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Chemistry.

There is no science to which the public is so much indebted as chemistry, and there is none respecting which so little is understood by the great mass of mankind. Although chemistry is a lofty science, demanding the highest range of intellect and industry to investigate and explore, it is also a very humble science; and there are none so lowly or limited in mental grasp, who may not acquire a great deal of useful and profitable information by its study. It enters into the operations of the kitchen, and there is no one who boils a pot or a pan but would do so in a superior manner by a knowledge of it. It enters the laundry, and should preside at the wash tub, for it can tell how to save soap, by rendering hard water soft; and it can tell how to extract the most inveterate stain that soils the snowy cambric. Chemistry can take up the sand on the sea shore and make it into the crystalline globe, or it may be to sparkle on the finger of the fair, as a false but still beautiful gem of the diamond, the ruby, or emerald hue.

Chemistry is truly a magical science, and to show how simple, useful, and beautiful its principles are, we will refer to an article in common use and well known to all. We all know how common and how useful an article soap is; it cleanses our clothes, and renovates the whole outward man. If we inquire—"What is this substance?" we are answered by chemistry telling us that one of its principle ingredients is oil or grease—a substance which we always wish to get removed from our clothes and our persons as soon as possible. If oil is thrown into water it will not mix with it, but will swim on its surface; but here chemistry steps in and says, "look at this piece of crystal, almost like glass,—it is a metal named potassium (or it may be sodium), combined with the air we breathe, and which we cannot see; if you take this crystal and put it into warm water, unlike glass, it will melt and disappear, and you cannot distinguish it from the water with which it unites; now take your oil can and pour it into the water and stir it well; the oil no longer floats; it mixes with the water, and, if it is olive oil, you may taste of it without fear, and scarcely be able to challenge the liquid from sweet milk. If this substance is boiled up it becomes soap, and when moulded into cakes and laid past to dry, it forms the choicest kind for the toilet." More common soaps are made out of tallow and soda, and a poorer kind out of palm oil or grease, and potash. Here we find two substances, the soda (or the potash), called an alkali, and oil or grease, totally different in their uses and natures, uncombined, but which, when united, form a substance entirely different in its nature and uses from the single qualities of either. Here we have a starting point for chemical investigation; and although we might have chosen a higher text, we could not have selected a more suitable one for the object we have in view. But chemistry does not stop with its investigations at the soap; it goes further. It is well known that soap will remove grease and dirt freely when used with rain and what is termed "soft water," but when used with some kinds of water, the soap curdles and is precipitated in flakes, and an extra amount of it is required; chemistry has found out that the water which we call "hard," so beautiful and pelucid, is not pure. It contains, unseen, chemical matter which decomposes the soap, and separates the two substances of which it is composed, and not until there is soap enough dissolved in that water to satisfy the hard claims of matter in the water, will the soap be allowed to act upon the grease in clothes.

Chemistry is a science altogether of experiment,—no one can tell how two newly discovered substances would act until an experiment was made. Well, by experiment, it has been found—we wish particular attention to this point—that the substance which enters so largely into the most of our hard waters, rendering them very unfit for washing, causing great expense to the dyer, calico printer, and soap-maker, is carbonate of lime (chalk). Hard waters, although held by many to be pleasing to drink, yet they are very expensive to those cities, and many kinds of public works which are supplied by them. The waters which supply the city of London, it is asserted, deliver every day twenty-eight tons of lime to its inhabitants. Streams which flow through chalk and lime formations, contain a great deal of the carbonate of lime (chalk) in their waters; this is the case with the Saquoit Creek, the hardest wrought manufacturing stream, we suppose, in the State of New York. Iron and alumina (in the form of clay) also render water hard, but, excepting after freshets, these are not found in any considerable quantities in streams. A few years ago it was discovered by Dr. Clark, that (like oil used for removing oil in a soap) lime removed lime from hard water, and rendered it soft. All waters impregnated with lime absorb carbonic acid from the atmosphere; limestone is the carbonate of lime, and by burning it in a kiln, the carbonic acid is driven off, and we have quicklime, or oxide of calcium; this quicklime—decarbonized limestone—when stirred into water containing carbonate of lime, unites with the carbonate and other impurities also, in the water, precipitating them to the bottom, purifying and rendering the water soft. Nine ounces of pure fresh lime, dissolved in 40 gallons of water, will purify 560 gallons of hard water—the precipitate is chalk. It takes sixteen hours for the water to settle and all the impurities to fall to the bottom of the vessel which contains the water. This is a useful fact in chemistry, and is not very extensively known. The quicklime is dissolved in water and added to the hard water, and when we consider that nine ounces of the hydrate, or quicklime, will combine with the bicarbonate of lime in hard water, and purify 600 gallons of it, we consider this one of the most useful and valuable discoveries in chemistry. It is one valuable to our calico printers, bleachers, dyers, soap-makers; in fact it is valuable to every family in our land.

