SCIENTIFIC AND PRACTICAL INFORMATION.

TESTING BELTING LEATHER.

M. Eitner proposes the following simple method of determining the value of leather employed on belting. A cutting of the material about 0·03 of an inch in thickness is placed in strong vinegar. If the leather has been thoroughly acted upon by the tanning and is hence of good quality, it will remain, for months even, immersed without alteration, simply becoming a little darker in color. But, on the contrary, if not well impregnated by the tannin, the fibers will quickly swell and, after a short period, become transformed into a gelatinous mass.

NO WATER IN THE SUN.

M. Janssen states that Croce-Spinelli, in his recent balloon ascension to an elevation of 25,000 feet, finds by spectroscopic observation that the lines in the spectrum, ascribed to the vapor of water, are due to the terrestrial and not to the solar atmosphere; since when the former, by reason of the elevation, is greatly eliminated, the bands are also in like proportion decreased. It may therefore be considered that in the sun there is no watery vapor, at least in appreciable quantity, and that consequently the temperature of that body is not yet sufficiently lowered to allow water to form.

THE SWEDISH EXPEDITION TO THE NORTH POLE.

M. Nordenskjold has recently found, in the ice and snow of the Arctic polar sea, a black dust. This he had melted, and subsequently submitted it to chemical analysis, which has proved that it is composed of nickel and cobalt, and similar in constitution to the meteorites. It seems probable, therefore, that the powder is actually due to the disintegration of these aerial bodies at a short distance from the earth.

The regions which this intrepid traveller has lately explored are the most inhospitable on the globe. He has traversed ice seas, the level of which rises to over three thousand feet above that of the ocean, and which are rent with huge crevasses often entirely concealed by snow and fog, rendering their exploration an enterprize of the greatest danger. M. Nordenskjold is now organizing a new expedition to start in the spring of 1875.

HYDROGEN ALLOYS.

In pursuing their investigations into the metallic combinations of hydrogen, MM. Hautefeuille and Troost have succeeded in obtaining a definite hydride of sodium. They have since compared this product with the hydride of palladium, in order to determine the density of the hydrogen, could it be solidified under like conditions. The hydride of palladium, having a density equal to 11, if the density of palladium, itself equal to 11·7, be considered, admitting that no variation in volume takes place, the density of the hydrogen is found to be 0·62. Repeating the same calculations for the hydride of sodium, the number 0·63 is obtained. Palladium, however, is much heavier than water, while sodium is lighter; and hence it is believed that the figures 0·63 more truly indicated the density of hydrogen under the above conditions. This number is very near to that which represents the density of lithium, and tends to confirm the opinion that hydrogen is one of the true metals.

A LUMINOUS SIGNAL FOR GEODESIC OPERATIONS.

M. Laussedat proposes, for the above purpose, to direct a spy glass from one station toward a second point, to which the signal is to be transmitted. In the focus of the instrument, he places a diaphragm having a very small aperture; so that, on looking through, the field of vision will be restricted to the tower, steeple, or other locality at which the receiver of the signal is stationed. The eye piece of the telescope is then removed, leaving the diaphragm, and behind the latter is placed, in the axis of the instrument, a light, the conjugate image of which, produced by the conveying glass, falls precisely on the opening of the diaphragm. The luminous ray transmitted through the telescope will fall directly on the edifice comprised on the restricted field of vision, and not elsewhere, and the light is therefore invisible to all without that field. The observer will perceive the objective of the telescope illuminated over all its surface; and necessarily the larger the diameter of the glass, the farther will the signal be visible.

A Chemical Centennial.

Dr. H. Carrington Bolton, of Columbia College, has suggested the idea that, as centennial celebrations are now in order, the present year is eminently appropriate for the organization of a social réunion among the chemists of the United States, in commemoration of events alike important to Science and civilization. Dr. Bolton considers that since so many remarkable discoveries in chemistry were made in 1774, we may date the foundation of modern chemical science from that period, and that consequently the year 1874 marks the lapse of the first century. It is pointed out that in 1774 Scheele first isolated chlorine, recognized baryta as an independent earth, and published his essay on manganese. Lavoisier was engaged in an investigation of the cause of the increase in weight of tin when calcined in close vessels, a research leading to the most important discoveries. Wiegleb proved alkalies to be true natural constituents of plants. Cadet described an improved method of preparing sulphuric ether. Bergmann showed the presence of carbonic acid in lead white. On the 27th of September in that year, Comus reduced the "calces" of the six metals by means of the electric spark, before an astonished and delighted audience of savants. On the first of August, 1774, Priestly discovered oxygen, the immediate results of which were the overthrow of the time-honored phlogistic theory and the foundation of chemistry on its present basis.

