

## Scientific American

NEW-YORK, JULY 10, 1852.

## Iron Structures.

Widely extended as the uses and application of iron has become within a few years, we must say that its superiority as a material for buildings does not yet seem to be publicly appreciated. A few iron buildings in this city, some in Baltimore, Philadelphia, and other places, have been erected, but when we take into consideration the advantages, beauty, and durability of such structures, we are not a little surprised that so few of them have been erected in our country. That so few iron structures have been erected in New York city, says but little for public sagacity, and is not a little mortifying to that progressive, pushing, utilitarian fame of which New Yorkers seem to be so proud. There is no city in the world where so many buildings are constantly being erected as in New York. There is a continual tearing down and building up going on from March until December, every year. On every hand in every street, are to be seen pile upon pile of mortar, stone, and brick. The number of houses undergoing renovation every day, reminds one of a field previous to a battle, when from each busy camp there comes the hurried sound of armors driving rivets up. Strangers visiting our city every few years say, "well, you are building a new city here all the time;" it is really so. We presume that, owing to obstructions in our streets, caused by pulling down old buildings, and putting up new ones, the dust, dirt, and trouble connected therewith, costs the public a tax of some millions every year. The tax is not levied by law, but it is not the less certainly exacted for all that. Let any citizen imagine the benefits that would be conferred upon the public by substituting cast-iron buildings for those of brick. The piles of brick and mortar, and the clouds of dust, which now obstruct our streets, and cause such general annoyance, would all disappear. Here, as at present, where there has been accumulating for days and perhaps weeks, a mountain of materials blocking up the street and annoying everybody, all would be clear, and the pathway unobstructed. There would appear the space for the building, and all clean and quiet around it on Monday morning. In a few minutes some carts would arrive with beautiful cast-iron blocks, and a few men with derrick, block, and tackle would be seen quietly hoisting these blocks and fitting them into their places, and perhaps by evening—in a few days at most—a building which will endure for ages, will be seen standing erect, in dignity and beauty, where at morn there was nothing but an empty space. This can be done,—this has been done; and we should like to see it done oftener. There would be no falling of walls, either, owing to miserable mortar; nor would there be any fears for the freezing of cement. It would be well for every city and village in our country, if there were less danger from fires, consequently if there were more buildings erected of fire-proof materials, there would be fewer fires. The fire engines and the fire departments of cities and villages, are exceedingly burdensome systems of taxation. It is also well known that the conduct of many firemen is very disreputable, and exceedingly dangerous to young men. During the past week a fearful riot took place among the firemen of Williamsburgh (the scene was more like an engagement of contending fiends than human beings), and another riot of a like nature in Brooklyn. More iron buildings would be the means of preventing fires, and if cheap rural cast-iron cottages could be erected in our villages, there would be fewer fears of fire raising, less to pay for insurance, and less for fire companies. The public could afford to pay good high prices for iron structures at first, for they are the cheapest in the end. All the cast-iron buildings which have been constructed in our country, have been erected by the inventor, Mr. Bogardus, of this city, whose taste and constructive skill are of the very highest order. We hope that more attention will be devoted to the utility of cast-iron structures by the men of capital in our city.

## What is Man?

Much as is known of anatomy and the organic structures of creation, the most learned physiologist is exceedingly ignorant of the primary organism of man. Throughout creation there prevails a common structure of recognized organization—the element of which is denominated "the simple cell." Here nature remains still wrapped in mystery, and we believe will ever remain so. The cell of one organism appears exactly like another, but as the cell develops itself, how different are the final productions—that of man and the inferior animals. Yet all follow after their kind, and there is no variation. Every seed bringeth forth after its kind, and so do all the races of animated nature. The great Creator who impressed the simple cell with a property for the production of a man, can surely impress upon man the property of that development which will enable him to live forever as a glorified being. No man can detect in the human machine, by its construction, that it is made to run for only 70 years, but it moves by a command or law over which it has no control creatively, and then ceases to move by the same fiat. Why this should be, no one can tell; we know it is so, and that is all, and we have no more reason to suppose that this is the final state of man, than a simple organic cell, would have to suppose it was its final state. So uniform is the simple cell in its structure, the microscope cannot detect the least variation wherever examined; everywhere is to be seen the same wonderful identity, from the humblest plant to the highest state of animal organization, but when it develops itself and becomes humanity, we behold an intelligent being, shaping out, as it were, a destiny for himself, which endureth beyond mere physical organizations and results—which affects his own and future generations. How fearfully and wonderfully made is man; how often he resembles an angel,—how often a demon. With a lofty intellect he counts the stars, measures their distances from one another, and even weigheth them in his balance, and yet at one time he could not be distinguished from the cell of a plant. Man is endowed with great wisdom, and yet how often is he to be seen more degraded and less wise than the brutes which perish. Although he can send his thoughts thousands of miles distant in a few minutes, he is continually reminded of his humble origin—that from dust he came and to dust he must return, until the final resurrection, when the nature of all things shall be changed—when mortality shall be swallowed up of life.

