For the Scientific American.

The Voltaic Battery.

NUMBER III.—(Continued.)

The battery of Prof. Grove is the same in principle as Daniell's, but nitric acid is employed in the place of sulphate of copper. As nitric acid will dissolve all the metals except platinum and gold, one of these metals must be used for the conductor, or at least that portion which dips into the acid. The acid does not throw off hydrogen, but, like the saltpetre of copper, forms new compounds with it. The action which goes on is very complicated and varies continually, at times forming water and hypo-nitrous acid or nitrous acid, nitric oxide, oxide of nitrogen, ammonia, or nitrate of ammonia, or perhaps all these at once. The battery is generally formed of a porous cup placed in a cylinder of zinc, and this again in a mug or tumbler; in the porous cup is placed a piece of platinum and nitric acid, in the mug is sulphuric acid and water. This instrument is extremely active; I have not compared its power with Smee's, but think it much exceeds it. It is admirably suited for the magnetic telegraph, and some experiments of the lecture table; but it cannot maintain its action for more than half a day; it cannot be set up in the work-room, on account of the nitrous fumes which would be fatal to the operator; it is, moreover extremely liable to local action from the nitric acid penetrating the porous cup and attacking the mercury; and is altogether extremely unpleasant and laborious in its manipulations. Theoretically, its cost is only one-half of Smee's for the same power, but practically, I am afraid that it will exceed Smee's in cost, for maintaining its action.

Before we can estimate the cost of the various batteries, it is necessary to know what is meant by the terms *quantity* and *intensity*, and also form some conception of chemical equivalents.

Quantity is the voltaic action considered simply as more or less, and is always expressed by the amount of zinc consumed in a given time.

Intensity is that capacity of the battery that induces its action on other bodies. To those who are familiar with mechanical problems, quantity may be compared with weight, and intensity with velocity; it is easily understood that mechanical power is weight multiplied by velocity, and so with every battery—its power is its quantity multiplied by its intensity; let the difference between weight and velocity, or quantity and intensity be thus explained:—suppose a cannon ball of 62½ pounds weight, hung by a string and moving at the rate of one foot per second, should strike against a man's head, it would not cause him any serious injury; but if the ball were only one ounce, and moving at the rate of one thousand feet per second, it would pass through his head.

Every man has a true conception of intensity of motion and its effects, for although a man might be induced to let a 62½ pound pendulum swing against his head, yet he could not be persuaded to have a musket ball fired through his skull. But the ball and the bullet have the same mechanical power; it is the same with two equal voltaic powers—the one may not be observed, while the other is awful in the extreme. The great Farraday has shown that there is more lightning passing from a silver spoon to our lips, in the act of eating an egg, than there is in the fiercest flash that astounds the sentient creation. If to the voltaic power of a large Smee's battery could be given the intensity of that derived from the heavens, it might be capable of rending the globe itself.

The intensity of every battery is constantly the same, but the quantity is continually varying, and consequently, as the power is the quantity multiplied by the intensity, the power is continually varying. A battery of high intensity will induce its effects through a longer conductor, or decompose a more stable compound than one of low intensity. Intensity can be increased to any degree by combining many batteries together by their dissimilar ends or poles, as the zinc of one to the silver of the next, and so on; in this way a great many batteries are sometimes placed in a box and the whole called one battery, or a battery of so many pairs. But however great we may increase the intensity by combination, the quantity will remain the same, for quantity is always expressed by the amount of decomposition at any one point of the conducting line; hence, if we combine large and small batteries together, the whole will be reduced to the capacity of the smallest.

The quantity is not only the same in every part of the compound battery, but also in every part of the conductor, thus if a thousand batteries were connected together by a thousand miles of wire between each, and the terminal ones by a million of miles of wire and thousands of decomposition cells, the quantity would be the same in every battery, in every inch of wire, and in every decomposing cell; this is a most wonderful feature of the battery, that distance does not make the action less than at the fountain-head. Heat, light, sound and gravitation decrease with the squares of the distance. But if we could carry the battery wires to the ends of the universe the action would be the same in every part. Contemplated in this light, galvanism is a sublime and fearful study,—the battery seems to be the recipient of some potent force of the spiritual world, and its action to tie earth to heaven. Here science appears standing at the source of creation, and man is warned that he is at the door of the laboratory of the Omnipotent.

VOLTA.

Scientific Memoranda.

IMPROVEMENT OF THE OHIO RIVER.

