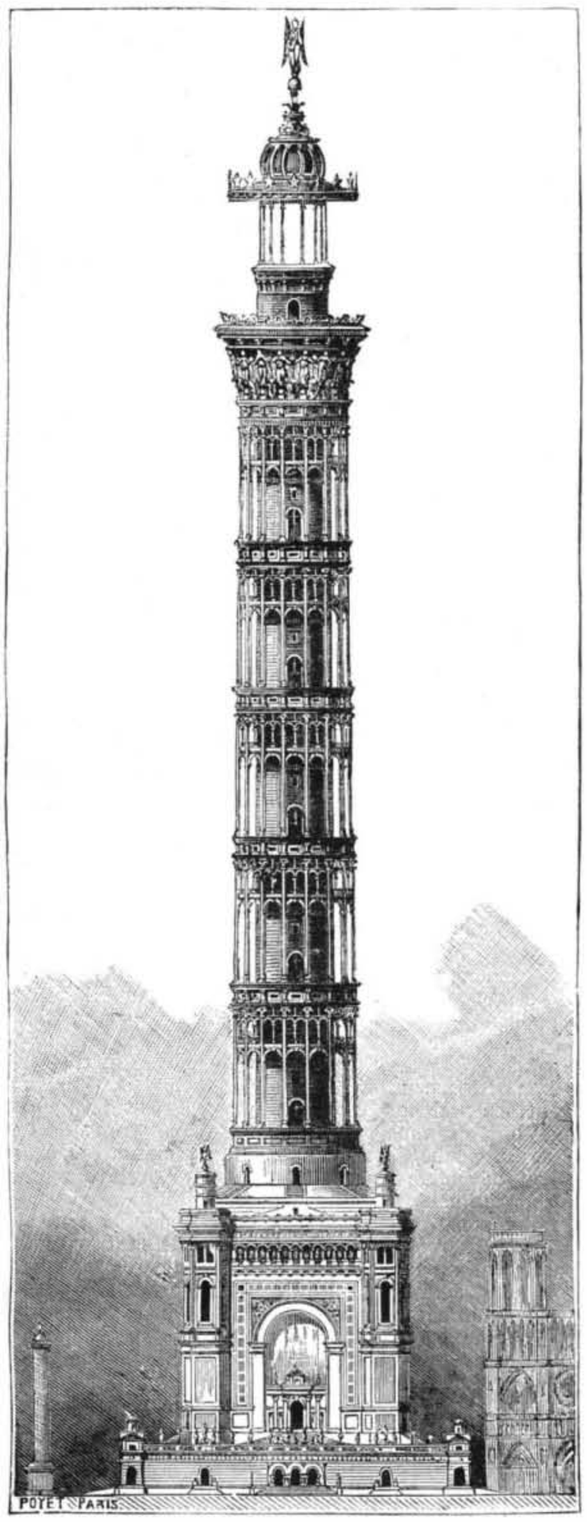
THE "SUN" COLUMN, DESIGNED FOR LIGHTING ENTIRE PARIS.

Mr. J. Bourdais has just presented to the Society of Civil Engineers a project that he has been studying, and that concerns the erection of a masonry tower 300 meters (984 feet) in height.

After an examination of the different geometric profiles realizable, Mr. Bourdais has adopted the column as being more apt than any other form to satisfy the rules of æsthetics, and also as being the most stable. In fact, the highest chimney in the world, that of Saint Rollox near Glasgow, 433 feet in height, has been submitted to numerous storms without suffering therefrom, and, as other chimneys exposed to great wind pressure have never given rise to any accident, it results that a cylindrical form is the one that should be adopted.

In short, Mr. Bourdais' structure would consist of a base 216 feet in height, in which would be established a



PROPOSED ARTIFICIAL SUN FOR PARIS.

permanent museum of electricity. Above this would rise a six story column surmounted by a roof forming a promenade and capable of accommodating 2.000 persons. The central granite core, 60 feet in diameter, would be surrounded with an ornamental framework of iron faced with copper. Ths would be divided into six stories, each containing 16 rooms, 16 feet in height and 50 feet square, designed for aerotherapic treatments. Patients could come here to find a purity of air that is usually met with only on mountains.

