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The Homogeneous Metal.

The article which recently appeared in our columns (page 117) on the above subject has arrested the attention of Joseph Dixon, of Jersey City, N. J., who has sent us a few lines on the subject, in which he states it as his belief that the metal in question is the very same as that which he manufactured in 1847–8, and which was held to be pure iron. We were well aware of Mr. Dixon's experiments, and had seen a plate of his metal; but we cautiously stated in the article referred to that we had not received satisfactory information in relation to the exact nature and composition of *the* metal; but "if it possessed the advantages claimed for it by its inventor, it was one of the most important inventions of the age." We shall yet be able, we think, to elicit the whole truth in relation to it.

Mr. Dixon's pure iron was homogeneous, very strong, quite free from the mechanical imperfections of bar iron; was easily converted into good steel, and rendered suitable for tools, engraver's plates, and other purposes. If the homogeneous metal of Mr. Howell is the same as that of Mr. Dixon, the latter deserves the credit of the invention, as he was the first person, we believe, who effected the melting of a mass of malleable iron, and the purification of it while liquid. Previous to this a few grains of the malleable iron had been fused in the laboratory, but it was considered impossible to render it available for practical purposes. Why is it that no more of Dixon's homogeneous metal has been manufactured than the few specimens under his own special superintendence?

The British government has ordered several tuns of Howell's metal for the boilers of naval steamers; and the manufacture of it is said to be established and increasing in Liverpool. Have our people proved so insensible to the advantages of this metal as to allow Uncle John to "take the wind out of their sails"? Specimens of this metal were exhibited at the Fair of the American Institute, and were tested in various ways. A plate of it was found to be double the strength of boiler iron; and yet the invention has been allowed to slumber for the past ten years without good reasons. This is inexcusable.

We have stated that pure iron is more easily oxydized than iron containing silicon and carbon, owing to the great affinity which iron has for oxygen, especially when exposed to moisture. Mr. Dixon informs us that this is true, chemically, but owing to the homogeneous structure of metal made by his process, it is not so subject to destructive corrosion as common wrought iron, because the fibrous construction of the latter, mechanically, presents more favorable points for the action of the oxygen. This is a very good reason indeed, as it is well known, that a piece of bar iron, exposed to the action of salt water, which is very corroding, soon becomes honeycombed. The moisture seems to permeate through the *lamina* of wrought iron and thereby finds a more extensive surface for oxydizing action, than if it were homogeneous.

There are some materials which occupy a far more distinguished position than others, as aids to man. The chief among these are fuel in a compact form (such as coal or wood) and iron. Without the former, man might cook his food with dry herbage, like the squalid barbarians on the bleak plains of Asia and South America, but he never could rise to the condition of practising the useful arts. Without iron, man could, indeed, rise to that state in the arts of the ancient Phœnicians and Egyptians, in their favorable climates, for they were unacquainted with this metal but without it, practical mechanics and the manufacturing arts never could have arisen to their present high position, which as far transcends that of those ancient nations as the light of the sun exceeds that of the moon. Without iron, steamships, locomotives, printing presses, power looms, and the hundreds of machines which are the assistants and aids of man in his present civilized state, would be unknown. Unlike fuel, such as coal and wood, however, it is a manufacture itself, and is produced by expensive processes. It is evident, therefore, that any improvement in its manufacture must be of great and general consequence. It is for this reason we so frequently direct attention to everything which comes under our cognizance that has a bearing upon its improvement. If this homogeneous metal is so valuable to the arts, and embraces such important advantages over other kinds of iron, its manufacture in our country should not be delayed for a single month longer.

Making Bread by Machinery.—Berdan's Patent Automatic Oven, &c.

It is somewhat remarkable that up to the present time, when almost every want of civilized man is supplied by machinery, the manufacture of bread—the first of all necessaries, the "staff of life"—should be almost universally carried on in as rude a manner as by the ancients. It is true that the primary process of converting the grain into flour may be said to have arrived at perfection, but beyond this, the manufacture, as generally practiced, differs little from what it was in the days of Moses. The subject has, however, within the last few years, attracted much attention from scientific and ingenious men, both in this country and in Europe, and it now seems that this most important of all the useful arts is to be no longer behind those which minister to our other wants.

