### On the Manufacture of Phosphoric Acid and of certain Phosphates.

Blanchard describes this process as applied to the fossil phosphate of lime found in the department of Lot, containing from 52 to 80 per cent of tribasic phosphate of lime.

The average composition is: phosphate of lime, 72; carbonate of lime, 7 to 8; phosphate of peroxide of iron, 2; fluoride of calcium, 4 to 5; silicate of lime and alumina, 10. Traces of iodine are also present, especially in the gray varieties. The phosphate is treated with an equal weight of sulphuric acid at 50° to 55° Baumé in large vats, and stirred for a quarter of an hour. It is then allowed to rest for half an hour, when it presents a spongy mass ready for the manure maker or the farmer. At the first, dark brown fumes containing fluorine are given off, and afterwards splendid violet fumes of iodine, neither of which appear to injure the health of the workmen.

The superphosphates produced are of two classes; the lower quality containing 10 to 14, and the higher 17 to 18 per cent of soluble phosphate.

For the preparation of free phosphoric acid, equal weights of acid and phosphate are mixed as above, but after a short time, 1,200 kilogrammes of water are added to 1,000 kilogrammes of phosphate taken, and the agitation is continued. After an hour, the product is submitted to hydraulic pressure in coarse cloths surrounded by casings of wood perforated with holes. The solution of acid phosphate of lime at 18° Baumé, which is thus obtained, can be used either for the preparation of alkaline phosphates or of the free acid. The last equivalent of lime is removed by the addition of a further equivalent of sulphuric acid, when sulphate of lime subsides, and the phosphoric acid is drawn off at 61° Baumé.

### The Macropode.

This little fish forms the subject of a paper communicated to the French Academy of Sciences by M. N. Joly. Eight years ago, M. Agassiz said that he had found among the fish tribe metamorphoses as considerable as those which had been remarked in reptiles; and this is a case in point. The egg of the macropode, not bigger than a poppy seed, when hatched is perfectly transparent and lighter than water. It is hatched in about sixty-five hours, just as is the case with the egg of the tench. But on account of this rapid birth, the creature is necessarily in an imperfect state. It makes its appearance in the shape of a tadpole, the head and trunk of which are attached to a large belly, the tail being free and surrounded with a natatory membrane which is exceedingly transparent. Although the animal seems to have no striped muscular fibers, it is very nimble under the microscope and is not more than a millimeter and a half in length. Its head has two large eyes still deprived of their pigment; there is no mouth, and no digestive apparatus either. But the heart is already active, and some circulation is perceptible in the upper part of the tail. There are no gills, so that respiration must be effected through the skin. There are no secretory organs and no fins. The same as in all fish, the nervous system is formed at an early period, and is composed of two parallel chords which branch out into the head. Of the skeleton, nothing appears as yet but the dorsal cord. Numerous pigmentary spots appear all over the body. A short time after, the mouth, intestines, liver and air bladder are formed, together with the gills. New vessels gradually make their appearance, while the earlier ones are obliterated. The caudal natatory membrane is gradually formed into two pectoral fins, and brilliant scales cover the body, and from that moment the creature assumes the shape of a regular fish. Here, therefore, we have changes similar to those which are observed in Planer's lamprey, in insects and in crustacea. This is an important fact, since naturalists had hitherto denied the existence of such changes in fish.

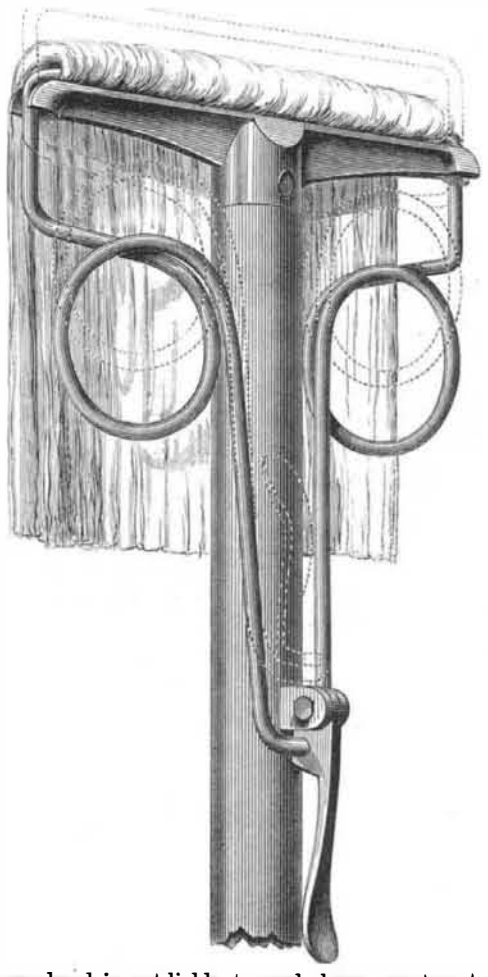
### Beware of Green Wall Papers.