The central core would be hollow, so as to permit of all sorts of scientific experiments being tried. Finally, at the summit would be placed an enormous electric lamp, studied by Messrs. Bourdais and Sebillot, that would cast a flood of light over the entire city. This lamp would have an intensity equal to that of two million Carcel burners. The lamp would be surmounted by a statue representing the genius of science. This would make the entire structure 1,180 feet high. We are indebted to *Le Genie Civil* for the accompanying illustration.

A CHEAP BATTERY.

It frequently happens that people living in the country, and far removed from our electrical supply stores, are desirous of having in their possession for experimental or practical use an electric battery, and are discouraged from attempting to secure one by ignorance of proper parties to apply to or the difficulty of transportation. To such as these, and to those who are of an inventive turn of mind, or are fond of "tinkering," perhaps a few hints as to how to make a battery will not be amiss. The cheapness of the form of battery described is also one of its chief virtues, for the cost of the materials required is almost nothing, and the time required for putting together the different parts very little.

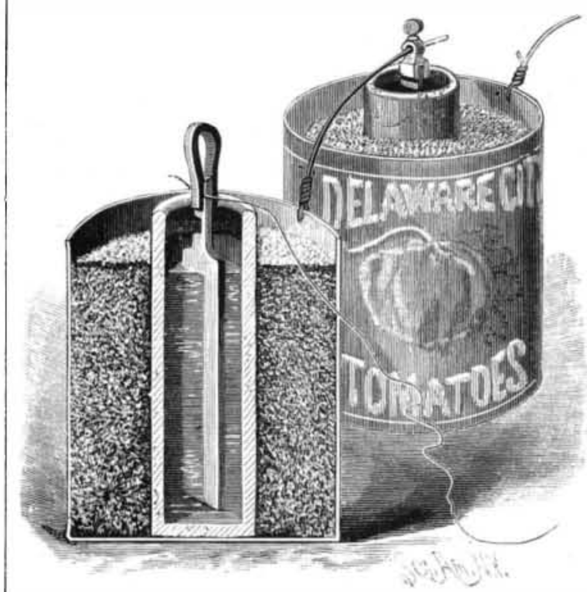
The first step is to secure a strong tin can. The proper article can be purchased at any hardware store, or even this is not necessary, for an ordinary large sized vegetable tin will do. The former is the better, as the joints are better clamped, and less solder is required. If much solder is used in the joints, it will be necessary to coat it with melted pitch while the tin is warm, as the chemical is apt to eat away the solder. Of course the tin cans are used as the outer cells of the battery, and should therefore be as nearly of a size as possible. It is important to secure cans that are well tinned and free from rust and pin holes. The next most important thing is the inner cell. This consists of an ordinary earthenware pot, made commonly of red clay, like a flower pot, and as such cells are made of all sizes by potters, there is little difficulty in obtaining them. These pots are highly porous, as is well known, but before they are suitable for service as cells it is necessary that they should be rendered non-porous in the upper part for about one-third of their height, for a reason that will be seen later. This is accomplished by dipping the pot at different intervals into a bowl containing melted paraffin wax. The wax fills into the rough surface of the clay, and very soon renders it impervious. The space between the two cells is to be filled with iron borings, which may be secured from the lathe of a metal turner, or, if this is not at hand, iron scraps would serve, such as iron wire, old nails, etc., or even old pieces of tin ware thoroughly cut up. Care should be taken, however, that no pieces of copper or brass ware or galvanized wire are mixed in with the borings.

