OSBORNE'S PROCESS OF PHOTOLITHOGRAPHING.

If gelatine is mixed with bi-chromate of potash, and exposed to the light, it becomes insoluble. If a portion only is submitted to the action of light, that portion becomes insoluble, while the remainder that is kept in the dark preserves its property of solubility. This action of the chromic salt has been taken advantage of by Dr. J. W. Osborne, of Australia, for copying maps, drawings, and engravings on lithographic stones by the action of light. The following description of his process was given by Dr. Osborne in a paper read before the Royal Society of Victoria:

"In the first instance, a sheet of paper is prepared with albumen, in the usual way known to photographers; it is, when quite dry, passed through a copperplate or lithographic press, upon a polished steel or copperplate, by which operation it receives a very smooth and regular surface; it is then coated on the same side with a solution of gelatine, to which an addition of bi-chromate of potash has been made; this is then carefully dried in the dark, and again passed through the press, to insure the finest surface. This operation completes the preparation of what I shall call the sensitive paper. Having made a negative of the original map, drawing, or engraving, bearing the desired proportions to it, I place a suitable piece of the sensitive paper, just described, under and in close contact with the map, and the whole is exposed to daylight in such a way that the luminous influence passing through the transparent parts of the negative, shall strike directly upon the prepared surface, while the greater part of the paper is protected from its influence by the dark parts of the negative, which correspond to the white places on the original map. In the presence of the organic matter, the actinic agency effects the decomposition of the bi-chromate of potash, and the liberated nascent oxygen in all probability reacts upon the gelatine, altering its chemical characteristic in a peculiar manner. The visible effect after removing the negative is the formation of a picture in brown upon the clear yellow of the paper, corresponding to the transparent portions of the negative, or to the black lines upon the original drawing. This positive photographic print is next covered with an even coating of lithographic transfer ink, by passing it through the press, face downwards, upon an inked-in lithographic stone. The pressure causes the whole of the sensitive surface to lay hold of the ink, and bear away with it an even coating, hiding the brown photographic positive from view. The altered parts of the gelatine, which have been exposed to the luminous action, appear to be possessed of a certain amount of affinity for the grease of the ink, so that they will be found to retain it with considerable tenacity. The next operation is to coagulate the albumen which still exists under the prepared surface. This is done by floating it upon boiling water, with the paper-side downwards. A subsequent soaking for a short time causes the unaltered gelatine to swell in such a way as to raise the ink with it from the paper, and a slight amount of friction, with a sponge or other soft substance, removes the superfluous ink from all parts of the inked print which correspond to the white parts upon the original document. When the lines all appear clear and well defined, boiling water is poured over the whole, to remove the last traces of gelatine, and the print is dried. We are now possessed of a *bona fide* lithographic transfer—that is, a drawing in greasy ink, of such a nature that it admits of being transferred to the stone in the ordinary manner, by simply inverting it thereon, and passing it through the press; the albumen, which will be found to have withstood all the washing, acting as the adhesive substance under the ink to prevent the paper slipping on the stone. The whole of these operations need not occupy more than from two to three hours."

We have seen samples of the lithographs produced by this process, and they were very fine. The process is only adapted to copying pictures in the line, such as wood cuts, copperplate engravings, and pen-and-ink drawings. The half tints of ordinary photographs or mezotint engravings cannot be satisfactorily produced by it. Its great use is in copying maps on either larger or smaller scale, the copy being reduced or enlarged in the camera with perfect accuracy.

The process has been patented in this country as well as in Europe, and has been employed on a pretty large scale by the governments of Australia and Prussia.

Bismuth.

The high price attained by this metal was due to a circumstance which would scarcely be suspected in the present day. A company was formed in London, under the direction of a foreigner, for the purpose of making gold. Very large premises were taken, and much apparatus placed in position to carry out the most recent attempts at transmutation. Bismuth was to have entered largely into the process, and all that could be obtained was purchased by the company regardless of price. Of course, no gold has been made, and to save out of the wreck as much as possible, the deluded shareholders are cautiously selling their stock of bismuth, so as to obtain as high a price as possible, and thus by legitimate process convert it into gold. Few things can show more strikingly than this does the deficiency of knowledge among a large and respectable class of people. It was not long since that the writer of this notice was positively told by some gentlemen that they were about to extract aluminum from quartz, and if embarking a large sum of money in so wild a scheme may be regarded as a proof of their conviction that this was possible, that proof certainly existed. Still more recently a man, supposed to be an experienced miner, has returned from abroad, bringing with him what he regarded as a very fine specimen of tin, whereas they are only crystals of wolfram (tungstate of iron), and consequently valueless. Such instances surely show the necessity of making some of the sciences part of our ordinary educational system. Attention is again directed to the combination of tungsten with steel. Some years since Mr. R. Oxland patented a process for separating wolfram (tungstate of iron) from tin, and it was proposed to employ the tungstate of soda obtained in the process as a mordant, and the metallic tungsten as an alloy with iron. M. Jacob subsequently made steel, with tungsten in its composition, and carried out some large and apparently satisfactory experiments at Sheffield and Austria. The results were so promising that M. Jacob gained possession of nearly all the sources of wolfram in this country. For several years, however, nothing has been heard of this alloy. Now M. Le Guen has solicited attention to what he calls wolframed pig-iron. Experiments have been made at Brest, and the pig tested was found to offer a greatly increased resistance when less than 2 per cent. of wolfram had been added to the iron. Another description of pig-iron, formed of one-third of best old English pig and two-thirds of the fragments of old cannon, with German wolfram mixed in the same proportion, shows an augmentation of resistance equal to about 68 kilogrammes per square centimetre. Numerous other experiments of a similar character were made, the result appearing to be in all cases favourable to the wolfram pig-iron. There is much difference in the character of the tungstate of iron. The French wolfram, containing a little arsenic and sulphur, is not equal, even after roasting, to the German mineral, which is very pure.—*Quarterly Journal of Science.*

