For the Scientific American.

### Fulminating Powder.

*Mr. Editor*:—In a late number of your paper you gave a process for preparing Fulminating Powder. As you are probably not aware of the extent to which this composition has been applied to practical purposes I submit the following account of its use:—

I think it was in 1816, whilst exploding some of the composition on a fire shovel, I observed that the materials melted in the first place, and remained a little time in a fluid state before exploding, showing that a little more heat was necessary to explode it than was required to melt it; hence I thought that if I removed the composition from the fire at the instant of fusion, I should be able to save the product. This I succeeded in doing, and on examination I found I had obtained an article eight and one half times quicker than gunpowder, taking fire at a light heat. and exploding most beautifully. I made during the day sufficient for my purpose, and on the following day killed, by the aid of it a fine deer, which I drew from the woods in triumph to my quarters. To satisfy any one of its vast importance, used only as a priming, it was barely necessary to fire a small portion on paper. The excitement among our hunters was very great, and the calls on me for yellow powder, as it was called, barely as priming, at once was greater than I could supply. I continued the manufacture, greatly improving the quality of the powder, by altering the proportions of the ingredients, until some few years after, when, in filling an order for one ton my mill blew up, and myself and son barely escaped with our lives. I had in the course of my operations many dreadful explosions, and in a number of them have been severely injured. This induced me to adopt, if possible, some substitute to insure a certain and rapid discharge of fire arms. Mr. Forsyth, of Glasgow, in Scotland, had suggested a composition to be ignited by percussion. A few experiments had satisfied me of the value of the suggestion, when I abandoned yellow powder and offered Percussion Powder in lieu of it.

The greatest exploit ever made in hunting, in the State of New York, was performed, I think in 1820, with yellow powder. I engaged a small band of hunters, five in number, to hunt 5 or 6 weeks in November and December, at a camp near the "John Brown tract." In that time these hunters killed and brought in 182 deer, 1 panther, beside much other game. In precision of shooting nothing like it was ever approached by the use of gunpowder alone. Scarcely a miss-shot was made during the campaign.

A few words as to the manipulation, should it ever be called up again. Notwithstanding all my disasters, had not percussion been suggested, I should have pursued the business with redoubled energy, and at this time, had I lived, I should see yellow powder scattered over the face of the earth. To 6 lbs. of pure nitre add 3 lbs. pure carbonate of potash, and melt them in an iron vessel. Powder this mass very fine and add to 4½ parts of it one part of flowers of sulphur, mix intimately and melt over a muffled furnace on a thick iron plate. Stir and knead constantly, and as soon as the mass becomes waxy remove, and within a minute or two it will become very crumbly, when with a rolling pin, the mass may be rubbed fine enough for use. It should be immediately enclosed in air tight vessels or canisters. In the air it becomes soon damp, and our hunters renewed their priming once or twice a day, always carrying a small phial of it when on a hunt

My melter was two feet long, 6 inches wide, with sides 3 inches high on three sides, and was one inch thick, and made of wrought iron. A handle ten feet long, with a cord and pulley, enabled me to remove the pan on and off the furnace, as I needed. I usually melted 6 ounces at a time, which required some five minutes to a batch.

Allow me to describe one explosion as a sample of many similar ones which I have had. I usually stood about nine feet from the furnace and in this position 6 ounces in a melted state exploded. The first effect was to remove all the boards from the sides of the building, but a vacuum was formed so soon, that the boards all returned to their places on the timber, and remained a few seconds, when they fell upon the ground. Every thing destructible within three feet was shivered to atoms, whilst *I was unconscious of the slightest jar*, only that I was rendered deaf for a month afterwards. I have had occasion at four different times to feel astonishment, that amid such violence and destruction, I should remain without feeling the slightest agitation. S. Guthrie.

*Sackett's Harbor, N. Y.* Feb. 17, 1848.

For the Scientific American.

### Table.

Containing the lengths of chords for divisions of a circle from 1 to 24. The diameter being 1.

| Number of Divisoin. | Degrees of Division. | Length of Chord. |
|---|---|---|
| 1 | | |
| 2 | 180° 00' | 1.000 |
| 3 | 120 | .866 |
| 4 | 90 | .707 |
| 5 | 72 | .588 |
| 6 | 60 | .500 |
| 7 | 51 26' | .434 |
| 8 | 45 | .383 |
| 9 | 40 | .342 |
| 10 | 36 | .309 |
| 11 | 32 44' | .282 |
| 12 | 30 | .259 |
| 13 | 27 41' | .239 |
| 14 | 25 43' | .222 |
| 15 | 24 | .208 |
| 16 | 22 30' | .195 |
| 17 | 21 10' | .184 |
| 18 | 20 | .174 |
| 19 | 18 57' | .165 |
| 20 | 18 | .156 |
| 21 | 17 09' | .149 |
| 22 | 16 22' | .142 |
| 23 | 15 39' | .136 |
| 24 | 15 | .130 |

Application.—A wheel is to be built of plank segments, 9 segments in the wheel.—What is the length of each, their diameter being 12 feet?