A physician in Western Massachusetts recently had a lady patient who, for several weeks, had been suffering from nausea, general prostration, and other symptoms of slow poisoning. Failing to discover the cause of the symptoms, says the Hartford *Courant*, as a last resort the doctor requested her to move from her chamber, the walls of which were covered with paper of a very light shade of green, so light, indeed, that in the evening it could scarcely be distinguished from white. After leaving the room the symptoms immediately disappeared, and the patient rapidly recovered. A sample of the paper was forwarded for analysis to the State chemist at Hartford (Mr. Joseph Hall, of the High School), and was found to contain a large quantity of arsenic. Mr. Hall obtained the poison in the various forms of metallic arsenic, yellow tersulphite, silver arsenite and arsenious acid or common white arsenic. He estimates that every square foot of this innocent-looking paper contained an amount of the poison equivalent to five grains of arsenious acid, or double the fatal dose for an adult person. This, in the moist warm weather of last July and August, was amply sufficient to keep the air of a room constantly impregnated with the poison, and any person occupying such a room would be as certainly poisoned as though the arsenic had been taken into the stomach.

LONDON has a new industry, namely the manufacture of cripples. The police have discovered a firm of human fiends that take children of tender age and twist their limbs so that they may be bandy-legged or otherwise deformed, according to the wish of the parents. The object of this is to make the unfortunate infants objects of charity. A regular tariff of prices is demanded, a thorough and complete maiming costing four pounds. The members of the concern and about a dozen employees have been imprisoned.

### IMPROVED MOP HEAD.

The invention herewith illustrated furnishes an improved method of attaching a mop to its handle. To operate the device, the small lever on the staff is turned over, the bail is lifted from the notch on the same, and pushed down as far as necessary to receive the mop. The relative position of the parts will then be as shown by the dotted lines in the engraving. The mop being inserted in place, the bail is pulled up into the notch on the lever and the latter is turned back to its original position.

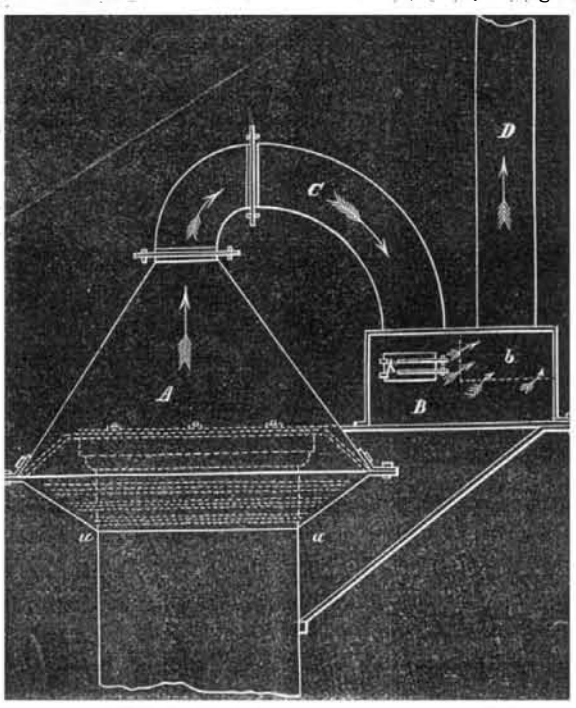


This mop head is not liable to work loose, nor to get out of order from hard usage, while it is easily and quickly adjusted to hold any thickness of mop.

Patented December 13, 1870. For rights and further information, address the inventor, Mr. L. Williams, Arlington, Vt.

### APPARATUS FOR EXTINGUISHING SPARKS.

G. J. Syrkin, of Irkutsk, Eastern Siberia, describes, in No. 18 of the *Practische Maschinen Constructeur*, an apparatus which was constructed for the purpose of extinguishing the sparks issuing from the stacks of the gold-refining establishments of that city. The incandescent particles of carbon have sometimes very nearly set the whole town, which is almost entirely constructed of wood, in flames. Being of course applicable to stacks of all kinds, we believe the following illustration and description will be found interesting:




The apparatus consists of four principal parts. A is the head, fastened with iron clamps over the opening of the chimney; B is a water reservoir, with a compartment, *b*, occupying exactly a fourth of the length of the reservoir, and containing numerous perforations on its sides. *k* is a small airtight side door. C is a pipe, extending from the head of the receptacle to B, both of which consist of strong sheet iron. The lower rim of the head does not directly rest on the chimney top, but extends for 14 inches further downwards, being supported by the slanting sides, *u u*. These four sides are perforated, so that a part of the hot gases may escape through them. The size of the head corresponds to the diameter of the chimney, and the bent pipe may vary in size according to the distance of the receptacle, B, from the stack, while the straight pipe may be of any length. The reservoir should be large enough to hold more water than will evaporate during the melting operation, and till the furnaces are cooled down sufficiently; it is filled to one quarter of its hight.

