

Editorial Summary.

ANOTHER CAST STEEL PROCESS.—As the Bessemer method consists in the simple oxidization of the carbon contained in iron, by penetrating it throughout with a blast of oxygen mixed with nitrogen (air) it is evident that mixing with the iron any substance capable of evolving oxygen would effect the same result. Mr. Bessemer patented this idea; but the substances, such as the nitrates of soda and potash, most available for yielding oxygen to iron, are very destructive to the vessel employed in the process. To meet this difficulty Mr. John Heaton, now of the Langley Mill Steel and Iron Works, Nottingham, patented, about a year ago, the plan of placing the salts in pockets within the fireclay lining of a revolving converter, so that all parts of the whirling mass might be brought in contact with the re-agent. It appears that about 5 per cent by weight is a sufficient proportion of the nitrate to be added to the iron for its conversion into steel. Samples of the product are spoken of as showing a fine silky fiber at the fracture.

ALUMINIUM IN DENTISTRY.—Dr. J. B. Bean announces in the *Dental Cosmos* that he has succeeded in discovering a process for fine casting in aluminium, which will enable the profession to make plates for artificial dentures preferable in all respects to those of any other material, from gold to vulcanite. In strength and rigidity he affirms that the aluminium plate, when properly cast with very slight and suitable alloy, is far superior to gold and platinum of the same condition and thickness, while its extreme lightness is one of the most desirable of qualities. In cleanliness nothing can be better: it has no more taste than porcelain, its brilliancy is much more lasting than that of silver, plates worn for weeks without cleaning exhibit no change, and sulphur and sulphuretted hydrogen, which attack silver and gold, have no effect whatever on aluminium. Its lightness is the great difficulty in casting it in fine molds, and a peculiar process had to be originated, which the inventor generously declines to patent, although he thinks the apparatus used should be covered by a patent, as an article of manufacture. Eminent dentists are said to have pronounced it "the great desideratum attained."

ARTIFICIAL PERCEPTION.—It has been suggested that the supposed odyllic force (animal magnetism) may possibly, if there is such a thing, be brought to artificial tests and measurements, by means analogous to those by which we separate and exhibit the distinct forces contained in light, or the allotropic states of the threefold substance to which oxygen belongs. What could be the nature of an odyllic battery, wherein this mysterious force might be caught, stored, concentrated and brought under examination? All we know is that it must be some arrangement of those living leyden jars (too often cracked) which in all ages have more or less perambulated with startling if not shocking effect. It is unfortunate that most of the attention hitherto devoted to this subject has been that of persons to whom the rigor of scientific inquiry is foolishness.

ENDLESS HOIST.—A recent English patent presents a very simple and efficient application of the endless hoist principle, commonly used for grain and flour, for building and general purposes. Two parallel endless chains pass over separate parallel pulleys widely enough apart for the hoisting boxes or cages to swing clear between them, and are connected at proper intervals by iron bars from the centers of which the cages are suspended. Four of these pulleys being arranged equi-distant like the four wheels of a car truck, at each end of the hoist, permit a constant succession of cages to pass each other going up and down, remaining always right side up.

BETTER LEATHER.—The *Shoe and Leather Reporter* argues a reasonable prospect of improvement in American leather, from the energy stimulated in the manufacture by the war. Although capital and energy were then turned in the direction of rapidity and quantity at the expense of quality, yet there is nothing now to prevent this power being transmuted from speed to force, and applied to thorough and excellent work, removing the stigma of inferiority from American leather and transferring to our own manufacturers the demand which now goes abroad.

SILICA IN GRAIN STALKS.—Pierri, the French chemist, has re-examined the grasses and has apparently thrown some further light on the agency of silica, which was once erroneously supposed to give the stalk its rigidity. He finds on the contrary that in the wheat plant the silica accumulates chiefly in the leaves and least of all in the hard knobs or joints of the stalk; the latter containing less than one seventh as much as the leaves, and the stalk between the joints less than one-fourth. Hence, the more silica the more leaf, the more shade, the less hardness in the stalk, and the greater liability to break down or "lodge."

PROFESSOR AGASSIZ'S immense collections in Brazil have been in good part opened and arranged (except about sixty packages) in the museum of Comparative Zoology at Cambridge. They include 50,000 specimens of fishes, representing over 2,200 species, 2,000 of which are supposed to be new to science. This collection now exceeds those of the British Museum and Jardin des Plantes united, containing altogether more than 9,000 species.

