Covering Engraved Copper Plates with Copper.

A valuable paper was recently read before the Society of Arts in London, by M. F. Joubert, on a method of rendering engraved coppes plates capable of producing a much greater number of impressions. The method of doing this is to cover their surfaces with an electro-plated coat of iron, which is a harder metal. The battery used for this purpose is one of intensity, and *Bunsen's* is preferred. The trough in which the engraved plate is to be immersed is lined with gutta percha, and is of such a size as the work to be executed requires. It is filled with a solution of hydro-chlorate of ammonia in the proportions of one part (by weight) of the sal-ammoniac to ten of water. A plate of clean sheet iron, in size nearly the length and width of the trough, is first attached to the positive pole of the battery, and immersed in the solution; and another plate of iron of half the size is then secured to the negative pole, and also placed in solution. The trough is now suffered to remain in this condition for about three days, in order to obtain a peculiar preparation of the iron, which is taken up from the plates. The one on the negative pole of the battery is now removed, and the copper engraved one to be coated is substituted, and kept in the bath until the proper coating of iron is deposited. If, on immersing the copper plate, the iron does not begin to be deposited at once in a bright coating over the whole surface, it is a sign that the solution is not in proper condition. The copper plate is then removed and the iron one returned, and allowed to remain until sufficient iron is taken up in the solution to render it of proper strength for deposition when the copper plate is re-immersed. The time required in obtaining a proper coating of iron in this manner varies; but the plate should not be allowed to remain in the solution after the bright coat of the iron begins to exhibit a blackish appearance at the edges. When the plate is coated sufficiently with the iron, it is taken from the bath, and washed carefully with rain water, by causing jets to flow against its surface, after which it is dried, washed with spirits of turpentine, and is ready for printing in the usual manner. A plate prepared in this manner, it is stated, instead of being able, like one of pure copper, to print only about 800 impressions without re-touching, will print 2,000 impressions.

The operation of coating in this manner can also be repeated on the same plate for a number of times, so as to produce a very large number of impressions. M. Joubert stated that an electro-copper plate, thus treated, had yielded twelve thousand impressions, and was then found to be as perfect as when it was first engraved. This appears to be a valuable discovery, and is the first really successful effort, we believe, that has been made in coating engraved surfaces of a softer metal with iron by the electro-plating process.

Fall of Water through Notches.

A series of experiments have recently been made in Ireland, by James Thomson, of Belfast, at the expense of the British Association of Science, on the velocity and flow of water through V notches. In gaging streams to determine the quantity of water which flows per second, it has hitherto been the practice to cause them to flow through rectangular notches in vertical boards. The hight at which the still water stands behind the board and above the lower edge of the notch is taken as the hight of the fall. The mean velocity of the stream which falls over the lower edge of the notch bears a certain proportion to that of falling bodies in free space; the contraction of the notch prevents the water falling as fast as a free body, hence experiments have been made with notches to find a factor or co-efficient of contraction. A body falling one foot acquires a velocity of 8.02 feet per second; the co-efficient of contraction adopted for rectangular notches is 5.4. o find out the quantity of water which flows per second through a notch or under a sluice, the rule is to multiply the square root of the hight from the surface of the water by the factor 5.4 into the area of the notch in feet; the resultant is the quantity of water discharged per second in cubic feet. But if the water flows over the board or sluice, the rule is to allow only two-thirds of the above resultant as the quantity discharged. The co-efficient of contraction generally used for rectangular notches is not perfect; it varies with different hights and notches of different sizes, and although tables of these variations have been made, yet for convenience a general co-efficient is adopted. The triangular notch employed by Mr. Thomson is supposed to be more accurate for general use than a rectangular one, as it maintains the same figure whether the flow of water be great or small, whereas a rectangular notch, when the water becomes low, is deeply curved on its upper surface.

The formula deduced from the experiments referred to may be thus stated for practical purposes. For the mean velocity of the stream take eight-fifteenths of the velocity due to the hight of the fall from the surface of the dam to the apex of the V notch, and for the area of the contracted stream, take five-eighths of the triangular area from the surface of the water. In other words, it may also be thus stated: the quantity of water which flows per second through a triangular notch is equal to the area of the angle multiplied by one-third the velocity (8.02) due to the hight of the fall from the surface of the water to the apex. According to this formulæ, the quantity of water passing through a V notch of 144 square inches area, and one foot fall, will be 2.67 cubic feet per second, or 0.93 less than by the common formula. These experiments are interesting to hydraulic engineers and millwrights.

