brass and Iron Founder."*

ENGLISH engineers have found out that one of our monitors, the *Monadnock*, made an excellent voyage to Valpariso, that she encountered the ordinary gales and behaved as well as any ship in the squadron. The monitor carried two 15-inch guns in each turret and her sides are but 15 inches out of water. It appears that the new English turret vessel *Monarch* has sides 14 or 15 feet high, which makes some grumbling among engineers; they do not seem to like such exalted structures.

THE following opinion of Mr. Solly was sent to Rome by telegram, by one of the late Mr. Gibson's friends. It is a curious sign of the times in two ways: first, in the mere fact of such a means of transmission of medical advice; and, secondly, in the extraordinary dread of bleeding a patient which exists out of, as well as in, the profession, at this present time. The message was: "Mr. Solly thinks no blood-letting is required, unless the head be hot and painful. Quiet and nourishment are indicated."

WE understand that Capt. John Ericsson is to be paid $13,930 as his reward in full for planning the United States war steamer *Princeton*, and superintending the construction of machinery of the vessel. Mr. Ericsson has realized a large fortune by his improvements and inventions during the war, which we rejoice to hear, as his services and skill have been exceedingly valuable to the Government.

A NEWSPAPER in California says they are so much annoyed out there with mosquitoes and bed bugs, that a physician advises, first a bath in a solution of soft soap and molasses, then a sprinkle of saw dust on the head, after which the patient should take to his bed and maintain perfect repose.