SUBMARINE TELEGRAPHS to the number of 72, with 12,008 miles of cable, are now in successful operation; 23, of 9,053 miles, have been worked but have since given out, and 9, of 862 miles, have been total failures. In addition to these there are 95 lines under American rivers,

EXCAVATOR.—A new railway bridge is being erected over the Clyde, at Glasgow, on cast iron cylinders 8½ feet in diameter, filled with concrete and penetrating through the sand to the bed rock at a depth of 85 feet. An excavator invented by Mr. John Milroy is used with great advantage in sinking these tubular piers. Its construction may be illustrated by supposing an octagonal disk of steel plate to be divided on all its diagonal lines, so as to make eight triangular plates. Let these plates be each hinged by its external side on an octagonal frame filling the interior of the cylinder like a piston head, so that when free they will hang vertically, points downward, and may be forced downward into the sand as spades; and when drawn up again to a horizontal position by chains attached to their points, they will converge and form a tight bottom, supporting the sand brought up with each spade. The further details necessary for working the plan may obviously be adjusted without difficulty, and the novel piston be made to pump the sand from the bottom of the cylinder as fast as it can rise and fall.

EARLY STRUGGLES.—The Illinois eight-hour law encounters great difficulty in getting into practical operation, from the want of a general concert of manufacturing states in the movement. It is of course impossible for employers to pay the excess of wages over their competitors in other states, and they will be obliged, and are preparing, to close their factories and shops, unless the hands consent to have the twenty per cent taken off equally from the work and the wages. Of these alternatives, neither working on four-fifths time nor being turned out of employment altogether, is the entertainment to which the operatives were invited. It would seem to be their only policy, at this stage of their movement, to content themselves with the initiation of the eight-hour standard of day's work, adding two hours overtime for the old wages at present, and leaving the advance of wages until a period when it can be made simultaneous and so practicable in all states.

GAS LIGHT IMPROVEMENT.—Any of our readers who burn gas can test for themselves a simple device by which a Mr. Scholl of London proposes to increase the illuminating power of a common gas burner by more than 50 per cent. Hold a strip of thin sheet brass or other metal, one third or half an inch wide, in the centre of the flame, splitting its thickness (not its breadth) and nearly touching the two holes whence the gas issues, so as not to obstruct the passage, but to divide the jets and check the velocity of their upward current. The division and the check will favor a more intimate access of oxygen to the gas, and hence a more perfect and brilliant combustion. Mr. Scholl uses a platinum strip resting in slits in a brass ferrule fitted over the burner tube.

SHARPENING FILES.—J. S. C., of New York City, says that when files become clogged and dulled they should be bathed in strong potash water to remove all grease, and then immersed endwise in a jar of one gallon soft water, two ounces tartaric acid and half a pint of sulphuric acid. Let them remain a few hours, remove them, and after washing in clear water put a little oil on the teeth. A second immersion in the acid before oiling and after washing is sometimes an advantage. The acid etches the teeth, or rather the interstices, and sharpens the file. We have heard of this before, but have never tried it.

A FRENCH WAY OF RIDING ON HORSEBACK.—Make a pair of enormously large wheels, and place a carriage body over the axle and shafts so high that the horse can travel under it and between the wheels. You will have a most symmetrical turn-out, such as they use in Paris, a beautiful dissolving view of driver, horse and carriage in one, defying man's wit to tell where either begins or ends, and a lofty perch where you can both see and be seen.

THE STABILITY OF OXIDE SURFACES is illustrated by a curious little experiment. It is said that writing in ordinary ink on the molded surface of an ingot of pewter, will remain after the metal has been remelted and cooled again within the same mold, even though it may have been stirred during the operation. It is supposed that an oxide is formed by the writing, which is not reduced by the melting.

HARD HYDRAULIC CEMENT.—A cement which is said to have been used with great success in covering terraces, lining basins, soldering stones, etc., resisting the filtration of water, and so hard that it scratches iron, is formed of sixty-three parts of well-burned brick and seven parts litharge, pulverized and moistened with linseed oil. Moistened the surfaces to which it is to be applied.

A SENSIBLE SILVER FORK.—An obvious improvement has been introduced by a Birmingham manufacturer, which consists in making the fork whole and hollowed or fluted for about two thirds its present length, leaving the prongs of the sufficient length of half or three fourths of an inch, the implement becoming thus a partially "split spoon," convenient for small particles, liquid or semi-liquid ingredients, peas, and the like.

SOLIDIFIED GLYCERIN.—An English company are now manufacturing a toilet soap with which solidified glycerin is amalgamated in equal proportions by weight. The result is a semi-transparent tablet which lathers well and wears well, and deserves a wide popularity.

STEEL BOILERS.—The Paris and Orleans railroad has 13 locomotives with steel boilers, the Southern has fifteen, and the Paris and Sceaux has a number. The substitution of steel for iron in this direction is making rapid progress.