The proposition has already been acted upon, and the New York Lyceum of Natural History has passed resolutions appointing a committee of five, consisting of Dr. Bolton and Professors Chandler, Wurtz, Leeds and Seeley, to correspond with the chemists of the country with the view of securing their cöoperation in the observance of the anniversary. The time fixed, we understand, is the first of August. The idea is a good one and doubtless will be favorably received by the profession.

The Iron Trade.

The *Bulletin* of the American Iron and Steel Association says:

There are 175,000 men who are usually employed at rolling mills, furnaces, etc., out of employment today in consequence of the depression in the iron business; to these must be added many mechanics and others whose business has not been prosperous, or has been partly or wholly destroyed because the iron business upon which they depend has been prostrated.

More than one half of the rail mills of the country were wholly idle on the first day of January last, and the same number remain idle to day, while others are only running a part of their time. Few mills are running to the extent of their capacity. The amount of work now done by merchant bar mills, car wheel makers, car and locomotive builders, and other branches of business intimately connected with the railroad interest, is fully one half less than it was a year ago.

Merchant bar mills, plate mills, founderies, machine shops, and other establishments not dependent upon the railroads for orders have as a rule less business than during the first month of the panic.

Of the 666 completed furnace stacks in the country, the whole number in blast on the first of January last was 400; out of blast, 266. The aggregate number of furnaces out of blast at this date is as great as it was in January.

The decline in prices is as follows:

Principal Articles.	April, 1873.	April, 1874.
Rails at eastern mills	$82.00	$68.00
Bar iron at Pittsburgh	4 1-5c.	2¼c.
Gray forge pig iron at Pittsburgh	$42 00	$28 00
No. 1 Lehigh pig iron at Philadelphia	47.00	33.00

These figures represent an average decline in prices during the past year of over 30 per cent. When it is considered that the prices one year ago, which we have used for comparison, were lower than they have been previously, that money was then abundant and sales for cash were of daily occurrence, and that mill owners and furnacemen then had orders months ahead and now rarely know that they will be able to sell tomorrow what little they make to day, the extent of the disaster to the iron business which yet survives the panic is readily seen.

The Iron Dome of the Capitol.

The iron dome of the Capitol at Washington is 300 feet high, and is surmounted by a metallic statue. In reply to an enquiry, as to whether there was a daily movement of the statue, due to the heat of the sun, the architect, Mr. Clark, gives the following particulars:

The statue on the Capitol has a motion resulting from the unequal expansion of the opposite sides of the dome. The entire length of the line of oscillation of the plummet from the eastern limit to the western limit is only four and a half inches, which would make the inclination in the morning two and a quarter inches to the west, and in the afternoon the same distance to the east. This apportionment of the distance for morning and evening, however, is not strictly correct, and for this reason: that in the morning the east side of the dome is rapidly heated, while the west side is chilled by radiation through the night. Now as the sun passes to the western side of the dome, this side is heated, but as the east side still retains a good portion of its heat, the expansion is more nearly equalized on both sides and the inclination of the statue to the earth to some extent counteracted, so that the inclination to the west is a little greater than that toward the east. The variation is probably about the same all the year around, the extra contracting by cold on one side of the dome during the winter producing the same effect as the extra degree of expansion by heat on the other side in the summer."

Electroplating with Cobalt.

The following process of George W. Beardslee, of Brooklyn, N. Y., is stated to form a thick and useful covering, which will very perfectly protect the plated surface from the action of the elements, and form a most beautiful plating, very white, exceedingly hard and durable, tenaciously adherent, and not liable to tarnish:

Dissolve the pure metal cobalt in boiling muriatic acid, and evaporate this solution to dryness. Then dissolve from four to six ounces of the salt thus obtained in a gallon of distilled water, to which add ammonia sufficient to show on test paper the solution just slightly alkaline. Then prepare an anode of the metal cobalt, in granular form or roken into small pieces, free from impurities, as follows: Take a plate of carbon, or of some other material that is a conductor of electricity, but not susceptible of being attacked by the plating solution, and place it within a sack or envelope made of some material that is neither a conductor of electricity, nor attackable by the solution, formed with open meshes or interstices through which the solution may freely circulate. This envelope should be made to conform in shape to the carbon plate, and large enough to leave a space between it and the plate of, say, one half an inch to one inch; then fill this space with the granules of cobalt, which will, as is evident, surround the plate and be in contact with it.

