USEFUL INFORMATION.

Separation of Gold and Silver from Lead.

But little is known, to those not engaged in the business, of the methods employed in this country for separating gold and silver from impure lead; and we believe the following facts, gathered by our reporters, will be found of interest:

Two grades of impure lead are exported from Utah to the Eastern States for refining. The impurities are gold and silver, which communicate a superior hardness to the lead, and also increase its fusibility. These ingredients, however, however, do not exist in sufficient proportion to warrant the application of the cupel process, or rather the loss of lead would be so great as to make the operation too expensive. The lowest grade contains 80 ounces of silver and 1 of gold to the ton; the other grade, known as the R. C. M. bullion, contains 120 ounces of silver and 4 of gold per ton of bullion. Beside these components, certain proportions of antimony and occasionally a trace of arsenic enter into the composition of the bullion.

The bullion is first placed in kettles and melted to refine it. In this process the dross, which rises to the surface of the metal during the melting, contains the greater part of the impurities, such as antimony, bismuth, etc. This dross is afterward refined separately in an appropriate furnace. This having been removed, the melted metal is drawn off into a larger kettle. It is thence removed to other kettles, and a certain proportion of zinc added, the quantity bearing a fixed ratio to the quantity of silver already in the metal. In the working of each sample of bullion a preliminary assay is necessary to determine the proportion of silver.

When the metal is melted with the zinc, a slow fire is employed; and, as the process goes on, an alloy of silver and zinc rises to the surface. The latter is skimmed off, and placed in a plumbago crucible, provided with a neck similar to a retort. The crucible is then placed in one of Du Faur's furnaces, which is so arranged that it can be tilted by the aid of a wheel attached to the furnace. The zinc is here distilled off, and condenses in the tube or neck, which is attached to the crucible. A part of the zinc is driven off as oxide, and this is lost, but about two-thirds of it sublimes in the neck of the crucible. When the tube is removed, the zinc is withdrawn therefrom, and used again in a similar operation. It will be remembered that silver melts at about the same temperature at which zinc is volatilized.

The metal remaining in the crucible consists of gold, silver, and lead, the latter in small quantity. This having been withdrawn, the precious metals are separated from the lead by cupellation. The resulting gold and silver are then run into ingots, and the silver removed by nitric acid, or by whatever method may be most convenient. In this mixture of gold and silver, gold forms from one-half to one and a half per cent. Some idea of the magnitude of the operation may be formed from the following facts regarding a large establishment. They claim a weekly production of silver of about 12,000 ounces, and a proportionate quantity of lead. Generally, the process returns about 89 per cent. of the lead which was in the bullion, at the commencement of the operation. They use cast iron kettles in the process of separating the silver from the lead by the aid of zinc, each capable of holding two tons of bullion. Twelve of Du Faur's tilting furnaces are used, each cupola holding about 250 pounds of metal. Four refining furnaces are used, two capable of a charge of 6 tons each, one of 12 tons, and one of 16 tons.—*Iron Age.*

Improved Seeders.

In a new form of seed planter, invented by a Mr. Koeller, of Illinois, the bottom of the seed box is formed with a circular recess in its center, in the sides of which are formed slots to receive the sliding bar, by the movements of which the dropper is operated. To the center of the bottom is attached a projection which passes up through the sliding bar and forms a pivot for a star wheel, which is made with seven rays, the outer ends of which are made more inclined upon one edge than the other, so that the point or extreme end of the arms may be at one side of the radius passing through the centers of the said arms. To the upper side of the sliding bar are attached two wedge-shaped projections, which fit into the space between the rays of the star wheel, and which alternately strike an arm of the wheel and turn it through have the space of one arm. The dropping plate is made in the form of a circle with its middle part cut away, and is carried around by and with the star wheel. In the dropping plate, near its outer edge, are formed fourteen holes, arranged in a circle and at equal distances apart, which receive the seed from the hopper and carry it to the discharge hole through the bottom, through which it falls into the guide spout that conducts it to the ground. Upon the lower side of the sliding bar is formed a projection which works in a slot in the bottom, and to the end of which is pivoted the end of a bar, the other end of which is pivoted to a bar, which is in turn pivoted to the conductor spout so as to detain the corn in the conductor spout. This is operated at each movement of the sliding bar to allow the corn to drop to the ground.

Another new machine, a grain drill, is described as follows: A long grain hopper extends across the front portion of the machine with a chamber into which the grain escapes through the passage, which is regulated by a gate. The side of this chamber is made to fit nearly half around a small dropping roller containing pockets, opposite which there are slots, through which the grain passes into the pockets. The roller has as many pockets as there are to be drills in the machine, and each pocket discharges into a spout for sewing in drills. The drill stocks may be readily released for adjustment or removal. The dropping spouts terminate over the drill tubes, and have, when the machine is to be used for planting, a gate or valve closing against the lower end by a spring shank to retain the grain until it should fall into the hill.

NEW SURGICAL DEVICES.—Two great surgical novelties have lately been introduced into European hospital practice. The first is the aspirator, originated by Dr. P. Smith, which has been extensively employed by Dr. Dieulafoy, of Paris. By this instrument fluids can be extracted from formations at some distance from the surface with safety and certainty. The second novelty is the introduction of a bloodless method of amputation and other operations on the limbs, by means of a compressing bandage, by which the limb is blanched by a circular elastic cord, which compresses both the arteries and veins of the limb. This plan, proposed by Professor Esmarch, has been adopted by many hospital surgeons. It remains to be seen whether there are any drawbacks to this system, and especially whether, in certain cases, embolism is likely to result from displacement of clot, which may have already formed in the veins of a damaged limb.—*Scientific American.*

Carbolic Acid.

