Science and Art.

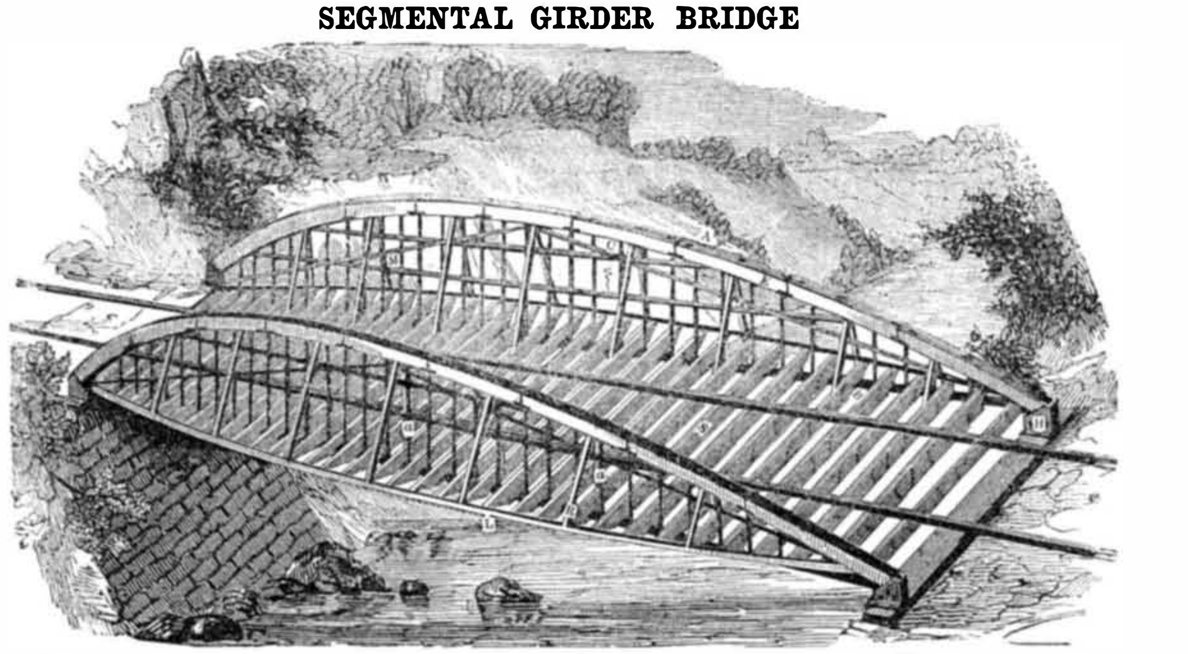
Galvanic Metals.

Any two metals put into a liquid and connected together, will produce a current of electricity and form a battery, if one of the metals be capable of oxydizing in the liquid, (or if both have that property, and one oxydizes more rapidly than the other.) The power of a battery, therefore, must depend upon the difference of oxydization between the two metals employed in it. Platinum is the least and zinc the most oxydizable metals employed in batteries; therefore they should form the most powerful battery plates, when employed together, the former as the negative, and the latter as the positive pole. But there is another law connected with metals, which has an equal effect with that of decomposition in the construction of a battery, that law is *conduction*. Thus one metal will transmit a current through it easier than another—offers less resistance to its passage—hence this must be taken into consideration. Although platinum is a better negative metal in a battery than copper, it is five times less efficient as a conductor to transmit the current back to the zinc or positive plate. This is the reason why copper and zinc plates are about the best elements that can be used for galvanic batteries. Iron is a very oxydizable metal, and would form excellent positive plates, were it not such a poor conductor, it being to zinc as 24 to 40.

Etching on Ivory.

The ivory to be etched is first covered with a thin coat of wax, and the designs traced on it with a style. Nitrate of silver—composed of 6 grains of silver dissolved in 30 grains of nitric acid, then diluted with 150 grains of water—is then poured upon the ivory, which bites lightly into the lines traced by the style, and when exposed to the light, dyes it a deep black color. The wax is then removed by washing in hot soft water, leaving the design in dark lines on the ivory.

SEGMENTAL GIRDER BRIDGE



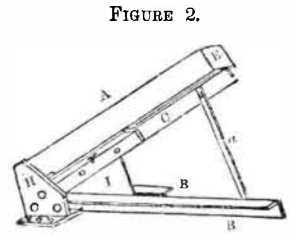
New Bridge.

Figure 1 is a perspective view of the bridge, and figure 2 is a section of the girder extending from the shoe, H. Similar letters refer to like parts on both figures.

The Girders which form the subject of this Bridge are each composed principally of an arch, A, string piece, B, forming a chord to the arch and supporting the floor, suspension rods, *a a*, arranged radially to the arch to suspend the string pieces therefrom, and diagonal braces, M. The arch is composed of two continuous lengths of wrought angle iron, C, arranged side by side, the thickness of the suspender rods, *a a*, apart, and supporting at short distances, a series of wrought or cast-iron spurs or double skew-backs, firmly bolted on, which receive tightly between them square timbers, E, which are bolted to the angle-iron string pieces, B. In this manner an arch is formed, the under part of which is well calculated to resist tensional force, and the upper part to resist compressive force, such being the forces respectively brought into action by any weight applied to the arch The string piece, B, forming a chord to the arch, is composed of two continuous pieces of angle iron, arranged the thickness of the suspenders, *a a*, apart, like the angle irons of the arch. The string piece, B, is secured at its extremities by shoes, H, of wrought or cast-iron to the ends of the arch. The string pieces and the angle irons of the arch may be formed of pieces of the greatest convenient length, bolted, riveted or otherwise connected together, so as to be perfectly continuous from one extremity to the other. The suspension rods, *a a*, are made of flat bar iron, and are placed between the angle irons of the arch and the lower string piece, and secured by rivets or bolts passing through them and the angle irons. The suspension rods may be put at any convenient distance apart. The diagonal braces are flat bar iron and extend from the shoe, H, to the crown of the arch. A brace arranged as a chord extends across the arch some distance above the string piece, B. The floor timbers, S, are supported by two or more girders, and lie across the string pieces, B. The bridge is secured against lateral vibration by extending the floor timbers beyond the outside of the girders and bracing them with horizontal wrought iron braces, L, to the ends of the arch, and oblique braces, R, extending upward and inward to the arch.