By an anode thus constructed, a large surface of the cobalt is readily and conveniently exposed to the action of the solvent, and the steady flow of the entire battery current through the cobalt is secured, thereby rendering the dissolution and deposition of the metal steady, uniform, and very perfect.

This anode is to be connected with the copper pole of the battery by connecting the wire to the carbon plate and suspending in the plating solution before described, and the article to be plated is connected in the solution with the zinc pole in the usual way. A battery power of from two to five cells (Smee's battery) will be sufficient to do good work. Care should be taken not to permit the solution to lose its slightly alkaline character, as, if this is not maintained, the plating operation will be rendered imperfect, the tenacity, adherence and uniformity of the deposit becoming thereby impaired.

The Open Treatment of Wounds.

A very remarkable study of surgical cases in the hospital at Zürich has lately been published by Dr. Kroenlein, illustrating the new so-called "open" treatment of wounds advocated by Professor Rose. He compares two periods of several years each, during the first of which the wounds, amputations, etc., were treated by bandaging in the ordinary way.

The results of the two series were, as regards mortality per cent., as follows:

	Bandaging.	Open Treatment.
Thigh	86·1	35·7
Leg	58·3	18·1
Foot	35·2	20·0
Upper arm	55·5	14·0
Forearm	16·6	0·0
Hand	0·0	0·0

Critical researches by the author show that this remarkable result was due neither to the age and sex of the patients, nor to the method of amputation, but solely to the after treatment.

The principal maxims followed by Professor Rose (the present director of the clinic) in the treatment of wounds are to secure absolute rest after arrest of bleeding, and to provide for perfect freedom of discharge and scrupulous cleanliness. Another principle is to interfere with the healing process of wounds only when special indications are afforded, and to consider stitches and bandages of all kinds as interferences to be so avoided. The air to which the wounds are freely exposed in the open treatment must, of course, be pure, and the system accordingly includes the use of energetic ventilation. In the hospital at Zürich, the ventilation is obtained only by constant opening of the doors and windows, a proceeding which, it is true, renders the heating arrangements often insufficient in winter.

The advantages claimed for this open method are:

1. There is no pressure or constriction by dressings.
2. An irritation of the wounds by changing the position and external applications is avoided.
3. There is no danger of infecting the wounds by impure articles.
4. The danger of retention of matter is small.
5. The state of the wounds may be controlled at any time by simply lifting the coverlets.
9. As healing by the first intention is given up, as many ligatures may be applied as are desirable, and thus secondary hæmorrhage may be better avoided.
7. The air of the wards is not infected by emanations from the dressings, as in the case is other methods, except Lister's.
8. There is less need of material for dressings, therefore less expense.

Naturally these statistics have excited much attention among surgeons, and corroborative evidence is not wanting to support Professor Rose's views. Mr. Richard Davy, F. R. C. S., writes to the London *Medical Times and Gazette* that the open treatment of wounds has been practised among his surgical cases for the last five years; the results arrived at have been gratifying, and his firm conviction is that all so-called dressings, to the majority of wounds, are not only needless but injurious.

Amputations, resections, wounds for removal of tumors, injuries, etc., are exposed freely to the atmosphere of the ward. The exceptional cases that receive dressings are burns, scalds, and subcutaneous operations.

The treatment that the wounds are subjected to consists in their adjustment by metallic suture; the atmosphere surrounding the bed is attended to, as to purity and temperature; the surface of the sore is occasionally cleansed by an aqueous spray (the most delicate brush, that destroys itself by usage), and the margins are gently freshened up by a small hog's bristle brush (a separate one for each patient), dipped into clean tepid water.—*Medical and Surgical Reporter.*

FROM a comparative pay schedule given in the *Naval Gazette*, Portsmouth, England, it appears that engineers receive rather more than twice as much pay in the American Navy than is given in the British Navy. For example, an American engineer receives $2,800 per annum, and the British engineer, $1,100 per annum.

TO DYE LEATHER BLUE-BLACK.—Take of beeswax 8 ozs., black resin 2 ozs. Melt together, and then add: Prussian blue 1 oz., lampblack ½ oz. While the mixture is cooling, add turpentine till a suitable consistency is obtained. It should be applied with a soft rag, and the leather afterwards polished with a brush.