We would like to impress upon the minds of young persons in the families where the Scientific American is read, the value and necessity of acquiring chemical knowledge. We know that our children are taught some chemistry—worse than none to them—in the schools, but the lesson we wish to inculcate, is reading, study, and personal experiments in leisure hours. We have good works for the uninitiated to commence the study, in Youman's Chart, and Elementary Chemistry, and there are other works for more intricate and extended information afterwards. Every new fact which a person becomes acquainted with in science, is an addition to his stock of knowledge.

To the farmer, a knowledge of chemistry is invaluable for it teaches him the substances which are contained in and are necessary to the composition and usefulness of the bread of man, to one of which chemists give the name of the phosphate of lime. This material the growing wheat extracts from the soil; without its presence in sufficient abundance in the earth through which its roots spread, the plant flourishes poorly, the ear is ill-filled, and the produce of grain scanty. The bones of animals contain this phosphate of lime; but chemistry established the fact that certain stones and rocky masses, which occur in various parts of the earth, also contain it, and with these the farmer may renovate his soil and make the desert blossom like the rose.

Our subject is one which we might elaborate into a volume, but we trust we have said enough upon it at present to present its claims to many of our readers, so as to point a moral rather than adorn a tale.

And, to conclude this article, we do certify that, within a week from this date, we were shown a patent, granted for a chemical composition, and for which the assignees paid $8,000 for the State of New York alone, which had they been as well versed in qualitative chemistry as the writer of this, they would not have paid eight cents for, as the composition is worse than useless for the purposes intended, and this the assignees have truly felt to their loss and sorrow.

The study of chemistry, like any other branch of natural philosophy, is one which always rewards every student of it.

The Hillotype.

Our readers will remember that we have twice alluded to an invention in the Daguerreotype Art, by a Mr. Hill, in this State, who, either himself, or his friends for him, claimed to have made the discovery of forming his daguerreotypes with all the natural colors of wood and wild. A beautiful landscape of Mr. Hill's residence was said to have been done, and exhibited at Albany. It was stated that a number of persons had seen several beautiful colored pictures by Mr. Hill, one of which was that of his own child, or some other child, painted by the sun in all its rosy colors, and displaying a pearly tear on its cheek. We thought it very wonderful how those pictures were so slow in finding their way into Gotham—the city for all such wonders; but then Mr. Hill stated that there was always some little bit yet to be discovered, some perfective touch to be given to one color, and that color was yellow; he never could color a yellow. Prof. Morse, we believe, wrote a letter about this great discovery, its value, and its reality; but after all, it is asserted by the daguerreotype artists of this city, that all this alleged discovery has been a delusion. "The Daguerrean Association," of this city, appointed a committee to wait on Mr. Hill, find out about his alleged discovery, and report. They have done so; they waited on Mr. Hill, at his residence, on the 13th inst., and stated their business, and the result is, that they conclude their report to the Association in the following language:—"Mr. Hill has deluded himself, thoroughly and completely—the origin of the discovery was a delusion, and the only thought about it, in which there can be no delusion, is for every one to abandon faith in Mr. Hill's abilities to produce natural colors in daguerreotypes—the whole history of which has been a delusion."

Well now, this appears to be pretty hard for poor Mr. Hill; but, if he is not deluded, he can easily open the eyes of a wonder-waiting world by producing the pictures. It is really too bad; but this will not end delusions while Dr. Roback lives.

Improvement in Railroads.