The inner cell is to be filled with the chemical, which should be caustic potash in solution or caustic soda. The former is preferable. The active properties of these alkalies are well known, and they should be kept as far as possible in crockery or glazed vessels, as they will devour cork, tin, zinc, and animal tissue. Every precaution must be taken to prevent the liquid from coming in contact with the skin, as it eats the flesh and causes grievous wounds. This destructive feature of the alkali is the very quality, however, which is active in the production of the electric current. As has been said, zinc is voraciously attacked by the chemical, and it is therefore this element which is employed in this battery for the purpose of generation. A thick plate of zinc should be procured; roofing zinc will do, or if this is not to be procured, rods of zinc, not too thin, however, as the metal soon begins to dissolve in the solution, absorbing the oxygen from the alkali and liberating hydrogen, thus forming an oxide of zinc.

A thin tang of the plate should be formed to extend up through the covering of the cell, which latter is next to be considered. The object of the covering is to prevent the carbonic acid of the air from reaching the solution and to keep the caustic salt from creeping out. This covering is an important feature, and is made very simply out of a cork or wooden stopper, turned to the proper size to fit the earthen cell, and with a hole in the center for the admission of the tang of the zinc plate. The bung must be thoroughly soaked in paraffine or pitch, and must be sealed with the zinc element in the cell after it has been filled with the caustic alkali. Care should be taken, in filling the battery with this solution, to have the liquid rise considerably above the line of paraffine on the walls of the cell. To render the cell more completely air tight, a rubber band is sometimes used in connection with the wooden bung, this being covered over with the paraffine or pitch after the bung is inserted.

Now, all is ready for connecting the batteries. The cell has already been placed inside the tin can and the borings packed around it, and it is only necessary to join a copper wire to the tang of the zinc or connect it by a simple spring clip, as shown in the engraving, and connect it with the tin of the next battery, the outer cell of each being connected with the inner cell of the next battery.

Owing to the porosity of the clay cell, the borings will very soon become moistened with the alkali; and as neither the iron nor the tin will rust, owing to the

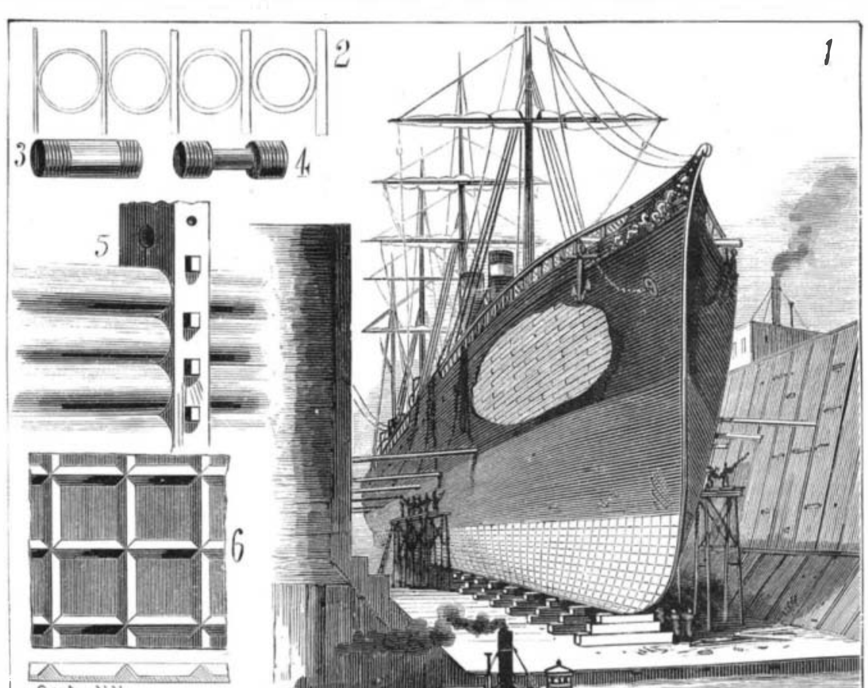


A CHEAP BATTERY.

presence of the alkali, this part of the battery will last for a long time. The zinc will be the first to show signs of decay, and this may need an early renewal, according to amount of work required to be done by the battery. This amount of work also determines the number of batteries that may be required. This battery was invented by Mr. Bennett, of England, and he estimates the cost of its construction at 6d., which estimate, doubling the expense of everything in this country, would bring the cost of each battery to less than 25 cents apiece. These batteries may be found of service in running experimental electric lights and small electric engines.