Ginseng.

This plant, associated with opium and China in the minds of most people, is a native of this country as well as of Asia. The *Panax quinquefolium*, or ginseng, is an annual plant, the root of which is held in high esteem by the Chinese for its supposed medicinal qualities. Its name, panax, from *panacea*, was given to the genus by Linnæus. In this country, it is found growing in a wild state in Tennessee, Virginia, and several of the Western States, and also in Canada. It is collected in large quantities in Ohio, Minnesota, and Wisconsin, the roots carefully dried and sent to this city for shipping to China in payment for silks and teas. The dried root is now selling in this market at $1.25 to $1.35 per pound. See what a Dane County (Wisconsin) exchange says of it:

"'On to Richmond!' may be the watchword along the York and James rivers, but *Ginseng* is the cry in Menomonie and the surrounding neighborhoods. We are told that the speculators are paying 15 cents a pound for it in a green state—it is selling in New York for $1.15, wholesale. Dunn and the surrounding counties are full of the desirable root, and men, women, and children are digging it; and we do not hesitate to say, if 'John Chinaman' does not have a sufficient supply of the 'narcotic' next year, it will not be from a lack of the efforts of the people of this neighborhood to furnish him the material to manufacture it from. We are informed that, in this early part of the season, $8,000 have already been paid out in this county for Ginseng."—*The Horticulturist.*

Fatal Explosion of Fulminating Mercury.

The *N. W. Times* publishes the following communication:

MR. SOMERBY—*Dear Sir:*—It is with deep agony and sorrow that I have to inform you of one of the most heart-rending and terrible accidents that few ever describe, and which has sent my esteemed employer to an untimely grave, and plunged his own and his father's family into grief and sorrow that knows no comforting.

We had been engaged for several days back in taking account of stock, and had nearly finished when Mr. Parry, who was engaged in taking an account of the business, took up a 1 oz. vial of Fulminating Mercury for the purpose of weighing it, but before doing so, he undertook to remove the glass stopple from the vial, and the friction produced by its withdrawal caused a small portion of this dangerous compound (that had insinuated itself between the stopple and the neck of the bottle) to explode, which communicated with the balance, causing an explosion of a fearful nature, tearing his right hand clean from his wrist, stripping the flesh from the fingers of his left hand, destroying one eye and ripping open the abdomen—his bowels falling out on the floor, presenting one of the most ghastly sights that imagination can conjure up. Such was the force of the explosion, that articles he had in his pockets, such as keys, some coins, &c., were indented and forced to a distance of fifteen feet from him.

This fearful explosive is the matter with which gun caps are filled. Its greatest force struck him in the abdomen, tearing and lacerating him in a fearful manner. He recovered his senses in a few seconds sufficiently to communicate the way the accident occurred, and the physicians, who arrived in a few moments after, did all that they could to save him; and as soon as he could be removed he was carried on a bed to his residence, where he died about four hours after the explosion.

Mr. Parry is a great loss to the community as a business man, and to his numerous friends. As a private citizen his death will be mourned by every one. STANLEY STOUT.

La Crosse, Wis., Oct. 21, 1864.

New English Rock Drilling Machine.

Lately a very ingenious machine has been invented by Mr. Westmacott, a partner of Sir William Armstrong, for the purpose of drilling holes, instead of doing it by manual labor. This machine is worked by hydraulic power, and the inventor has taken for his model the operations of a man in drilling, the various movements being exactly copied; first, the drill is pressed against the stone to be operated upon, and then a blow is struck, the drill is then withdrawn a little, and also moved a little round, again pressed against the stone, and struck, and so the operation is continued. All these operations are performed by the machine, which appears to be a very ingenious one. It is capable of striking from 150 to 200 blows per minute, and the drill makes one revolution during the striking of fourteen blows; its rate of progress (the size of the hole being $1\frac{1}{8}$ inch) is 2 inches per minute, or 20 inches in ten minutes, which has been done in repeated trials. So that, taking this rate of progress, it is capable of performing work equal to the labor of $12\frac{1}{2}$ men, presuming that a man will drill in this stone 8 feet per day, which is a fair average; and the machine to bore 100 feet per day of ten hours. There can be no doubt that this machine will prove of great value.

RECENTLY the propeller *Ontonagon*, on Lake Michigan, broke her shaft, and the large mass of iron came crashing down among the timbers and stove a large hole through the bottom, into which the water rushed with fearful rapidity.

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