It is needless to state that we opened the book above referred to with these feelings. We need not picture our dismay when nineteen monuments with funereal urns and five with broken pillars met our gaze; and there was the inevitable lamb. and the invariable angel in the usual uncomfortable position which it makes our bones ache to contemplate. There was not a design which seemed to us to offer any striking originality, save one, and that was a most incomprehensible combination of a ewer and basin perched on a slab. What connection existed in the designer's mind between those indispensable toilet utensils and the grave, we should much like to have explained. Some of the gravestones depicted are above average merit; but the stigma of conventionality is upon every one of them. The designers doubtless think they know the public demand, and aim to supply it in the best possible way; and the public taste and judgment perpetuates these trite conceptions, to the exclusion of the new and beautiful designs which an art knowledge, far more advanced than that which originally evolved the former, is capable of producing. We do not refer to lofty and magnificent monuments erected without regard to outlay, because such always are the work of the artist-sculptor and not of the gravestone maker, but to the humbler memorials which mark the thousands of graves in our cities of the dead. There is as abundant opportunity for the application of the principles of true taste and art feeling to these as to the more pretentious piles; and while we are making Nature transform our great cemeteries into beautiful parks and gardens, it would be well if we allowed art to produce forms which would harmonize, and not disagreeably contrast, with Nature's handiwork. Ancient mythology and the tombs and relics of the Old World abound in appropriate emblems which might find more place on the modern gravestones than they now do. What architect or artist will strike out in a new and original line of thought, and give us something better than the upright slab, pillar, or obelisk for marking the graves of the dead?

HELPING INVENTORS.

A co-operative movement, based on the English system first started at Rochdale, has been begun in Indiana and other western States. The organization is on the masonic plan, there being a "Grand Guild" and subordinate "Guilds," the latter of which have for their object apparently the promotion of co-operative enterprises of any legitimate character. Among other schemes, that of an inventors' union has been projected, whereby inventors are assisted in preparing their devices, a workshop is provided, and other encouragement afforded.

We are of course heartily in favor of any plan which tends to develop invention; but the inventors' union scheme is a very bad one, and it has been many times unsuccessfully tried. There never was and never can be a community of interest among inventors, except so far as all are interested, more than the average run of people, in general progress. The very nature of the inventor's work impels him to keep it out of public notice until it is completed, and his right in it secured to him. There are abundant circumstances under which it might be highly disadvantageous to an inventor's interest for his neighbor to gain a knowledge of his invention; and there are not many inventors who would risk making their models in a co-operative workshop, no matter to what pledges of secrecy other occupants of the room had been committed. Besides, this is not the kind of help our inventors want. In many cases of invention, not only is something originated but the implements for its production must also be contrived. It is impossible to foresee what particular means inventors will use to put their ideas in practical form; and it is useless to attempt to fit up a special shop for that purpose. The needs of inventors are, first, suggestions of devices required, and information of what others are doing or have done in the way of origination or improvement: in brief, ideas which will keep their minds in a channel which is likely to end in their conceiving some object on which to exercise their genius. Afterwards, after the patent is secured, and the inventor has perfected his device, then he sometimes needs assistance to aid in its introduction. Now the "Guilds" can furnish either class of help we have indicated, and do good; but we do not believe that they will ever earn much gratitude from inventors by fitting up a shop and requesting people to come in there and invent. They would find that good reading rooms—such as we have frequently advocated, and which have been successfully established in many places in accordance with our suggestions—will attract thinking people; and if an abundance of mechanical books and papers are provided, and discussion on new mechanical and industrial subjects encouraged, inventions will speedily follow. As regards assisting inventors in introducing their devices, there is no lack of opportunity; but the guild's part in securing the aid could hardly extend beyond bringing investors and inventors into communication. It is useless to attempt to organize an association which undertakes to push any or all the inventions of its members. Discrimination will be found necessary; and as a rule, it is about as easy to convince an inventor that his device is not of superior merit as it is to convince a mother that her baby is not handsome.

We are glad to hear of the existence of the guilds, and can commend their motive in endeavoring to help inventors. But we think that, after a little experience, they will agree with us that it is better for them to furnish means for obtaining ideas, and to leave the inventors to work out the projects based thereon after their own fashion.

LIGHTNING RODS.