The particular feature of this girder, in which it is alleged to possess advantages over all other girders, is in the construction of the arch, the lower part, consisting of continuous angle irons firmly connected together, is stated to be capable of resisting great tensional strain; and the upper part, consisting of the skew-backs and timbers fitted tightly between them, is capable of resisting great compressive force; and, at the same time, the peculiar forms of the several parts composing the arch are such that all unite in a perfectly secure manner, and that the arch can be very

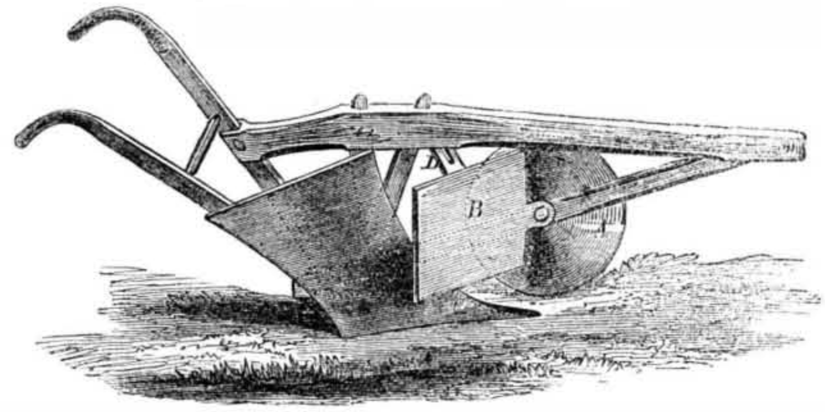
FIGURE 2.



easily constructed, and any one of the timbers between the skew-backs can, at any time when defective, be conveniently taken out and be replaced without disturbing the stability of the bridge. The other parts of the girder are so disposed as to stay the arch, and, at the same time, support the string piece at the expense of as little material as is practicable.

The inventor states that a model one hundred inches long, weighing fifty-four pounds, will sustain 8000 pounds weight and not depress the bridge in the center one-sixteenth of an inch. The bridge is constructed on scientific principles, and is, in our opinion, a valuable improvement. For further information address the inventor, Peter C. Guion, 244 Fifth street, Cincinnati, Ohio. Patented Feb 26, 1856.

IMPROVED SUBSOIL PLOW.



New Subsoil Plow.

Our engraving shows a plow of novel construction, for which Letters Patent were granted April 22, 1856, to Pells Manny, of Harvester-machine fame.

The improvement consists in having a rotary cutter, A, attached to the front part of the beam, followed by a spreading wing, B. The latter is set on an angle, enters the soil for a short distance, and turns over a shallow furrow. The mold-board, C, then lifts the soil below, and throws it up to the surface. D is a set brace extending from wing B to the plow beam. The various parts are adjustable.

As the implement is drawn along, the coulter, A, rotates and cuts the furrow slice in advance of the separating wing, B. The latter spreads or opens the furrow of the surface soil while the mold board, C, throws up the subsoil to the top of the ground. The mold board being sufficiently narrow to take up only half of the subsoil at each plowing, and being relieved from the weight of the top or surface soil by the action of the separating wing, it has such advantage in the draft as to enable it to take a much deeper furrow than ordinary subsoil plows.

The principle of this plow gives to it the desired strength, so that in its construction it is said to be as light and convenient as an ordinary plow. It will take a very deep furrow, at certain intervals, if desired, leaving a portion of the subsoil undisturbed, in a comb, between each furrow, and within reach of a subsequent plowing. This is a new and apparently a very important principle by which a great depth may be reached and brought on top with as much facility as in ordinary plowing. The hidden treasure of the subsoil has too long been neglected for the want of suitable means to render its fertility available. Is it not absurd for our farmers to expect to outrival England in the yield per acre, when our subsoil is left undisturbed?

The inventor states that twenty years' experience has led him to believe that no fertilizers can be used on our Western prairie lands equal to a good subsoil plow. "Try it, farmers," he continues, "and if you do not find it so, I will then admit that my time and money have been spent in vain in getting up and perfecting this plow."

Address the inventor at Waddam's Grove, Stephenson Co., Ill., for further information.

Improved Quality of Alloys.

Many persons entertain the wrong idea that pure metals, for every purpose, are superior to alloys, and a mixture of any two or more metals depreciates the quality of them all. The fact is, that alloys generally are superior to the pure metals for most purposes, because pure metals are more liable to crystallize. Thus zinc requires to be alloyed with a small quantity of lead before it can be rolled into sheets; when perfectly pure, its power of crystallizing is so great that it cannot be rolled. Gold is so soft that it has to be alloyed with copper or silver in coins to prevent it wearing out rapidly.

Discoveries of rich copper ore have recently been made on the Dun Mountain, in New Zealand.