the *former cost*, and a hundred other little expenses in keeping with the new order of things. And all these grew out of those very andirons. Yes, Peter, I was entirely within bounds when I said two thousand dollars."

The opposition was now silenced. My aunt immediately rose, and guessed it was bed-time. I was left alone with my uncle, who was not inclined to drop the subject. He was a persevering man, and never gave up what he undertook till he had done the work thoroughly. So he brought out his books and accounts, and set about making an exact estimate of the expenses. He kept me up till after midnight, before he got through. His conclusion was that the pair of andirons cost him two thousand four hundred and fifty dollars!

SCIENCE AND MECHANICS.

CONSTRUCTION OF LIGHTNING RODS.

A correspondent, after reading the remarks in our last number, on "The Protection of Buildings from Lightning," says he is determined to fix a protector to his house and barn, and wishes to know if a common blacksmith can make a rod that will answer the purpose. According to the article alluded to, an *iron* rod would require to be "coated with silver, gold, copper, or tin," to make it efficient. This is too broad an assertion. The cause of inefficiency in an iron rod is oxidation or rust. Paint or varnish will prevent rust, but at the same time interferes with the conducting power of the rod. Professor Olmstead recommends a paint with *charcoal* as the base of the coloring matter, this substance being a good conductor. Copper, which is a better conductor than iron, is too expensive for common use, and to coat an iron rod properly with copper or silver would, we suspect, transcend the skill of a common blacksmith. An iron rod is therefore more likely to be tried in ordinary cases, and this a good blacksmith may easily make. It should be painted as mentioned, to protect it from rust.

A correspondent of the *Albany Cultivator* gives the following plain directions for the construction and erection of rods. We will only add, that the "points at each end of the ridge pole" should be carried up to the height of eight or ten feet above the top of the roof, in accordance with the rule which has been well ascertained, that a proper rod "will protect a space in every direction from it, whose radius is equal to twice its height." From the language of the writer it would not be inferred that the "points" required any elevation above the ridge of the building:—

As the season is fast approaching in which large quantities of hay and grain are to be stored, I wish to call the attention of your numerous readers to the importance of protecting their barns by lightning rods.

It is well known that the warm vapour arising from newly filled barns, has a strong affinity for electricity, and on the near approach of a thunder cloud, places such buildings in imminent danger; but a prejudice has arisen against the use of conductors, from the improper manner in which they have generally been constructed. When not rightly made and put up, they are of no value. In many cases they may be even worse than useless. For instance, if the points at the upper extremity are covered with rust, they will not answer the purpose intended, because a metallic oxide repels instead of attracting electricity. If the lower end terminates before reaching the ground, or penetrates it but a short distance, the fluid is liable to escape from the rod into the side of the building, which being close at hand, offers a better conductor than the air, or the dry surface of the ground.

For the information of such as may not have given attention to this matter, I will give the method of making and attaching conductors, which has been tested by experiments, and approved by men of science. They should be made of horse shoe rods, five-eighths inch square, which are sufficiently large, and being slit cold, have a rough jagged surface, affording numerous radiating points. The several pieces of which the rod is composed, may be welded smoothly together, so as not to increase the size, or joined by a hook and eye. In the last method, the hook should have a point left on the end, and be driven into the eye after being bent at little more than a right angle.

In applying the conductor to barns, begin at the north west corner, by inserting the rod far enough into the ground to always insure its contact with moist earth; carry it along the gable end to one end of the ridge pole, thence along the ridge pole to the other end of it, thence along the other gable end, and down the southeast corner, continuing it *into* the ground, as in the beginning, far enough to reach the *moist* earth. There should be a point at the eaves on each corner, and one on each end of the ridge pole, which should be covered with a coating of silver to prevent them from rusting. The rod should be secured in its place by wooden fastenings. If these directions are carefully observed, there can be but little doubt that buildings thus provided would be effectually secured against destruction by lightning, with little trouble and at a small expense.

NEW CARDING MACHINE.