A mechanical bakery has just commenced operation in Philadelphia, the ovens and machinery of which are the invention of H. Berdan, of New York city, which is capable, when worked up to its full capacity, of converting into bread the enormous quantity of 1,000 barrels of flour daily, estimated sufficient to supply the entire population of the Quaker City. By the immense saving of labor, fuel and space, the bread can be supplied from this establishment to the consumer, at a cost very greatly below that charged by bakers, and even cheaper than it can be made by families, purchasing their flour at retail. A brief description of this immense concern will, doubtless, be interesting to the majority of our readers, though it would require engravings to give anything like an adequate idea of it.

The building is four stories high, to the uppermost of which the flour is conveyed in the barrels by a hoisting apparatus, and after being turned out of the barrels, is sifted by suitable machinery, and afterwards conveyed into a large hopper belonging to the kneading machine, which is on the floor below. This machine is composed of a horizontal cylinder, in which rotates a bar for stirring the flour, water and ferment together, a scraper for preventing the adhesion of the dough to the cylinder, and a "flopper," which cuts into and opens the dough, takes up several hundred pounds of it at a time, and throws it about in a most remarkable manner, somewhat imitating, on a large scale, the operation of kneading by hand, causing much air to enter into it and be retained within it distributed in small cellules, and making the bread very light, with a small quantity of yeast. From this machine the dough is conveyed to the hopper of the loaf-making machine, the principal portion of which is on the second floor. This machine cuts or molds the dough into loaves, and registers the number made. The molds or cutters of the last-mentioned machine are variable, to enable the loaves to be varied in size exactly in proportion to the market price of flour. The loaves, after being formed, are carried off by an endless apron to a convenient point, to be taken by attendants and placed on brick-bottomed cars, on which they are passed into the ovens and baked. The ovens, of which there are two, are upright, and occupy comparatively little horizontal area. They are independent of each other, and each complete in itself, containing a system of upright endless chains, which are constantly in motion, to convey the bread from one door of the oven on the second floor of the building, where the bread is introduced, down to a door on the first floor, where it is discharged when sufficiently baked; the time occupied in its descent being just sufficient for the baking process, which is made continuous for any length of time, by the introduction of new supplies as fast as the discharges take place, the oven being thus kept constantly filled with the bread at progressive stages of the baking process. While the baking bread is passing down the oven on one side, the cars which have been emptied on the first floor and introduced at another door on the same floor, are passing up through the oven on the opposite side to a door on the second floor, where they are discharged, to be re-loaded and introduced at the first-named door again. There are four doors in all, two on the first, and two on the second floor. The endless chains of the ovens are made with rails, on which the cars run in and out. The doors are opened one at a time, at proper intervals, for the admission and exit of the cars, which are drawn into and expelled from the oven, and moved from the discharging to the receiving doors outside the oven all by machinery; and the only manual labor in the whole establishment is that of loading and unloading the cars. The oven is built entirely of brick, and the cars on which the bread is baked are, with the exception of light iron frames, made entirely of brick. Of the advantage of brick ovens it is needless to speak. The ovens are heated by fires which are tended in the basement of the building.

This bakery, which is the property of a joint-stock company, composed of some of the most influential men in Philadelphia, is one of the most perfect manufacturing establishments we have ever seen; and its machinery works with the precision of a clock. We had the pleasure of witnessing its operation on the opening-day, which was celebrated last week by a public *déjeuner* within its walls, at which some of the most distinguished men of the city were present; and in the speeches that were made on this occasion, Mr. Berdan received some very flattering compliments, to which he replied with great feeling and good taste.

The oven and kneading machine have both been patented through the Scientific American Patent Agency is this country, and in almost every country where patents are granted. Bakeries on the same principle are now in course of construction in New York, Boston, Baltimore, New Orleans, and other large cities; and it is hardly venturing too far to predict that similar concerns will be started, and come into successful operation, in every city of the Union, for cheap and pure bread is one of the greatest desiderata in large communities.