IMPROVED CONSTRUCTION OF VESSELS.

The object of the invention herewith illustrated is to construct the hull of a vessel of a stronger and more buoyant form than heretofore made, with the same amount of material. The hull is built up of a series of steel tubes, placed side by side and extending transversely the thickness of the vessel, with skins interposed between the tubes and secured to the outer and inner tubes, as shown in Fig. 2. While the tubes remain of the same diameter, the thickness of the steel increases toward the interior of the vessel, thus making the hull thicker and stronger on the inside; the intervening skins or plates also vary in thickness. The lengths of the tube section are comparatively small, and they are joined together at measured intervals by plugs, each length thus forming a watertight compartment. The plugs may be solid or hollow; Figs. 3 and 4 show two forms. The cylindrical ones are employed to join two tubes where no ribs are used between them, while those formed with cylindrical heads are used to join the superimposed tubes at their junction with a rib, Fig. 5, the plugs



ESHELMAN'S IMPROVED METHOD OF CONSTRUCTING VESSELS.

passing through holes in the ribs. The tubes and rib are flush with each other, and skins or plates are secured to the outer and inner faces of the tubes and ribs. The keel, keelson, and false keel, before being laid, are made hollow and plugged at certain intervals, and the stern post is similarly constructed to insure greater buoyancy. The knees, beams, and curlings are hollow tubes plugged at points. The decks and transoms for the hatchways are built of tubes in the same manner as the sides of the vessel, and are provided with wooden coverings. The steel skins and tubes connecting with the keel, commencing with the garboard streak, are made much heavier proportionately than the upper sides of the vessel, this serving the main purpose of strengthening and adding to the weight of the vessel near its bottom, so that it will always float keel downward. The vessel may be formed with a water bottom, conforming in shape with the bottom of the hull, and provided with longitudinal and cross ribs (Fig. 6) upon its outer face, thereby forming rectangular water spaces. The cradle strengthens the bottom by forming a covering, and also adds to its weight.

Further particulars can be obtained by addressing the inventor, Mr. John L Eshelman, care Mr. G. W. Cook, Superintendent D. & R. G. R.R., Leadville, Col.

The Buffalo Gnat.

For many years past, says Prof. C. V. Riley in a recent report, one of the greatest pests the stock raiser of the South and West has had to contend with has been the so-called "buffalo gnat." This insect is a small fly, closely related to the well known "black fly" of the Northwestern woods. At certain seasons it swarms in immense numbers, and by its poisonous bite, multiplied a thousand-fold, causes great destruction among sheep, hogs, poultry, cattle, horses, and mules.

JERSEY COW MOLLIE GARFIELD.

As the years go by, the value of pedigree of the dairy cow grows less and less, and in proportion the test at the churn gains in importance. Many once famous and high-priced families of Jerseys are becoming unknown, and the cows, and the families of the cows, that make from fourteen pounds of butter per week and upward, are those that command attention. We show this week, on this page, the Jersey cow Mollie Garfield, 12,172, the property of F. S. Peer, Mt. Morris, New York. While she traces back to John Le Bas 398 and Pilot Boy 3, she performs, at the milk pail and churn, in a way to entitle her to be placed amid the good butter producers.

In 1881, for the month of July, she made an aggregate of eighty-two pounds of butter, and again in 1882, during the month of August, she made eighty-one pounds, being an average of over two pounds ten ounces daily. She is somewhat over eight years old, of a dark fawn color, with a remarkable development of the milk veins, as will be seen by our very accurate cut, made from a photograph.