"Under this head we published a description of a new invention, which has been copied and criticised in the Scientific American. The criticism shows a complete misunderstanding of the principle of the invention, and supposing a want of clearness on our part, we will repeat it briefly. Two parallel lines of rails three feet apart, and elevated from two to six feet above the ground, are maintained by appropriate contrivances against the sides of wooden posts, in such a manner as to leave the space free above, under, and between them. Cars and a locomotive of a light frame being placed upon the rails, each car is then firmly united by braces and stays with beams running cross-way under it, one under each extremity. These beams are lower than the rail, and long enough to have their extremities under them; to these extremities are attached artificial magnets—or, if it will make it any clearer, natural loadstones—which by their tendency toward the rails above, will counterbalance as large a part of the weight of the cars as the constructor thinks desirable, the remainder of the weight being left to act on the wheels. In this way a locomotive of small power, and consequently light, will prove sufficient to draw the train with great velocity."—[N. Y. Tribune.

[We must say to our worthy cotemporary, that we perfectly understand the principle of the invention spoken of; there was no misunderstanding of the subject. We will quote from the other article referred to above, to show that the explanation of the invention makes it quite a different invention.

"At the two extremities of each car, and in the middle, at a sufficient distance from the wheels, are attached powerful magnets, made of an immense number of reels of wire, wound round pieces of soft iron, the poles placed directly below the rails, and as near them as practicable. The effect is easily understood. As soon as the wires are united to a pile to form a circuit, the magnets exercise a powerful attraction on the rail; but this being immovable, the magnet itself obeys the attraction, and the car attached following, the slight pressure which it still exercises on its wheels is just equal to its weight, minus the attractive power of the magnets."

Now, in the one case, he says artificial magnets and natural loadstones are used, and in the other electro-magnets. There is not the least similarity between the two: the electro-magnet requires a battery on board the car,—the natural loadstone does not. Neither of the two magnets could effect the object at all, and, besides, could the inventor operate it, (which he cannot) it would do the very thing which is desirable to be obviated. The magnet cannot act upon the rail until the rail is also magnetised, and the power of a magnet diminishes according to the square of the distance. The effect of the magnet would also be as strong upon the wheels as the rails, and it would be different from the principles of the magnets were they to be drawn to the rails; the attraction at best, too, would be lateral, not vertical. We are not surprised at the proposition of such an invention, for it requires a great deal of knowledge to know what principles of science are applicable to mechanism.

Mournful Accident.

On the afternoon of Thursday last week, no less than forty-three children were killed in one of our Ward Schools. The cause of the accident was a panic occasioned by one of the teachers being struck with paralysis, and an alarm of fire being raised, which caused the children to rush out to the stairs, and crowding one another over, broke down a railing whereby, they were precipitated down below upon the flags like grain through a hopper, until they lay upon one another, heaped and pent, in the struggles of death. The severity of the accident can well be imagined by the great number of little ones who lost their lives—nearly all of whom were suffocated. It was a terrible and heart-rending scene, and has thrown many happy families into the deepest grief. Only for the determination of Mr. McNally, the Principal of the Male Department, the loss of life would have been far greater. He put his back to the door and kept it shut against some larger scholars, who, had they got out, would have dashed all the smaller ones before them. About forty, also, were more or less injured. The stairs appear to have been badly constructed for ready exit from the school. We also condemn the practice of having such large schools. No less than 1300 scholars were attached to this school. In all large schools some of the smaller children are getting hurt all the time, by large scholars. Our country has a very unenviable name among the nations of the earth for murderous accidents. There are more execrable buildings erected around and in the city of New York, than in all the world beside. Many architects, masons, and carpenters, appear to care only about shamming the work out of their hands; there does not appear to be real sterling honesty in their dealing, nor a pride of producing good work, only quantity—quantity. The railing of the school stairs was weak and easily broken down; it was just like the great majority of all our buildings; there is always some miserable and inefficient piece of work left to mark the careless constructor.

Great blame is attached to the firemen for increasing the excitement of the children by their shouting and want of management. We have reason to believe this is correct, from the evidence of eyewitnesses, and some who escaped, as it were, by a miracle.

In connection with the above, we are sorry to add that a fatal accident took place last Monday, by the falling of the walls of a brewery adjoining the Blacksmith Shop of Messrs. Hoe & Co.'s establishment in Sherriff street. The number of persons killed was two, and two wounded. Everybody is to blame for this.

To Inventors.

Inventors who are interested in knowing where they can find agents competent to do their business with the Patent Office Bureau, are reminded that we continue to transact it with our former success and dispatch. We refer to Thomas H. Dodge, Adam Lemmer, S. Curtis, James Hardie, Norris & Flanders, Hale R. Rose, Vine B. Starr, Frederick Fitzgerald, John Ryer, and Silas C. Herring,—whose names appear in this week's list of patents, and to others with whom we have done business.