Incandescent particles of carbon will fall in the water, while the gaseous products of combustion pass off through the perforations of the compartment, *b*, and pipe D. As the density of the watery vapors is less than that of the products of combustion, the pressure they exert can in no wise influence the draft. Any gold that may be carried off through the chimney will be deposited in the water and thus saved.

In the establishment where the above described apparatus is in use, the following quantities of gold, from the various districts of Eastern Siberia, have been refined.

| | Pouds. |
|---|---|
| Olekme (Irkutsk) | 761¼ |
| Bargusin (Transbaikalien) | 69¼ |
| Werchneoudinsk (do.) | 15 |
| Nertschinsk (do.) | 154¾ |
| Amur | 172 |
| Total | 1172¼ |

One poud equals 36·11 lbs. avoirdupois.

### One of the Errors of the Age.

One of the growing evils of this country is the overweening desire on the part of young men to engage for life in pursuits that have not "the smell of shop" about them (says the *Journal of the Farm*), or to be more explicit, to engage in those classes of business which do not involve the necessity for practical mechanical skill, or even a theoretical knowledge of them. Thus we find thousands of farmers' sons rushing to the city, and eagerly seeking employment in stores as clerks or salesmen. A portion of them, with better judgment, apply themselves to the study of the professions, and hence it is that large cities abound with hundreds of lawyers, physicians and clergymen, who eke out a miserable subsistence, and who, had Nature's rights been respected, should be following the plow, or doing duty in the workshop. Much of this unwholesome disposition is due to what are known as business colleges, the proprietors of which, by inflated advertisements, induce young men to believe that all that is necessary to success in life is a knowledge of bookkeeping, and that this knowledge can be obtained through their institution in the course of a month or two of ordinary study. Excited by these plausible stories, and believing—as many of them do—that a clerkship is not only a more lucrative, but more respectable, avocation than that of a farmer, young men flock to the city, enter upon a course of two or three months, study in one of these mercantile colleges, graduate(?), and are awarded a diploma, setting forth the fact that they are thoroughly fitted to take charge of the books of any business house. It is only when these graduates are called upon to apply in practice what they found so easy in theory that they awaken to the fact that they have made a serious blunder, and, worse yet, that their visions of big salaries have dwindled down to figures that barely provide them with the commonest necessities of life. Occasionally one succeeds in doing better, but the instances are rare. Failure is the rule; success the exception.

It is not surprising, therefore, to find business men fighting shy of these mercantile college graduates, or to encounter at almost every step young men in fruitless search of clerkships, while our workshops and farms are sadly needing their services.

### A Meteor in Arkansas.

About twelve miles south of Huntsville, Madison county, on the 8th instant, occurred the most wonderful and startling phenomenon that has ever been witnessed by the citizens of that neighborhood. Near the farm of Captain Smith, sheriff of the county, some of the citizens were startled by a frightful noise like the rushing of a mighty cannon ball through the air. On looking up, they discovered something that looked like a solid column of fire passing with tremendous velocity through the air, with a whirring, hissing sound, something like that of a shell, but many fold louder. It appeared to be from eight to ten feet in length and from four to five feet in diameter, but it was passing with such swiftness that it may have been many times larger than it appeared. When first discovered, it seemed to be several hundred feet above the earth, and was inclining in its course toward the ground, profusely emitting great sparks of fire. About a minute or two after it passed out of sight, an awful explosion was heard, that shook the earth for miles around, and was heard at a distance of fifteen miles. The truth of this statement is vouched for by several prominent citizens of the neighborhood.—*Fayetteville (Ark.) News.*

CUTTING UP WHALES BY STEAM.—The whaling bark Java, of New Bedford, is provided with an upright five horse power engine, to be used in cutting in whales and discharging cargo, hoisting topsails, if required, etc. This must prove a great saving of time and labor, as it usually requires 15 or 16 men to cut in a whale, while, with the help of the engine, six men can easily attend to it. The engine is stationed in the forecastle, occupying a space ten feet by four feet. It will be the first ever carried to sea in a whaler for these purposes. The idea originated with the first officer of the Java, Mr. E. T. Fish, of Falmouth, Mass.

COOKING UNDER PRESSURE.—Experiments by Professor Junichen prove that the time for cooking various articles of daily consumption is very much shorter when effected under strong pressure, while a great saving in fuel is also obtained.