

by an hydraulic press, the removal of the acid being carried a step further in a centrifugal machine, which reduces the weight by 50 per cent. After a long course of washing, to remove all traces of free acid, the cleansing being in the final tank assisted by the agitating effect of a current of air which passes through the water, the pulpy product is dried in a centrifugal revolving about 1800 times in a minute. The dried gun-cotton is then weighed, and a definite proportion of an oxidising agent is added. Though the nature of this substance was confided to us under no reserve, it would possibly be considered a breach of confidence to publish it. The mixture is completed, and the mass thoroughly disintegrated into a fine powder under two copper edge-runners in a pug-mill. The resulting powder having had the last particles of moisture removed under the influence of a stream of hot air passed through the perforated trays in which it is exposed, is now ready to be placed in cartridges.

There is a separate building devoted to the preparation of sporting powder. To produce this, the ordinary powder has to be pressed into cakes and otherwise manipulated in a manner which has been productive of more than one explosion, and its manufacture has been for the present discontinued. That the fact of the attention of the staff being devoted to the production of blasting powder alone has been productive of the most satisfactory results, was demonstrated by the succeeding experiments. These were arranged to demonstrate alike the safety and power of the powder used, which was throughout that known as blasting powder No. 2 and No. 3. To illustrate the fact that the cartridges are harmless unless fired with a special detonator, various cartridges were burnt with impunity in the naked hand, while similar ones, fired by a detonator, produced explosions that induced the experimenters to keep at a respectful distance. Then followed an experiment which, through it resulted in an unexpected *contretemps*, was valuable as an indication of the perfect *bona fides* of the operators. Two cartridges having dynamite detonators attached, exploded in defiance of the programme, which insisted that they would not explode. It was explained, however, that these particular detonators were of extra quality, and that the occurrence was most unusual, while the probability of a lighted dynamite detonator being brought into proximity with the powder accidentally, is indefinitely small.

After two large barrels of the powder had been peacefully consumed on bonfires, affording nothing more alarming than a beautiful sheet of yellow flame—while the fall of half a ton of iron from a height of 15 feet failed to induce any action in the large bulk of powder on which it fell—it was pretty generally conceded, that so far as experiments can prove anything, they had demonstrated the possession by the patent powder of a singularly large measure of safety under ordinary and even extraordinary conditions. It seems at first sight so contrary to all that we should expect that a detonator should cause the violent explosion of a cartridge which no other treatment, whether by chemicals, by fire, or by impact, can prevail on to do more than harmlessly burn away, that it may be satisfactory to explain the probable *raison-nale* of the phenomenon. The miniature explosion of the detonator doubtless communicates simultaneously to each molecule of the powder vibrations of precisely the same periods or length of swing—which the explosion of the powder itself would give rise to; thus by a species of inductive action does the trifling wave motion of the detonator find its expansive and *dé-nouement* in the extended, but synchronous, agitation of the exploded powder. This opinion is confirmed by the observation that while fulminating silver and iodide of nitrogen will not explode gun-cotton, the much milder detonation of fulminating mercury will do so instantaneously, this would of course follow on the hypothesis that the explosion of the latter substance propagates isoperiodic waves with that of gun-cotton, while the more violent explosives do not do so. Similarly may we account for the difficulty of preventing the combustion of an explosion of gun-powder from exploding adjacent magazines.

The destructive portion of the programme was not less decisive and conclusive in its teachings than the prior experiments. Among the most striking results attained was the rending into fragments (which were projected aloft in every direction) of four solid ingots of steel measuring 42 inches long by 11 inches square and weighing 12 cwt. each, by a charge of 2½ lb. of the blasting powder in cartridges simply fixed in between the ingots with clay. A similar group of

smaller ingots, weighing 8 cwt. each, fare'd no better with a 2 lb. charge. The huge fragments, rushing hurtling through the air and ploughing rugged tracks over the fields, presented a most impressive spectacle, which was enjoyed by the visitors at a discreet distance, being, in fact, productive of an incipient stampede. A less imposing, but practically valuable, illustration was afforded by the splitting-up a large block of freestone by a 2-oz. cartridge placed in a shallow cavity. A heavy rail was also cut to pieces by an 8-oz. charge simply laid on it without tamping, and a post 12 inches square was neatly snapped off by a cartridge (2 lb.) hung loosely against it, being exploded.

As a variation, we were shown a 30-lb. charge, lightly covered with sods, instantaneously excavating a grave-like cavity over 20 feet long and 8 feet deep. Lest a suspicion should exist that interment, with its consequent damp, might prove fatal to its destructive power, it was demonstrated that powder, said to contain 20 per cent. of moisture, and to be incombustible by ordinary means, was by no means harmless.

An appropriate conclusion to a uniformly satisfactory series of demonstrations was found in the firing of a 50-lb. torpedo, sunk under 10 feet of water, which threw up a magnificent jet of water, some 200 feet high, with a force that would lead to the inference that the staunchest ironclad would prove an easy victim to such an infernal machine, were it once located under her hull.

Two additional points respecting this new powder, gathered from the day's investigations, are, that its state of minute division gives it a more certain and uniform composition with a smaller chance of any unduly acid portion escaping detection—the addition of an alkaline body also neutralises any free acid and diminishes the chance of spontaneous combustion. Of its strength there can be no question, and the improbability of its exploding with any provocation short of the contiguous firing of a particular class—or classes—of detonators seems also tolerably evident. That so few precautions were taken on Wednesday, while the whole process was being peered into and explored by some score of inquisitive mortals in ordinary attire, appears to indicate that the company's officers share the opinion of Professor Atfield "that the patent cotton gunpowder is less dangerous to handle, transport, or store, than common gunpowder."—*Iron*.

#### EGGS AS FOOD.

The *Poultry Review* gives the following estimate of the relative value of eggs as food.—Would it not be wise to substitute more eggs for meat in our daily diet? About one-third of the weight of an egg is solid nutriment. This is more than can be said of meat. There are no bones and tough pieces that have to be laid aside. A good egg is made up of ten parts shell, sixty parts white, and thirty parts yolk. The white of an egg contains 80 per cent. water, the yolk 52 per cent. The average weight of an egg is about two ounces. Practically an egg is animal food, and yet there is none of the disagreeable work of the butcher necessary to obtain it. Eggs are best when cooked four minutes. This takes away the animal taste that is offensive to some, but does not so harden the white or yolk as to make them hard to digest. An egg cooked very hard is difficult of digestion, except by those with stout stomachs, such eggs should be eaten with bread and masticated very finely. An excellent sandwich can be made with eggs and brown bread. An egg spread on toast is food fit for a king, if kings deserve any better food than any body else, which is doubtful. Fried eggs are less wholesome than boiled ones. An egg dropped into hot water is not only a clean and handsome but a delicious morsel. Most people spoil the taste of their eggs by adding pepper and salt. A little sweet butter is the best dressing. Eggs contain much phosphorus, which is supposed to be useful to those who use their brains much.

The *Revue Industrielle* states that sour milk, after protracted exposure to the sun, develops a poisonous quality, sufficient to cause disease and death to pigs fed thereon.

By rubbing metallic surfaces with soda amalgam, and pouring on a solution of chloride of gold, gold is taken up by the amalgam; and it is only necessary to drive off the mercury by heat, to obtain a gilded surface that will bear polishing.