## The Art of Bleaching Cotton.

Snowy linen and cotton are beautiful articles of apparel, but their whiteness is the result of art. Linen is of a dirty yellow appearance in its raw state, and although cotton is whiter, still, as compared with the bleached fabric, it is a dingy color indeed. In connection with cotton in its natural state, there exists substances which have a tendency to operate along with certain atmospheric influences, and aid in the decomposition of cotton cloth. One of these is an earthy salt, taken up from the soil with the fibre, the other is mucilaginous matter. The object of the bleacher is to get rid of these. The original method by which the separation of these matters from the cloth fibre took place, was such as to give rise to the opinion that the process interfered very much with the quality of the cloth. The process was at first rude. It was the custom to subject the woven fabric to the action of some alkaline lye, or some acidulated element. Lemon juice was very extensively employed. In England, which was the last country in Europe to take up the question of the cotton trade, and to devote its attention to the manufacture of that article, the practice was this:—The persons engaged in bleaching a piece of woven cloth composed of vegetable substances, burnt some wood to ashes till they got the usual result of a white, powder ash. This was suspended in a coarse cloth, tied at the ends, something in the form of a hammock; and water being poured upon the surface, it took up a substance now known by the name of potash. This was carried through by the water, and deposited beneath; the goods were then subjected to the action of this substance for different periods, varying

from three to four days to as many weeks. They were then spread upon the grass, where they were allowed to remain for some weeks. Being again taken in, they were submitted to the action of the alkaline lye, and afterwards, if any appearance of color remained, to sour milk; then to the fields again, and again, perhaps, to the ash lye, till at length they managed to get a piece of goods white. Thus the cloth was half worn out before it came to be made up for use, and it was no wonder if a shirt of such material did not last so long as one formed from cotton, which had undergone no such destructive process. People were quite right, therefore, in giving the preference to unbleached calico, once, and they are yet, where the bleaching is not well understood. The practical-bleacher, of the present day, is a practical chemist, and knows exactly what materials to employ, and in what proportions to take up the substances he desires to remove from the cloth. Calico is now more durable after bleaching than it would be without it.

The reform accomplished in the art of bleaching was made by the discovery of chlorine as a bleaching agent. Before its application to bleaching, it took upon six months, amid sunshine, rain, and wind, to bleach a linen handkerchief; now this feat can be accomplished in a few hours, and at most a few days. The properties of chlorine, as a bleaching agent were first discovered by a Swedish philosopher, from the effects produced upon the cork of a phial containing muriatic acid. It was first employed in France. The first bleach-works in Britain were established near Glasgow, by Mr. Macgregor, the father-in-law of James Watt, who, having heard of the discovery of chlorine from a learned correspondent in Paris, at once communicated it to his relative, by whom it was turned to good account.

The art of bleaching has been the means of bringing millions upon millions of wealth into the lap of Great Britain and it may well be said, when we take Watt's great improvements of the steam engine into consideration, that he has done more for the mechanic and practical chemical arts of that country, and perhaps the world, than any other man.

Without bleaching, it would not be possible to apply so many beautiful colors to the surface of cotton cloth, as are now applied. Unless the ground of the cloth were clear, the colors would be dull and indistinct, and many would not take hold of the fibre of the cloth at all. The mucilage, for instance, would prevent the introduction of mordants, without which it is impossible to get a fast color. The art of bleaching consists, at present, in first boiling green cotton goods, as they are called, in lime water, in large keers, for some hours, then washing and afterwards steeping them in chlorine liquors for some hours, then washing and steeping them in a weak sulphuric acid liquor; and repeating these two latter processes until the goods are perfectly white, when they are thoroughly washed and then finished. The chlorine used is obtained by stirring some of the chlorate of lime in cold water, in hogsheads, and using the clear. The chlorate of lime was the discovery of Charles Tennant, in Glasgow, and a great deal of the chlorate of lime used in America is made at Tennant's works. When the art of bleaching by chlorine was, and by whom introduced into our country, we cannot tell.