The Tele-stereoscope.

The stereoscope is an instrument which, from two pictures taken at different angles, presents to our view objects at a short distance in the solid form. Common pictures have a flat, dead appearance; stereoscopic pictures stand out in life-like relief. The reason of this is that, with the stereoscope, each of our eyes obtains a somewhat different view of the object, and they find the true form of it out of the two perpective views or pictures taken at different points. If, however, the distance from which we view the pictures in the stereoscope is considerable, the eyes are too slow in their action to enable the observer to form a correct idea of the distance and the form of the object represented, unless some very favoring circumstances of light and shade assist in doing so.

Ranges of distant mountains generally appear to the naked eye like perpendicular walls attached to the firmament. In the stereoscope, it is possible to combine two perspective views of a landscape taken from two different points sufficiently distant so as to give the observer a correct idea of the real or true forms embraced in the views. A stereoscopic picture, therefore, conveys a more perfect representation of a landscape than an observation made with the naked eye. It is only by changing positions, and thereby obtaining different perspective views of a landscape, and by comparing these views, that an observer is enabled to perfect his observations, and to obtain something like a correct idea of the forms of the objects embracing the scene. If the observer could take different views of a landscape at the same moment, the scene presented to his vision would be charming and life-like. But this he cannot do, neither can it be done with the common stereoscope for distant objects; but in *Dingler's Polytechnic Journal*, published at Augsburg, Germany, it is stated that this is accomplished by a simple instrument called the "tele-stereoscope," recently invented by M. Helmholz. It consists simply of a smooth board, four feet long, on each end of which a looking glass is fastened perpendicular to its plane, and making an angle of 45°, with a line drawn longitudinally through the center of the board. In the middle of the board, two other smaller looking-glasses are fastened parallel to the first two, and so close together as to enable the observer to look at once with an eye into each. If it is desirable to magnify the object, an opera glass or spectacle lens may be inserted between the eye and the looking-glasses. By these means the right eye sees the landscape as it appears in the looking-glass at the right end of the board, while the left eye sees it as it appears on the looking-glass at the left end. The distance of the observer's eyes is increased by these means from about three inches (the common distance) to four feet, and he thereby obtains a view which as far surpasses stereoscopic photographs as an oil painting excels an engraving. The journal referred to also states that objects distant from one to two miles appear correct in the back ground, and nearer objects very perfect, particularly trees, the limbs and branches of which are distinctly separated, and the whole landscape stands out solid and beautiful.

Gomez & Mills' Safety Fuse.

Last week, at the New York State Arsenal, we were present during a series of experiments with the above fuse. It is a peculiar chemical composition, enclosed in a paper case and wrapped round with cotton, and for land service it is passed through tar to render it impervious to rain and the dampness of the ground, but for submarine purposes it is coated with gutta percha. It is of flat form, and in consequence not so liable to injury as the ordinary round miner's fuse. The fire passes through this fuse at the rate of one mile in four seconds; and one of the experiments consisted in firing two guns, the one with a length of about fifteen feet of fuse, and the other with about two hundred feet, both lighted at once, and from our position on the steps of the arsenal, each seemed to go off at the same moment. The fuse is inserted in the cartridge, and passes through the mouth of the gun to the hand of the gunner, so that an enemy spiking a gun does not render it any more unfit for service than it was before. One man can fire a battery of any number of guns at almost the same instant with this fuse, and it is without doubt a great and valuable addition towards that perfection of the art of war which shall ensure universal peace.

This invention was recently tried with success at Washington, under the personal direction of the Secretary of War.

Water in the Sea.

If we would obtain any idea of the water which the sea contains, let us suppose a common and general depth for the ocean; by computing it at only two hundred fathoms, or the tenth part of a mile, we shall see that there is sufficient water to cover the whole globe to the height of 503 feet; and if we were to reduce this to one mass, we should find that it would form a globe of more than sixty thousand miles in diameter.