Soap.

C. N. Kottula, of Liverpool, G. B., has recently made some improvements in the manufacture of soap, which consist in adding to soda lyes made in any way, a certain quantity of alum for the purpose of producing purified lyes, which purified lyes are capable of saponifying all fatty matters and rosins used for soap, making at one operation and with better result than heretofore, as by their employment full or perfect saponification is obtained. The patentee first heats the soda lye, and to every cwt. of lye marking 10° Beaumé, he adds about 12 ounces of alum; to every cwt. of lyes marking 15° Beaumé, he adds about 18 ounces of alum; to every cwt. of lye marking 20° Beaumé, he adds about 24 ounces of alum; to every cwt. of lye marking 25° Beaumé, he adds about 30 ounces of alum; that is to say, he adds for every degree of strength in each cwt. of lye, about one one-fifth of an ounce of alum; he then agitates the lye for about half an hour until the alum is well dissolved, and leaves the mixture to settle and become clear. It will be found that by the employment of soda lye, purified and treated as above, perfect saponification of the fatty matters and resins used in the manufacture of soap will be the result.

A second invention consists in combining fatty matters with concentrated soda lyes and lime liquor, for the purpose of quickly producing cheap and saleable compact neutral soap. The fatty matters may be any of those usually employed. The patentee makes the lye strong and highly concentrated, and then purifies them by adding a certain quantity of alum—say to every cwt. of highly concentrated lye about six or seven pounds of alum. He prepares the lime liquor by combining water and lime, and then adding to it a certain quantity of sal-ammoniac—say to every cwt. of lime liquor about one pound and a-half to one pound and three-quarters of sal-ammoniac. The materials are mixed and boiled together so as to form a saleable compact neutral soap very quickly.

A third improvement consists in mixing fatty matters with certain quantities of highly concentrated soda lye, which the patentee purifies with a certain quantity of alum and sal-ammoniac, for the purpose of producing better and cheaper neutral hand or skin soap than by any means heretofore adopted; and the manner in which the patentee carries his invention into practical effect is as follows:—He prepares the highly concentrated lyes by boiling, until they reach about 30° to 33° Beaumé, adds about five pounds of alum to each cwt. of lye, and boils both together about half an hour. He removes the lye and alum from the heat, and adds to each cwt. of lye one pound of sal-ammoniac, stirs half an hour, covers, and allows the mass to settle and become perfectly clear. To obtain the lye stronger than 33°, he makes a second addition of alum, but in smaller proportion. To obtain lye of 42°, he makes a third addition of alum, and then adds the sal-ammoniac. He melts a quantity of any fatty matter used in soap-making, and, while still hot, stirs and adds the highly concentrated purified lyes, prepared as above described, say, to every 100 ponnds of fatty matter about 100 pounds of the lye of 30° Beaumé, or about 90 ponnds of the lye of 33° Beaumé, or about 80 pounds of the lye of 36° Beaumé, or about 70 pounds of the lye of 39° Beaumé, or about 60 pounds of the lye of 42° Beaumé, continues to agitate the mass until it commences to become thick, and when thick it can be transferred to the frames. After the soap is finished it may be colored, mottled, or perfumed in the manner well-known to soap-makers.

Ancient Philosophy.