The Scotch are the most famous for bleaching in Europe. At one time Holland was the most distinguished country for bleaching, and the finer qualities of linen made in Scotland and Ireland used to be sent to Holland to be bleached. An Irish bleacher who learned the art in Holland, introduced it into Scotland, but then it required a whole summer to bleach a fine sheet. The first bleach-fields were erected on small clear streams; the cloth was first steeped in cow's urine—which was the only alkali then in use by cottars—it was then washed in a tub, a woman tramping it with her feet, and changing the water till it came off pretty clear. It was then beat on a stone, and spread out on the grass for some days, where it was well watered. These operations were repeated till the color pleased the owner.

When we look back and see what progress was made in this art in a century, we have reason to feel grateful. There are plenty of

bleached goods of a very tender character, owing to their not being well washed. It is positively necessary that all the lime should be removed from the cloth: this cannot be unless enough of sulphuric acid is employed to render the lime a sulphate, when it can be easily removed by washing—it will flow off in fine solid particles. It would be well if bleachers would finish their last washing of bleached goods before drying, in clear water of at least 160° Fah. The warm water would remove every particle of acid, and would drive off all the chlorine if any were left in the cloth. This practice would involve more expense to our bleachers, but it would be a good plan for the wearers of the cloth.

## Independence Day.

Last Sabbath was the 75th anniversary of the day on which the Declaration of American Independence was adopted and signed. The day was kept in a more becoming manner than if it fell upon any other day, still our people wish to shoot and make considerable noise on such occasions, consequently Monday was the day which was observed as Independence Day.

When we take into consideration that free institutions cannot exist but among a virtuous population, we should be very careful, as a people, to inculcate virtuous deeds, and nurture the rising generation in sound morality. Freedom consists in obedience to good laws, and of the protection of all in their just rights. In our cities and villages the rising generation seems to be growing up without virtuous restraint, and with great contempt for good and wholesome law. We must depend upon our rural population to counteract this evil tendency—to be a good leaven, or we may bid farewell to the blessings conferred upon our country by the Revolution. We consider that those men who never tell the people of their faults, in the fine Orations made on the Fourth of July, do not do their duty to their God, their fellow men, and their country.

## New Light House.

A lighthouse has been erected on the Romer Shoal, which is about two miles east of Sandy Hook, and directly in the entrance of the harbor of New York. The engineer was J. W. P. Lewis. It is built in water 13 feet deep; it is 20 feet in base diameter, of an octagon form, and is 50 feet high. The principle of its construction consists in screwing into the sand of the shoal, at each angle of the octagon and in the centre, one of Mitchell's screw-piles; the blade of each screw being two feet in diameter, and entering the sand to a depth of ten feet; attached to the screw are nine wrought-iron shafts or piles, each 6 inches in diameter, and 32½ feet in length, extending to a height of 8½ feet above high-water mark; on the top of these piles heavy cast-iron sockets are keyed, to which are attached also by keys the cast-iron shafts, which, rising from the pile-heads, and uniting in a centre-frame at the tops, form the supporting braces for the basket frame, or distinctive mark of the Beacon, which is secured to a prolongation of the centre pile, at a height from the level of the sand of 63 feet. The whole of the piles and shafts are securely braced, and counter-braced by wrought-iron tie-rods, keyed to the sockets, rings, or pile heads, forming altogether one of the most efficient systems ever erected for such a purpose. The whole weight of the structure is but 75 tons, and it cost the Government but \$10,000. Whereas, a stone structure would not cost less than \$35,000, at the least estimate—that being the cost of a stone beacon on the same shoal, and but 40 feet in height.

The screw piles is the invention of an Irish engineer, Mr. Mitchell, of Belfast, we believe. It was patented in England some years ago, but found no great public favor for some years, and he did not receive remuneration for the value of his invention before his patent expired. It was renewed to him upon mature consideration of its great importance. A great number of lighthouses or beacons are built upon his piles, in Britain.

## Henry Clay.

This great statesman died in the city of Washington on the 29th ult. He was called the Model Senator. He died of old age—the tide of life ebbed slowly and gently away.