ACETYLENE.—A colorless gas, consisting of two equivalents each of carbon and hydrogen, is contained in small quantities in coal gas, and is supposed to have been the cause of certain mysterious and hitherto unaccountable gas explosions. It may be separated from the coal gas by passing the latter through a solution of ammonia-sulphate of copper, precipitating a reddish brown deposit of acetylide of copper. This being very explosive, igniting with slight friction, is supposed to have been the cause of several explosions which have occurred in moving copper gas pipes and in altering meters where the brass work had been much in contact with the gas, and a deposit of acetylide of copper might naturally have been formed. It is a curious fact that if chlorine gas is turned into a jar of acetylene gas even in darkness, an explosion will ensue, but not so if the acetylene be turned into the chlorine, unless a moderate degree of light be present. In the latter case, the chlorine unites with the hydrogen, setting the carbon free, so that the vessel, which previously held a mixture of colorless gases, is instantly filled with a mass of inky black smoke, giving the jar the appearance of patent leather. These observations are derived from a late lecture by Prof. Frankland.

MINING EXPLOSIONS are rare in this country, from the very limited number and depth of bituminous coal workings. The late explosion in the Clover Hill mines, Chesterfield, Va., is, however, a sad warning, and proves that stringent regulations and improved safeguards are matters of deep interest in this hemisphere as well as the other. Our bituminous coal beds are of vast extent, and destined yet to be as extensively worked. It seems in this instance, gross neglect of both rules and specific orders caused an inexcusable calamity by which sixty-nine persons were cruelly put to death. The removal of the door that closed a disused upset, or gallery, and neglect of an order to replace it, and a further neglect on the fatal day to make the regular examination for dangerous gas at the same place; these were the conditions, naturally leading to the possibility of a disaster which might otherwise have been prevented. There were two deputy gas men, each of whom successively neglected their examination at this point, at morning and at noon; the first by his own admission, and the second, who was killed by the explosion after ostensibly completing his examination, and of course could not have performed his duty, else his life and those of sixty-eight others would have been saved.

THE PARIS BOURSE has been connected with the Grand Hotel by a pneumatic dispatch tube about three quarters of a mile long and 2½ inches in diameter, through which a cylindrical box containing forty envelopes can be sent in one minute. The atmospheric pressure is obtained gratuitously by means of the ordinary pressure in the water pipes. The water is introduced into a close reservoir of two chambers, the first connected at the top with the second by an escape valve, and when the first is filled with water, of course two atmospheres are in the second: then the water is drawn off and outer air admitted, and water is again allowed to run in as long as its force suffices to inject it. Nothing remains but to leave the apparatus in this condition, while drawing off water as it is wanted for ordinary purposes, air entering as water is removed, through an inlet valve.

DEODORIZING PETROLEUM.—M. Joale, chemist of London, patents the application of deutoxide of nitrogen, or nitrous gas obtained from nitric or fuming nitrous acid and metallic filings, and conducted by a tube into the bottom of the vessel of petroleum, until the fumes reach the surface, when it is thoroughly agitated, and closed until a satisfactory result is perceived. Or, the gas may be mingled by pressure with the vapor of petroleum in the still. Or, three or four lbs. of the acid may be thrown into a 40 gallon cask of petroleum and thoroughly agitated, after which thrust in two lbs. moistened metallic filings, and repeat the process with further additions if necessary. Afterward, wash the petroleum with suitable alkaline substances, and agitate with it about 6 lbs. of fresh slacked lime to the cask.

BREECH-LOADING ARMS IN EUROPE.—The Belgian War Office having instituted an inquiry into the armaments now going forward, finds the following numbers of breech-loaders now ordered and in process of construction or conversion, viz:—Prussia 1,100,000, France 480,000 (Chassepot), England 350,000 (Snider, converted), Austria 600,000 (Wanzl, converted), Russia 600,000 (Carle needle-gun converted). Italy, Spain, Portugal, Greece, Belgium, Holland, Denmark, Bavaria, Wurtemberg, Baden, Hesse-Darmstadt, are all making or procuring breech-loading arms, or have voted funds for the purpose. Breech-loading and rifled cannon are also largely ordered.

PURE SILVER.—At a recent meeting of the California Academy of Natural Sciences, Mr. Gutzkow presented a sheet of chemically pure silver, three feet in diameter, three ounces in weight, and as thin as fine paper. The color was beautifully white, and the texture like fine lace. This sheet was made by mixing solutions of protosulphate of iron and sulphate of silver in a large dish, and the silver rose to the surface, and there formed into a sheet. Successive sheets will rise with each stripping. This easy mode of obtaining chemically pure silver is of much practical value.

STABLE'S PROCESS OF BEEF PACKING, now in use in Texas, consists substantially in substituting carbonic acid for air in contact with the meat. A little salt is used, and the bone removed, and the meat is placed in cans in carbonic acid in an air-tight box.