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so much indebted as chemistry, and there is great deal of the carbonate of lime (chalk) in by the great mass of mankind. Although Creek, the hardest wrought manufacturing chemistry is a lofty science, demanding the stream, we suppose, in the State of New York. highest range of intellect and industry to investigate and explore, it is also a very humble render water hard, but, excepting after freshscience; and there are none so lowly or limitets, these are not found in any considerable ted in mental grasp, who may not acquire a quantities in streams. A few years ago it was great deal of useful and profitable information discovered by Dr. Clark, that (like oil used by its study. It enters into the operations of for removing oil in a soap) lime removed lime tham—the city for all such wonders; but then the kitchen, and there is no one who boils a pot or a pan but would do so in a superior 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 metalnamed 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 of the phosphate of lime. This material the for chemical investigation; and although we growing wheat extracts from the soil; withmight have chosen a higher text, we could not out its presence in sufficient abundance in the have selected a more suitable one for the object we have in view. But chemistry does flourishes poorly, the ear is ill-filled, and the not stop with its investigations at the soap; it, produce of grain scanty. The bones of anigoes further. It is well known that soap will 'mals contain this phosphate of lime; but cheremove grease and dirt freely when used with mistry established the fact that certain stones rain and what is termed "soft water," but and rocky masses, which occur in various 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 composes the soap, and separates the two sub- | to many of our readers, so as to point a moral makes it quite a different invention. stances of which it is composed, and not until rather than adorn a tale. there is soap enough dissolved in that water grease in clothes.

vered 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, ren- their loss and sorrow. dering them very unfit for washing, causing soap-maker, is carbonate of lime (chalk). always rewards every student of it.

Hard waters, although held by many to be Frientific American pleasing to drink, yet they are very expensive There is no science to which the public is $\frac{1}{2}$ through chalk and lime formations, contain a Iron and alumina (in the form of clay) also 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 know-

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 earth through which its roots spread, the plant 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 elabo-

The Hillotype.

Our readers will remember that we have to those cities, and many kinds of public works twice alluded to an invention in the Daguerrewhich are supplied by them. The waters otype Art, by a Mr. Hill, in this State, who, least similarity between the two: the electrowhich supply the city of London, it is assert- either himself, or his friends for him, claimed ed, deliver every day twenty-eight tons of to have made the discovery of forming his dalime to its inhabitants. Streams which flow guerreotypes with all the natural colors of wood and wild. A beautiful landscape of Mr. Hill's residence was said to have been done, none respecting which so little is understood their waters; this is the case with the Saquoit 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 Gofrom hard water, and rendered it soft. All Mr. Hill stated that there was always some waters impregnated with lime absorb carbo- little bit yet to be discovered, some perfective manner by a knowledge of it. It enters the nic acid from the atmosphere; limestone is touch to be given to one color, and that color was laundry, and should preside at the wash tub, the carbonate of lime, and by burning it in a 'yellow; he never could color a yellow. Prof. kiln, the carbonic acid is driven off, and we Morse, we believe, wrote a letter about this have quicklime, or oxide of calcium; this great discovery, its value, and its reality; but quicklime-decarbonized limestone-when after all, it is asserted by the daguerreotype stirred into water containing carbonate of lime, 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, pent in the struggles of death. The severity in which there can be no delusion, is for every of the accident can well be imagined by the one to abandon faith in Mr. Hill's abilities to great number of little ones who lost their lives produce natural colors in daguerreotypes—the whole history of which has been a delusion."

Dr. Roback lives.

standing of the principle of the invention, and ing such large schools. No less than 1300 ning cross-way under it, one under each ex tremity. These beams are lower than the counterbalance as large a part of the weight of left to mark the careless constructor. the cars as the constructor thinks desirable, velocity."—|N. Y. Tribune.