We learn from the Newark Herald that Mr John Dagget of that place has invented and put in operation at the establishment of Messrs. J. Dagget & Son, an improved Carding Machine in regard to which the writer remarks:—

This machine is intended to perform *four times* the amount of work done by the best double carding machines now in use, within the same length of time; and we can see no impediment to hinder it from so doing, as the machinery is so arranged that it will card the wool and produce *four rolls* as easily and as quickly as a common machine produces *one*. It requires one m .e power for its motion than that used to impel an ordinary machine—it does not take up as much room on the floor—and its expense is but a trifle more.

The superiority of this invention over every thing of the kind now in use, is perceptible to all who have witnessed its operation; and we do not hesitate in saying, that in our opinion—as well as that of more competent judges—it is bound to do away with and supplant the use of all other machines, adapted to this purpose, that have ever yet been made.

While it was under the course of construction, some imperfections were predicted by different individuals, but upon a thorough trial none have been discovered—everything working admirably; and, indeed, considering the long acquaintance and experience which Mr. Dagget has had in the business of manufacturing woollen machinery, and the reputation which he enjoys throughout the United States and Canada, it would hardly seem probable that he would invent or manufacture anything in that line but what would be an improvement, and be sure to perform the object for which it was intended.

All who have any doubts as to the practicability of the above machine, by calling at Messrs Dagget & Son's manufactory, can examine it and satisfy themselves; and the view which will necessarily be had of their extensive establishment—the powers of mechanism therein employed—together with the perfect order in the arrangement of their machinery there, constantly undergoing the various processes previous to its being perfected, etc—will be amply recompensed for the time and trouble thus expended.

We may give some idea of their notoriety by saying that they have supplied orders to the amount of from $16,000 to $20,000 since the first of January last! As they have lately enlarged their establishment to nearly double its former size, they will now be more able to supply the great demand for all kinds of woolen machinery, which they constantly have from every part of the Union—and which will probably be increased to a great exent, when people once begin to discover the utility of their new machine.

IMPROVEMENT IN MILLING.—We have been informed that a great improvement has been made in the Water Wheel of a Flouring Mill. The experiment has been tryed in Rawdon, in this District, in a Mill belonging to Edward Fidlar, Esq., and at present leased by Mr. Wm. Baker, through whose enterprise this new wheel was introduced into the District. The Mill has been built about two years, during which time it has been running, with what is called "*Smith's Wheel*," and which would grind at most, ten bushels of Wheat per hour, with about 10 feet head of water. This appeared to be too slow work for the spirited Lessee, and accordingly he went to the States, and engaged the services of a Mr. Boyce of Fulton, Oswego County, New York, who has constructed and put in operation two "*New Centre Discharge Wheels*," which have performed wonders such as were never, we are informed by those whose judgment in such matters is worthy of credit, before known in this country. Our informant says, that he saw 20 bushels of Wheat weighed, put into the hopper, ground and bolted in 35 *minutes* with one run of stone, and that there is not the slightest doubt, but that the Mill will grind from 35 to 40 bushels per hour, on an average, with each run of stone. By the means of this new centre discharge wheel the Mill will be able to grind and bolt 480 bushels of wheat in 12 hours, making 96 barrels of flour with each run of stone; while with the old wheel it could not have ground more than 120 bushels, making 24 barrels of flour; or, in other words doing with the new wheel, in one day, that which it would require four to do with the old one. If this is correct, and we have it from unimpeachable authority, Rawdon can now boast of possessing the fastest flouring mill in the province.—*Belleville Intelligencer.*

NEW INVENTION.—We learn from the *Springfield Republican*, that a machine has been recently invented in that town for folding newspapers and other printed matter. It is to be connected with a cylinder, or improved Adams press, so that the sheets come forth from the press, folded in the required form. The inventors warrant it to fold 3600 papers per hour, of any size, with the greatest accuracy.

METHOD OF DISTINGUISHING IRON FROM STEEL.—Drop a little aquafortis on the metal; let it remain for a few minutes, and then wash it off with water. If it is steel, the spot will be black; but if iron, the spot will be whitish grey.