She has a daughter, Mollie Garfield 2d, 18,662, that made last summer sixteen pounds four ounces of butter per week, and another that made fifteen pounds seven ounces. While, as is well known, we have never catered to the Jersey boom, we believe that a judicious infusion of the Jersey blood into our dairy herds is advisable, now that bulls of this breed can be bought at reasonable prices.—*Rural New-Yorker.*

MOLLIE GARFIELD. (From a Photograph.)

TELEGRAPH wires have to be renewed every five or seven years. The Western Union Telegraph Co. exchange about one thousand tons of old wire for new every year. The new wire costs from seven cents to eight cents per pound, and for the old about one-eighth of a cent a pound is allowed.

Gray Hair.

Many persons begin to show gray hairs while they are yet in their twenties, and some while in their teens. This does not by any means argue a premature decay of the constitution. It is a purely a local phenomenon, and may co-exist with unusual bodily vigor. The celebrated author and traveler George Borrow turned quite gray before he was thirty, but was an extraordinary swimmer and athlete at sixty-five.

Many feeble persons, and others who have suffered extremely both mentally and physically do not blanch a hair until past middle life; while others, without assignable cause, lose their capillary coloring matter rapidly when about forty years of age.

Race has a marked influence. The traveler Dr. Orbigny says that in the many years he spent in South America he never saw a bald Indian, and scarcely ever a gray haired one. The negroes turn more slowly than the whites. Yet we know a negress of pure blood, about thirty-five years old, who is quite gray.

In this country, sex appears to make little difference. Men and women grow gray about the same period of life.

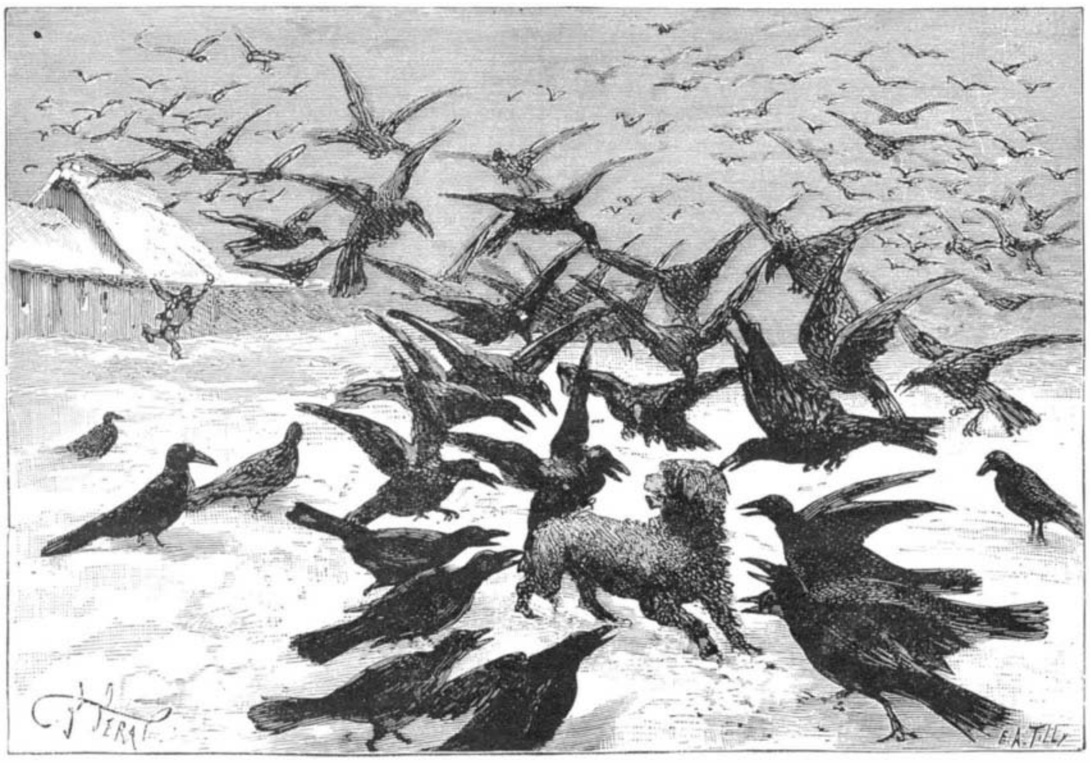
In men the hair and beard rarely change equally. The one is usually darker than the other for several years, but there seems no general rule as to which whitens first.