Rule.—Look into the table opposite the number of segments the wheel is to be divided into, and under the heading "Length of Chord," take out the number, which multiply by the diameter of the wheel, cut off three figures from the right hand and it will be the length of the segment in parts and decimals.

Thus: Opposite 9 in table and under the heading is .342, which multiplied by 12 gives 4.104 feet, the length of segment required.

H. B. Allen.

### The First American Cotton Factory.

At Pawtucket, Rhode Island, is the old mill of Samuel Slater, Esq. being the first building erected in America for the manufacture of cotton goods. It is a venerable wood built structure, two stories in height; bearing numerous evidences of its antiquity, and we believe was erected in 1793. Two spinning frames, the first in the mill, are still there, and are decided curiosities in their way. It is almost incredible to believe that this old building, time-battered and weather-browned, was the first to spread its sheltering roof over the young pupil of Arkwright, and that those dwarf frames, rusty and mildewed with inactivity, are the pioneer machines of that immense branch of our national industry—the manufacture of cotton goods. Mr. Slater, the father of American cotton manufactures, was so closely watched at the English Custom House that he could not smuggle over a drawing or pattern. He had, however, acquired a full knowledge of the Arkwright principle of spinning, and from recollection and with his own hands, made three cards and twenty-two spindles, and put them in motion in the building of a clothier, by the water wheel of an old fulling mill. Fifty-four years have since elapsed, and the business has since increased beyond all precedent in the history of manufactures. Our rivers and wild waterfalls that then flowed and bloomed in solitude, are now propelling thousands of mill wheels, and millions of shuttles and spindles. In the business, hundreds of fortunes have been made—thousands of our citizens earn a subsistence, and find constant employment, while millions are clothed in different portions of the globe. A wonderful revolution has that old mill produced on the shores of the new world.

### The Growing West.

There are eight hundred and sixty-nine children attending the public schools of Milwaukie, and seventeen hundred and fifty in Chicago.

### The Longitude by the Telegraph.

From the interesting Report of the Superintendant of the Coast Survey for last year, we learn that the attempts to obtain differences of longitude between Washington, Philadelphia, and Jersey City, by means of the electro-magnetic telegraph, have proved entirely successful. The Superintendant of the National Observatory, Lieut. M. F. Maury, directs the co-operation of that establishment The observations at Philadelphia were under the direction of Professor Kendall: and those at New York under the direction of Professor Loomis. The details of observation were arranged by Sears C. Walker of the Coast Survey. The principle of this method consists in transmitting signals at a determined time from one telegraph station to another, where they are noted by a time keeper, well regulated to the time of the place. The difference in the times of giving and receiving the signals, according to the local time of the station, is their difference of longitude expressed in time.

The signals are given at one of the stations by pressing a key which causes the closing of the circuit. This closing, it is intended shall be simultaneous with the ticking of a clock or chronometer, at the station. In these experiments there is liability to error. 1st. In the clock time at the different stations. These are, however, easily examined, and the most probable times assigned at each station. 2d. The time of striking the key, to close the circuit, may not coincide with the clock beat. Careful experiment failed to detect any sensible error from this source. Third. The electrical effect may take a sensible time to be transmitted, and this may be known by transmitting signals from an eastern to a western station, and vice versa. 4 From the interval between the activity of the coil, and the clock of the keeper of the magnet. 5. The error in noting the fraction of a second, as denoted by the clock. It was percived that this difference in the estimate of fractions of a second, rendered the transmission of signals by the beats of a well regulated and sideral clock, and their reception of another sideral clock, of little avail, the time falling constantly upon the same fraction of the second. The transmission of signals by beats of a mean solar chronometer, and the marking of the time of reception by a sideral clock or chronometer carries the fraction of the second over every part of the whole second, once at least, in ten minutes marks the coincidence of the beats, of the two time-keepers. By observations of the coincidences, and the marking of intervals at the same station, the law by which each observer varied in the estimate of fractions of a second became known, and of course the difference of each observer supposing them to be constant Pains were taken to compare personal equations by all the observers. It was found that when the two clocks do not coincide in their beats, the observers on the average, set down the fraction of a second too small.—Of the five errors which have been enumerated, all but the first and last turned out to be insensible; whence it follows that the telegraphic method of comparing clocks distant two hundred miles from each other is free from error when the method of coincidence of beats is employed