A correspondent of the *Country Gentleman* writes to the editor of that paper as follows:

"Having read the recent article in your journal relative to lightning rods, I venture to propound the following inquiries: Given a large building, say a church with spire, the spire covered with tin and painted, the church roofed with slate, valleys of copper and conductors of tin, a rod with points soldered to the tin roof, the latter connected by strips of copper soldered to the copper valleys, the tin conductors connected by strips or rods of copper from the bottom with permanent moisture underground—is the building protected against lightning? (1) Would the building be better protected if the above conductors were attached in the building to the gas pipes? (2) Does the paint on one side of the tin materially reduce its power of conduction? (3) Is it not an accepted theory that the closer the rods are attached to a building the better? (4) Do you approve of the method used for protection of the Centennial buildings, as explained in the SCIENTIFIC AMERICAN of about a month since? (5). W. H. G.

To which the editor of the *Country Gentleman* replies:

1. We do not perceive why this would not make a good connection throughout, and afford ample protection. The different connections might be more liable to become detached in the lapse of years than a firm rod, and would need looking to. In case the points above should prove insufficient to carry off silently the fluid from a heavily charged cloud immediately above, and there should be an explosion (a rare occurrence in such a case), there would be more liability to injure the building than if the rod were a foot or two distant from the building. 2. Gas pipes, well connected, would make good conductors, with the same liability as that just mentioned. 3. Paint does not reduce the conducting power. 4. It is better that the rod be a short distance off from the building, for the reason already explained. 5. We do not know the mode adopted on the Centennial buildings, and have not the paper referred to at hand.

REMARKS UPON THE ABOVE ANSWERS.—(1) We coincide substantially with the *Country Gentleman* in respect to the general sufficiency of the above example of protection. The proposed connections above ground are correct; but if there is any deficiency, it is in the underground connections. The terminal metal of the rod, placed underground, in contact with moist earth, should be as extensive in area as possible.

We think it erroneous to suppose that lightning rods are a means of *silently* discharging the electricity of thunder clouds. The latter are generally more than half a mile distant above the earth when the discharge takes place; and while a properly arranged rod, if struck, will conduct the electricity safely to ground, the sudden leap of the lightning through this air space to the rod sets the air into tremendous vibration, producing sounds like the roaring of artillery. Only the atmospheric electricity, close to the surface of the earth, is conducted to the ground silently by rods, buildings, trees, etc.

The object of the rod being to conduct off electricity from the building to earth, the rod should consequently be placed in close contact with the building, so that the electricity may easily reach it; the rod should not be separated a foot or two, as our contemporary suggests; the explosion he refers to is the crashing noise, which the rod can neither cause nor prevent.

(2) The protection of the building would be improved if the conductors were attached, in the building, to the gas pipes. But the attachment of the foot of the rod to the gas pipes, outside of the building, would be more convenient—these connections to be additional to the large metallic terminals in moist earth, before mentioned.

As to inside gas pipes, they are good conductors, and all that is necessary is to bridge over the space between the street pipe and house pipe, occupied by the meter and its lead pipe, with copper wires. The lead pipe is a poor conductor. By using the copper bridge, if the gas pipes in the house are struck, the electricity will pass off into the earth.

(3) We agree with our contemporary.

(4) It is an accepted theory that the closer the rods are attached to the building the better. The reply of our contemporary is incorrect, for the reason explained under (1).

(5) The mode adopted on the Centennial buildings was to connect the metallic roofs with the earth, by means of numerous rods soldered at different points to the roof, and carried directly down into the ground, and there soldered to the extensive system of eight inch underground water pipes. Thus the rods had the closest possible connection with the roof: while the earth terminals of the rods were provided with a very large area of conducting material placed underground—which latter is the essential thing necessary to render any rod a protection; but is the very thing that the majority of people neglect in rodding their buildings.

Fulton's Account of the First Steamboat Trip between New York and Albany.

In the *Suffolk Gazette*, printed at Sag Harbor, on the east end of Long Island, October 12, 1807, is a letter from Robert Fulton to Joel Barlow, giving an account of the first trip of the first steamboat on the Hudson River. It is as follows:

TO JOEL BARLOW, PHILADELPHIA.

NEW YORK, 22d Aug., 1807.

MY DEAR FRIEND: My steamboat voyage to Albany and back has turned out rather more favorable than I had calculated. The distance from New York to Albany is 150 miles; I ran it up in 32 hours and down in 30 hours. The latter is just 5 miles an hour. I had a light breeze against me the whole way going and coming, so that no use was made of my sails; and the voyage has been performed wholly by the power of the steam engine. I overtook many sloops and schooners bearing to windward, and passed them as if they had been at anchor.