The spot where grayness begins differs with the individual. The philosopher Schopenhauer began to turn gray on the temples, and complacently framed a theory that this is an indication of vigorous mental activity.

The correlation of gray hair, as well as its causes, deserve more attentive study than they have received. Such a change is undoubtedly indicative of some deep-seated physiological process, but what this is we can only ascertain by a much wider series of observations than have yet been submitted to scientific analysis.—*Med. and Surg. Reporter.*

A FIGHT FOR LIFE.

The *Echo de la Frontiere*, a journal of the Department of the North, recently gave an account of a remarkable occurrence in that part of the country. It was to the effect that some ravens that were starving during the snowy weather of January had pounced upon a dog and devoured him. Wishing to assure ourselves of the truth of the statement, we wrote directly to the superintendent of the Saint Albert glassworks, who, at our request, kindly gave us some accurate data upon the subject. We reproduce a portion of his letter:



A FIGHT FOR LIFE.

My dog, which was a long-haired Scotch terrier, was playing with some other dogs in a field adjoining the works, when he was attacked by some ravens that were doubtless famished. He was about two hundred feet from the building when the workmen saw him surrounded by the birds. There were at least a hundred of the latter in the field, but only about thirty of them had attacked him. These at first surrounded him on every side, but soon divided into two bands. Some flew in front of the dog, others behind him, pushing him forward. Those in front of him rose to a height of about six feet and then swooped down upon him, and always struck him in the same place. The dog, which had at first tried to defend himself, endeavored to escape, but the ravens in front and behind prevented him, and kept continually lacerating him with their bills. They had put out one of his eyes, had made a deep wound in his neck, and would certainly have picked him to pieces upon the spot had not a boy of the establishment been sent to his relief by the workmen.

When the dog was picked up, the ravens, far from flying away, remained near the earth, rather aggressive than timorous. They remained for some time at the spot whence their prey had been taken, while the boy ran to the works with the poor old faithful dog, which had to be killed two days afterward, on account of his wounds.

This account gives a striking example of the terrible fight for life that all living beings are compelled to undertake against each other here below in order to exist. It also shows how much temerity and audacity the cruel necessities of hunger will sometimes inspire an animal with.

It will be seen that the way in which the dog was attacked may be cited in support of the raven's intelligence. These bands of assailants, separated into two camps of observation, in the midst of which some individual assaulted the victim, certainly obeyed an organized plan of attack.

Count Wodzicki, in his book named "The Alps," has, as a conscientious observer, described the habits of ravens, and he tell us that he has several times seen these birds devouring a hare that they had pursued, after charming it with their croakings and forcing it to hide in the ground.

As well known, ravens, which among birds play the same part that the fox does among mammals, sometimes eat barnyard fowls; but it had never been heard that they were capable of giving battle to a dog, even of quite small size. The fact has appeared to us of interest to put upon record. It shows that during winter, when the ground is covered with snow, these birds may prove dangerous. These audacious plunderers might perhaps, under other circumstances, attack a wounded child, just as they did the dog of the Aniche glassworks.—*La Nature.*

THE appearance of platinum may be given to copper by immersion in a bath composed of $1\frac{3}{4}$ pints hydrochloric acid, $7\frac{1}{2}$ oz. arsenic acid, and $1\frac{1}{4}$ oz. acetate of copper. The article must be cleaned before immersion, and left in the bath till it has the color of platinum.