### How to Be Happy.

Do all the good you can Whenever you hear of a poor widow, an orphan child, or an aged man who is afflicted, pay that individual a visit. Do not hoard up all you earn; give a certain portion to the poor. Never get angry. If you are slandered or imposed upon, better suffer a little than retaliate and use harsh words. Be not proud or selfish. Think no more highly of yourself and your talents than you do of the capacities of others. Pay all you owe. Keep out of debt. Get not entangled in the meshes of law—avoid it as the sure way to ruin. Shun vicious pursuits and unprincipled associates. Honor the Sabbath, serve God and be devoted to truth and religion Finally take a useful paper, pay for it in advance, and read it attentively: and our word for it, you will be happy. Peace and contentment will smile in your path, joy dance on your countenance, and every lane of light before you will be fraught with blessings rich and abundant.

### TO CORRESPONDENTS.

"J. R. M. of N. C."—An overshot wheel is the most economical, as it regards a percentage of power, for your purpose. Below 12 feet fall, a good reaction percussion wheel would do as well, but not above that. The expense of an overshot wheel is much greater and the question with you will be—an advantage of power, or a cheap wheel. If the reaction wheel will drive your machinery with your quantity of water, and the fall that you have, get it by all means. We shall present a few articles on the making of Magnets, commencing next number.

"G. W. C. of N. Y."—The vulcanized india rubber is 55 cents per pound, of the thickness you desire. We know of no substance better than lac varnish for the sand on wood. If you would use a little ground marble, potash, and the lac varnish altogether, and dry the wood in an intensely heated oven, we think your difficulty would be surmounted and the sand would adhere even above 140.

"P. D. of Conn."—The spring in connection with a windmill would be ingenious for your purpose, and we do not believe it has ever been used in such a manner. But as it regards the economy of the invention that is a thing that experiment alone can decide. It will operate.

"A. D. C. of Mass.," and "H. G. W. of Mass." We have answered you by mail.

"L. B. of N. Y."—Your plan of supplying the boilers with water is not new. See No. 35, vol. 2, Scientific American. The alarm is new in the shape of a bell, but a whistle has been used

"J. R. of Pa."—The best Millwright's book published is "the Engineer's and Millwrights Assistant." Its cost is $22. Wiley & Putnam, or Appleton, of this city, have it. There is another, worth $3, a small work but very good, without the author's name, called the "Millwright's Guide."

"J. R N. of N. Y."—A plan upon the same principle as yours was devised and tried in England in 1844, but never was adopted practically. Your plan is more simple, as the English plan had two elevated tooth rails and wheels to bite upon them. You will perceive that objections can be raised to both plans—for instance, the strength of the notches, each must bear the enormous weight of 25 tons or more for the locomotive itself, and if one was to break, consider the consequences. We make these suggestions, as it is a very important subject and deserves much study and arrangement. What you claim as your invention, so far as we can find out, is entirely new in the arrangement for the purpose set forth.

"T. D. of N. Y."—We are not able to publish Hotchkiss's claim, as there is not a week passes but we are requested to republish five or six of them. Sometimes we do so, but not often. A patent will cover a combination although there is no change of principle, and the charge to a jury on a case of a patent infringement, is not that they shall judge whether the claim of the plaintiff is a new and useful improvement, but whether the defendant has used an invention of the plaintiff that was not publicly known or used with his consent before he got a patent for it. There are 24 or 25 patents for reaction water wheels and there would be no little clashing with the inventors if they were to go to law with each other.

"J. B. B of N. Y."—Mr. J. F. Holcomb, of Newcastle, Delaware, is the inventor of a good Hemp Brake. Mr. Anderson, of Louisville, Ky., is also the inventor of another, said to be the most improved. We believe that either knives or saws are used in them all. No machine that we are aware of, has been invented to supersede hand pulling.

"N. H. P. of Md."—The power of the Windmill does not depend exactly on the number of the arms, but the surface upon which the wind acts. The greater the surface, the greater the power, but with an increase of speed, remember that the resistance increases as 2, 4, 16, and so on. With a greater number of arms, you will have no doubt more surface, more area of vanes, but also more complexity.

"W. G. of Mass."—See your mode of propulsion described on page 411 of Robertson's London Mechanic's Magazine for 1846. The only difference in the two plans is, that you