The U. S. Senate has voted $20,000 for an experimental examination, with a view to some important improvements of the navigation of the Ohio River, having been induced to vote this sum by the merits of a scheme recently presented by Mr. Ellet, C. E. Mr. E., in a recent paper, constituting one of the Smithsonian contributions to knowledge, says that less than a million and a quarter of dollars will suffice to supply the Ohio with a depth sufficient for boats of five feet draught; to carry an open and permanent river navigation up the Allegheny to Franklin, and a slack water navigation, during three-fourths of the year, from Franklin to the line of the Erie Railroad in New York; improve the navigation of the Monongahela in Virginia, and extend that of the Kanawha 70 or 80 miles above Point Pleasant, supplying water powers of unrivalled capacity and permanence, on numerous lines of steamboat navigation, and curbing most essentially the destructive power of the floods. The total discharge of the Ohio in ordinary low water, he says, is but 6,000,000 cubic feet per hour.

"A pipe, three feet in diameter, will discharge very nearly 1,000,000 cubic feet per hour under a head of 60 feet. Six such pipes, then, placed on a dam only 60 feet high, and provided with proper valves, would emit water enough to double the quantity flowing down the Ohio at its usual summer stage. And if there were three such dams on different streams, and 12 pipes in each, and one man to superintend each dam, and obey the telegraphic signal to open or close the valves—or an equipment equal to three dams, no higher than have been already built in this country, and 36 pipes equal in diameter to the mains in Broadway, and three men to manage the whole—the quantity of water could be increased six-fold, and the navigation could be maintained above five feet during all ordinary droughts. At the same time such is happily the form of many of the western valleys, that dams of double this height can be often erected without injury to any appreciable amount of property, improved or susceptible of improvement."

This is one of the most stupendous and magnificent projects of the age.

WONDERFUL BRIDGE.

Near Clermont, in the department of Puy de Drone, in France, there are wells, the waters of which are of such a quality, that any substance laid on them, soon contracts a stony crust. The most remarkable of these is that in the suburb of St. Alier, which has formed a famous stone bridge mentioned by many historians. The bridge, indeed, is a rock, composed of several strata, formed during the course of many years by the running of the incrustating waters of the spring. It has no cavity or arches, till for about sixty paces in length, where a rivulet forces its way through. The inhabitants of these parts, in order to lengthen this wonderful bridge, have diverted the brook out of its channel, and made it pass close by a pillar formed by the spring, through which means they have caused the spring to form a second arch; and thus they might produce as many arches and pillars as they please. But the stream being divided, its deposition of lime is consequently diminished, and the incrusting effect impaired. It is the only water used for drinking in this suburb, and no bad effect is found from it.

COTTON WORM.

The discovery has been recently made in Mississippi, that the great enemy of the cotton plant, the worm, is produced from a fly, resembling very much the candle fly, except that here in our cotton fields it assumes every variety of color. The planters here are pretty well confirmed in this opinion from experiments recently made. The fly has been caught and confined in a small box, where it deposited its eggs, and from which the veritable cotton worm made its appearance. Planters are now trying experiments to destroy the fly, and thereby prevent the worm. The fly makes the deposit of its eggs in the bud or bloom of cotton, from which the worm, under the influence of a warm moist atmosphere, is hatched out, and being of quick growth, descends and commences its work of destruction by perforating the boll and cutting off the forms or squares. Now for the manner of destroying the fly:—the experiment is now being tried in two ways, first, by topping the cotton stalk and carrying the bud containing the eggs out of the field, and burning or otherwise destroying them; and second, by placing plates, filled with molasses, all over the field, at least one plate to every acre. The plates are placed on stands on a level with the top of the cotton, and upon stumps, as may be most convenient. The molasses attracts the fly in large quantities, and when once in they can't get out, but stick and perish.—[Mobile Her.

DEATH OF LIEUT. GALE, THE AERONAUT.

The Bordeaux papers contain details of the death of Lieut. Gale, the aeronaut. He ascended upon the back of a pony, and, at a short distance from the city, made a successful descent. The pony was detached, and, while in the act of exhausting the remaining gas, his anchor gave way, and the balloon, being relieved of its chief weight, rose suddenly. A tree by which the anchor held, snapped, and the shock upset the car. The lieutenant clung to the ropes, and in this state was carried a mile and a quarter, when he dropped, either with the balloon or before it fell. His dead body, with all the limbs broken, was found in a wood. He has left a wife and eight children. He was engaged for twelve nights at £90 each, free of expense. It is said that the Prefect of Police in Paris, intends to prohibit balloon ascents out of the usual mode of performance.