Carbolic acid, in some of the various forms in which it is offered to the public, is one of the most popular disinfectants, and deservedly so. For simple disinfection, where the cause has been removed, nothing is superior to the acid itself, either concentrated or in solution. It is extremely useful in sick rooms and similar places for cleansing the vessels which have been used, and a small quantity of it added to the water in which the clothes are washed, will effectually destroy al: germs of disease which may be present. For disinfecting the air of a sick room a few drops may be put upon a hot shovel or stove-lid, or any article that will retain its heat for some time. It has the advantage that it does not injure clothing or metal articles with which the vapor comes in contact. It should be used with care, however, as the liquid itself is a violent poison, even in small doses.

In many cases, however, something more convenient of manipulation is wanted than the liquid. This is furnished by several different compounds. The so-called "metropolitan disinfectant" is a mixture of sesquioxide of iron and carbolic acid. The iron destroys the organic matter with which it comes in contact, and the carbolic acid is slowly given off and acts in purifying the air. Another compound is the "Egyptian powder," which contains common clay as a basis. Still another, and one which has proved of great use, is carbolate of lime. Carbolic acid has the property of combining with alkalies and alkaline earths without having its active qualities destroyed, as these compounds are very unstable, and are decomposed by the weakest acids. The carbolate of lime is a dry powder, with generally a rose tinge, and smells somewhat like ordinary coal-tar. The lime in it acts upon, and soon destroys any organic matter with which it may come in contact, the carbolic acid being set free. It is extremely convenient and useful in all places where decaying matter is found. A little of it scattered two or three times a week around a swill-pail or other offensive object, keep it perfectly sweet, and will also drive away all the flies from the vicinity—*Journal of Chemistry.*

A New Acoustic Pyrometer.

It will be remembered that, some time ago, we gave an account of an acoustic pyrometer, devised by Professor Mayer, of the Stevens Institute. The principal on which the instrument is based is the variation of the length of a sonorous wave in air, when the temperature of the latter is changed.

M. Chautard states, in *Les Mondes*, that in his opinion the method proposed by Dr. Mayer is difficult in application, and he suggests the following arrangement as more suitable for practical requirements:

The sound is produced by the aid of an organ tube, Ut 4, for example, disposed with reference to a resonator which is put in relation with the two branches of a König improved interference apparatus. To the moveable branch is attached a long tube of copper, which enters the furnace or other locality, the temperature of which it is desired to determine. The tube returns on itself and communicates with a small manometric capsule. The fixed branch of the apparatus is terminated by another capsule, which, like the first, is in relation with the same source of heat. The arrangement is completed by a revolving mirror, in which the state of the flame is seen.

Thus disposed of, if the pipes which separate the resonator from the capsules each contain an equal number of half wave lengths, the flame will be edentulated; in the contrary case the indentations will diminish, and this is as much more as the difference of length of the tubes is more nearly equal to an unequal number of half wave lengths. In the latter event the flame takes in the mirror, the aspect of a ribbon; and by noting the changes in its appearance the calorific state of the air in the tube in the furnace is determined. I fthe temperature is elevated, the length of wave augments and a clearly defined interference is shown by the flame in the mirror. If, during the continuance of the experiment, the moveable tube be gradually elongated, it will be easy to bring the flame back to its primitive state, that is, to cause the indentations to re-appear. Then, by the aid of a scale previously determined and empirically translated into thermometric degrees, the degree of temperature in the tube can be easily noted.

THE manner in which liqueur bon-bons are made is extremely simple. The sugar preparation, reduced to a fine powder, is spread over a tray, and upon this single, drops of the liqueur are allowed to fall; the tray is then shaken, and the pulverized sugar forms a coating round the several drops of fluid, which can be increased at will to any thickness. The manufacture of bon-bons is carried on all over France, and in Paris alone there are nearly 200 shops devoted to it, employing over a thousand hands. The men get from a franc and a half to eight francs a day, and the women from one to four francs; while the amount of indirect industry, such as making boxes, packets, crackers, and fancy goods, is enormous. The last published statistics show that the sweetmeat trade of France exceeds twelve million francs. Perhaps the greatest marvel is to find that the country itself expends ten millions of this sum.—*The Engineer.*

Effects of Heat on Textile Fabrics.

Recent experiments on disinfection by means of heat, made by Dr. Ransom, of Nottingham, show that white wool, cotton, linen, silk, and paper may be heated to 250° F., for three hours without apparent injury; although the wool will show a faint change in color, especially when new. The same may be said of dyed wools and printed cottons, and most dyed silks; but one kind of white silk easily turns brown by this heat, and pink silks of some kinds are also faded by it. The same temperature will, if continued for a longer period, slightly change the color of white wool, cotton, silk, paper, and unbleached linen, but will not otherwise injure them. A heat of 295° F., continued for about three hours, more decidedly singes white wool, and less so unbleached; and white cotton and white silk, white paper, and linen, both unbleached and white, but does not materially injure their appearance. The same heat, continued for about five hours, singes and injures the appearance of white wool and cotton, unbleached linen, white silk and paper, some colored fabrics of wool, or mixed wool and silk. It is noteworthy that the singeing of any fabric depends not alone upon the heat used, but also on the time during which it is exposed. In these experiments the heat was obtained by burning gas with smokeless flames, and conducting the products of combustion, mixed with the heated air, by means of a short horizontal flue, into a cubical chamber through an aperture in its floor, and out of it by a smaller aperture in its roof. Fixed thermometers showed the temperature of the entering and outgoing currents, which represented the maximum and minimum temperatures of the chamber. A self-acting mercurial regulator maintained the temperature of the entering current at any required degree.