Professor Youmans, in his lecture on Ancient Philosophy, assumed that the idea, often advanced and entertained by many, that the ancients were wiser than the moderns, is unfounded and untrue. In literature, the fine arts, and speculative philosophy, it may be admitted, the ancients excelled. Appelles and Phidias in art, Demosthenes in oratory, Pericles in statesmanship, Euclid in mathematics, Prœtus and Scopus in architecture, Homer in poetry, were stars of the first magnitude in the galaxy of genius; but in natural philosophy and useful arts, the ancients were deficient, ignorant, visionary, in the dark. Man, we may say, has two natures, an outward nature, by his association through the senses with the outward world, and the inward, ideal nature in the realm of mind. The earliest ancient philosophers, as mental children, were curious about the cause and origin of all things, and being without experience, continuously theorized upon such subjects. Thales insisted that water was the primary source of all created things; Anaximenes, that air was the original element of creation; Heraclitus and Pythagoras, that all matter sprang into form and substance by fire; Empedocles and others maintained that there were four primary elements—earth, water, air, and fire. Some insisted that metals grew in mines as plants grow; they also argued that lightning was a bolt from Jupiter, to be prevented by prayers and sacrifices; that water rose in a tube void of air, because nature abhors a vacuum; with Empedocles and Plato, they thought that light proceeds originally from the eyes, and then is reflected back to them by the objects lighted; they taught that eclipses are caused by a dragon swallowing the moon; that death by carbonic acid gas, in deep wells or cells, was caused by the fabled Basilisk, and that the stars moved with the sun in separate spheres or epicycles, to the "music of the spheres." Thus the ancients continuously sought an elucidation of the phenomena of the outer world by conjectures of their inner world of mind. Plato and others insisted that all outward objects, and observations or exercises of the senses, were positive obstructions to the growth and happiness of the soul, and that the body of man was a prison or dungeon to the mind. This doctrine led to the detestation, among philosophers, of material appliances, so that trades and physical pursuits, or inventions, were regarded as only fit for slaves, while discussions of verbal theories, syllogisms, and disputes and asceticism were alone worthy of philosophical considerations. This ideal philosophy, with its abhorence of the flesh and the world, blended with the first espousal of Christianity and Paganism, and extended through the scholastic periods of the middle ages, down to Kepler and Bacon's time, while such men as Turner of England (or Thomas Aquinas?) inquired "if a hog is led to market with a rope round his neck, and a man holding it, is the hog or the man led by the rope?" and others disputed long as to how many angels could dance on the point of a needle without crowding. This theoretic, ideal, mystic system of philosophy even prevailed, in some departments, to about the middle of the eighteenth century, up to which time the people, and even the physicians themselves, believed that scrofula or the "King's Evil" could be cured only by the touch of a king on the patient.

Hair Wash for Dandruff.

A correspondent writing to us requests a recipe for "preparing bear's grease," to prevent his hair falling out, and to free his head from dandruff. We are not acquainted with any preparation of bear's grease which is capable of effecting such important results. If there is any virtue in bear's grease to accomplish such objects, we think the genuine article must be superior to any chemical preparation of it, and the only way to obtain it pure, to a certainty, is to nab "Bruin," and make sure of his pork.

We give, as follows, however, a very good recipe for making a hair-wash which will remove dandruff and keep the scalp clean and soft, so as to prevent the hair, in ordinary circumstances, from falling out:—Take one pint of alcohol and a table-spoonful of castor oil, mix them together in a bottle by shaking them well for a few minutes, then scent it with a few drops of oil of lavender. Alcohol dissolves castor oil, like gum camphor, leaving the liquid or wash quite clear. It does not seem to dissolve any other unctuous oil so perfectly, hence no other is equally good for this purpose.

The New Bell of Westminster.

The great bell was only tried yesterday, says the London *Times* of the 19th ult., and not with the hammer, but with the clapper. The rope was passed down to the clock chamber, and the bell spoke out in tones not likely to be forgotten by those who were seated in the belfry. The first stroke was slight, but afterwards it came, peal after peal, in a tremendons volume of sound, that was actually painful. It seemed to swell and grow upon the air, with a vibration that thrilled every bone in the listener's body with a painful jar, becoming louder and louder with each gigantic clang till one shrank from the awful reverberations as from something tangible and dangerous to meet. Many went upon the balustrade outside the chamber, to avoid the waves of sound that seemed eddying round the tower; but the escape was only a partial relief, the great din seeming almost to penetrate the stonework of the battlements, and jar the very place in which one stood.

Sorghum Molasses and Printers' Rollers.

There is an old saying, that "everything has its own purpose and its own place." This axiom is literally true, as it regards molasses and glue of which printers' rollers are composed. Various other substances have been tried for the same purpose, but none seem to answer so well. It is stated, however, that Sorghum molasses when mixed with glue make superior inking rollers to those in common use, made from cane juice molasses. They are stated to be more elastic, and much tougher, and the molasses can withstand longer boiling without granulating.