An invention has recently been patented in England, called the Autographic Press, by which a letter written on prepared paper can be transferred by a short process to a metallic plate, from which any number of copies may afterwards be taken on common paper, and by ordinary pressure.

The great gun of the deserted city of Beejapore, in the East Indies, is about to be transported to Europe, and will find a place in the Exhibition of 1851. The weight of the gun is upwards of 42 tons—a tremendous specimen of Oriental ordnance.

PLUMBAGO.

A seam of black lead has been discovered in Connecticut, near the Housatonic railroad; specimens of this mineral have been received in New York.

A model of London has been made for the Great Exhibition; it is on a scale of 8 inches to the mile, and in all, contains 96 square feet. It contains the exact situation of all the public buildings, churches, bridges, &c, and it shows the different elevations of the streets.

Distilling Improvements.

A patent has lately been taken out in England for an improvement in distilling which appears to be different from any process now employed. The improvement is as follows: If barley is employed, submit it to heat by any convenient and suitable means, until it has lost about 12½ per cent. of its weight, being careful not to let the temperature be so high as to burn or scorch the grain: when cold, grind and mix with it one-eighth its original weight of malt, and brew in the usual way; then add about 4lbs. weight of the soda of commerce, dissolved in water, to each quarter of barley if it has been previously treated in the manner hereinbefore described. Should, however, the barley not have been so treated, then about 3½ lbs. in weight of the soda will be sufficient; mash in the mash-tuns for half an hour longer; let the wort run into the fermenting backs; when the temperature of the wort in the fermenting backs has fallen to below 80° Fah., add the usual quantity of yeast; when the fermentation has commenced, close tightly the fermenting backs and fill the refrigerator half full of water, adding soda thereto. The agitating apparatus in the fermenting back is put in motion for the purpose of stirring and agitating the wort under the process of fermentation, every five or six hours, until the fermentation has ceased, or until the specific gravity of the liquid is reduced to that, or less than that of water; in this state add to the liquid about 6lbs. in weight of catechu dissolved in hot water, or 1½lbs. of concentrated sulphuric acid diluted with two gallons of water, or such quantity of the said acid, or of any acid diluted with water, as will be sufficient to neutralize the soda previously employed; the wine or wash is now ready for the distilling process. The liquid in the refrigerator may, however, be employed in the before-described operations instead of the soda of commerce, using so much, however, of the liquid as contains the requisite quantity of soda.

When sugar is employed for the manufacture of spirits, dissolve 1 cwt. of sugar in 100 gallons of water, then let it run into the fermenting backs, adding thereto 2 per cent. of yeast; to promote the fermentation, dissolve in the mash-tun 1½ lbs. weight of soda in one gallon of water, and supply the liquid in the fermenting backs with it, so that the whole shall be in the back on the third day; or put ½ a lb. of carbonate lime (chalk or marble), into the fermenting back, to produce the same effect; then proceed in manner as hereinbefore described for barley. When the fermentation is finished, add to the liquid 2½ lbs. of catechu or nine ounces of sulphuric acid, diluted with two gallons of water, or 2 lbs. of acetate of lead; when molasses is employed for the manufacture of spirits, the process is carried on in the same manner as when sugar is employed for the manufacture of spirits; when it is required to obtain by distillation a very fine but peculiar spirit, employ tartaric acid or citric acid, or the juice of any fruit containing those acids (as lemon or lime juice), mixing the acid with the liquid before the process of fermentation, or with the wine or wash, after the process of fermentation, in the proportion of three-quarters of a lb. of the acid, or the relative quantity of the juice of fruit, containing that quantity of acid, to every 112 lbs. of the solid saccharine matter employed. When the above acids are employed, omit the use of both the soda and the carbonate of lime, or previously neutralize them. In distilling, a series of coiled pipes is run through the vessel (which may be of wood) which contains the wash, and this imparts heat enough to set free the spirits, by hot water or steam being sent through the coiled pipes from a boiler. Hot water makes the best spirit.

Wild Rice.

This remarkable production about Green Bay, this season is unusually abundant, and the Menominees are now engaged in harvesting and storing it for winter.

Pittsburg has now two bodies of night watchmen, one appointed by the Mayor, and the other by the Police Committee. Their duties, so far, have been confined to arresting each other.