[We must say to our worthy cotemporary, that we perfectly understand the principle of toadd that a fatal accident took place last the invention spoken of; there was no misun- Monday, by the falling of the walls of a brewderstanding of the subject. We will quote eryadjoining the Blacksmith Shop of Messis. "hard," so beautiful and pelucid, is not pure. rate into a volume, but we trust we have said from the other article referred to above, to Hoe & Co.'s establishment in Sherriff street. It contains, unseen, chemical matter which de- enough upon it at present to present its claims show that the explanation of the invention The number of persons killed was two, and

"At the two extremities of each car, and in this. And, to conclude this article, we do certify the middle, at a sufficient distance from the to satisfy the hard claims of matter in the that, within a week from this date, we wheels, are attached powerful magnets, made water, will the soap be allowed to act upon the were shown a patent, granted for a chemical of an immense number of reels of wire, wound composition, and for which the assignees paid round pieces of soft iron, the poles placed di-Chemistry is a science altogether of experi- \$8,000 for the State of New York alone, which rectly below the rails, and as near them as their business with the Patent Office Bureau, ment,—no one can tell how two newly disco- had they been as well versed in qualitative practicable. The effect is easily understood. are reminded that we continue to transact it chemistry as the writer of this, they would not As soon as the wires are united to a pile to with our former success and dispatch. We have paid eight cents for, as the composition form a circuit, the magnets exercise a power- refer to Thomas H. Dodge, Adam Lemmer, S. is worse than useless for the purposes intend- ful attraction on the rail; but this being imed, and this the assignees have truly telt to movable, the magnet itself obeys the attraction, and the car attached following, the slight John Ryer, and Silas C. Herring,-whose The study of chemistry, like any other pressure which it still exercises on its wheels inames appear in this week's list of patents, great expense to the dyer, calico printer, and branch of natural philosophy, is one which is just equal to its weight, minus the attrac- and to others with whom we have done busitive 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 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 -nearly all of whom were suffocated. It was a terrible and heart-rending scene, and has Well now, this appears to be pretty hard for thrown many happy families into the deepest poor Mr. Hill; but, if he is not deluded, he grief. Only for the determination of Mr. Mccan easily open the eyes of a wonder-waiting Nally, the Principal of the Male Department, world by producing the pictures. It is really the loss of life would have been far greater. too bad; but this will not end delusions while He put his back to the door and kept it shut against some larger scholars, who, had they got

"Under this head we published a description | before them. About forty, also, were more or of a new invention, which has been copied less injured. The stairs appear to have been and criticised in the Scientific American. badly constructed for ready exit from the The criticism shows a complete misunder- school. We also condemn the practice of havsupposing a want of clearness on our part, we scholars were attached to this school. In all will repeat it briefly. Two parallel lines of large schools some of the smaller children are rails three feet apart, and elevated from two 'getting hurt all the time, by large scholars. to six feet above the ground, are maintained Our country has a very unenviable name by appropriate contrivances against the sides among the nations of the earth for murderous of wooden posts, in such a manner as to leave accidents. There are more execrable buildthe space free above, under, and between them. ings erected around and in the city of New Cars and a locomotive of a light frame being York, than in all the world beside. Many arplaced upon the rails, each car is then firmly chitects, masons, and carpenters, appear to care united by braces and stays with beams run-ionly about shamming the work out of their hands; there does not appear to be real sterling honesty in their dealing, nor a pride of rail, and long enough to have their extremi- producing good work, only quantity—quantity. ties under them; to these extremities are at- The railing of the school stairs was weak and tached artificial magnets—or, if it will make easily broken down; it was just like the great it any clearer, natural loadstones—which by majority of all our buildings; there is always their tendency toward the rails above, will some miserable and inefficient piece of work

Great blame is attached to the firemen for the remainder of the weight being left to act increasing the excitement of the children by on the wheels. In this way a locomotive of their shouting and want of management. We small power, and consequently light, will have reason to believe this is correct, from the prove sufficient to draw the train with great evidence of eyewitnesses, and some who escaped, as it were, by a miracle.

In connection with the above, we are sorry two wounded. Everybody is to blame for

> To Inventors.

Inventors who are interested in knowing where they can find agents competent to do Curtis, James Hardie, Norris & Flanders, Hale R. Rose, Vine B. Starr, Frederick Fitzgerald,