The power of propelling boats by steam is now fully proved. The morning I left New York there were not perhaps thirty persons in the city who believed that the boat would ever move one mile an hour or be of the least utility. And while we were putting off from the wharf, which was crowded with spectators, I heard a number of sarcastic remarks; this is the way you know in which ignorant men compliment what they call philosophers and projectors.

Having employed much time and money and zeal in accomplishing this work, it gives me, as it will you, great pleasure to see it so fully answer my expectations. It will give a quick and cheap conveyance to merchandise on the Mississippi, Missouri, and other great rivers which are now laying open their treasures to the enterprise of our countrymen. And although the prospect of personal emolument has been some inducement to me, yet I feel infinitely more pleasure in reflecting with you on the immense advantage that my country will derive from the invention.

However, I will not admit that it is half so important as the Torpedo system of defence and attack; for out of this will grow the liberty of the seas; an object of infinite importance to the welfare of America and every civilized country. But thousands of witnesses have now seen the steamboat in rapid movement, and they believe—but they have not seen a ship of war destroyed by a torpedo, and they do not believe. We cannot expect people in general to have a knowledge of physics, or power of mind sufficient to combine ideas and reason from causes to effects. But in case we have war, and the enemy's ships come into our water, if the government will give me reasonable means of action, I will soon convince the world that we have surer and cheaper modes of defence than they are aware of.

Yours, etc.,

ROBERT FULTON.

Transparent Gold.

In the course of a lecture on gold, delivered before the Franklin Institute, on February 27th last, Mr. A. E. Outerbridge, Jr., of the Assay Department of the Mint in Philadelphia, Pa., gave an account of some experiments he had made, with the view of ascertaining how thin a film of gold was necessary to produce a fine gold color.

The plan adopted was as follows: From a sheet of copper rolled down to a thickness of $\frac{5}{1000}$ of an inch he cut a strip $2\frac{1}{2}$ by 4 inches. This strip, containing 20 square inches of surface, after being carefully cleaned and burnished, was weighed on a delicate assay balance. Sufficient gold to produce a fine gold color was then deposited on it by means of the battery; the strip was then dried without rubbing, and re-weighed, and found to have gained one tenth of a grain, thus showing that one grain of gold can, by this method, be made to cover 200 square inches, as compared to 75 square inches by beating. By calculation, based on the weight of a cubic inch of pure gold, the thickness of the deposited film was ascertained to be $\frac{1}{940000}$ of an inch, as against $\frac{1}{367850}$ for the beaten film. An examination under the microscope showed the film to be continuous and not deposited in spots, the whole surface presenting the appearance of pure gold. Not being satisfied, however, with this proof, and desiring to examine the film by transmitted light, Mr. Outerbridge has since tried several methods for separating the film from the copper, and the following one has proved entirely successful:

The gold plating was removed from one side of the copper strip, and by immersing small pieces in weak nitric acid for several days, the copper was entirely dissolved, leaving the films of gold intact, floating on the surface of the liquid. Three were collected on strips of glass, to which they adhere on drying, and the image of one of them was projected on the screen by means of the gas microscope. It was observed that it was entirely continuous, of the characteristic bright green color, and very transparent, as was shown by placing a slide of diatoms behind the film. By changing the position of the instrument, and throwing the image of the film on the screen by means of reflected light, its true gold color was seen. Mr. Outerbridge has continued his experiments, and, by the same processes, has succeeded in producing continuous films, which he determined to be only the 1 two million seven hundred and ninety-eight thousandth ($\frac{1}{2798000}$) of an inch in thickness, or ten thousand five hundred and eighty-four (10,584) times thinner than an ordinary sheet of printing paper, or sixty (60) times less than a single undulation of green light. The weight of gold covering 20 square inches is, in this case, thirty-five thousandths ($\frac{35}{1000}$) of a grain: one grain being sufficient to cover nearly 4 square feet of copper. The film is perfectly transparent and continuous, even in thickness, and presents all the characteristics of the one shown before. That a portion of the image appears darker is due to superposed films, the intensity of the green color being proportioned to the thickness through which the light passes.

Riches and Reason.

The experience of the late Mr. John Daly, of this city, who got riches but lost his reason and committed suicide, points a moral for our time. The case of Dr. Ayer, the well known millionaire, who is in an asylum for the insane, furnishes a commentary on the failure which some men are making by their appetite for money. There are scores of similar cases of insanity caused by a too intense application to business. Brains are of more account than bank notes, even in this world, truthfully says the *Christian at Work* and it is never wise to risk one's head to accumulate a property for other people to quarrel over.