

ductor, 100 feet in length, is of the section corresponding to that of the buckets, 17¼ inches in diameter. It is supported by three cables attached to a staging, resting on the boat and secured to the bucket wheel frame. The slope is 1 in 400, which allows the material to be deposited at a level 22 feet 3 inches above that of the water.

The position of the depots often involves the necessity of transporting the dredged material to distances of 1,200 feet or 1,500 feet from the excavator. In such cases supplementary conductors are added. These are open, and are laid on the ground with a slope of 1 in 1,000. When this mode of transport cannot be adopted, barges are employed to receive the dredged material and remove it to convenient points of discharge.

The contractors for this work have adopted an arrangement which consists of a system of pipes with flexible joints floating on the surface of the water, and connected at one end with a well in the excavator, into which is discharged the dredged material mixed with water to reduce it to the desired consistency, and at the other end with a conduit on the bank where the contents are discharged. This arrangement, only recently adopted, has given every satisfaction.

**THE PENCILLED EAR HOG.**

The Red River hog was described for the first time in the year 1848, by Professor H. Schinz, in his book on mammals as *Sus penicillatus*. Two years later a living specimen was

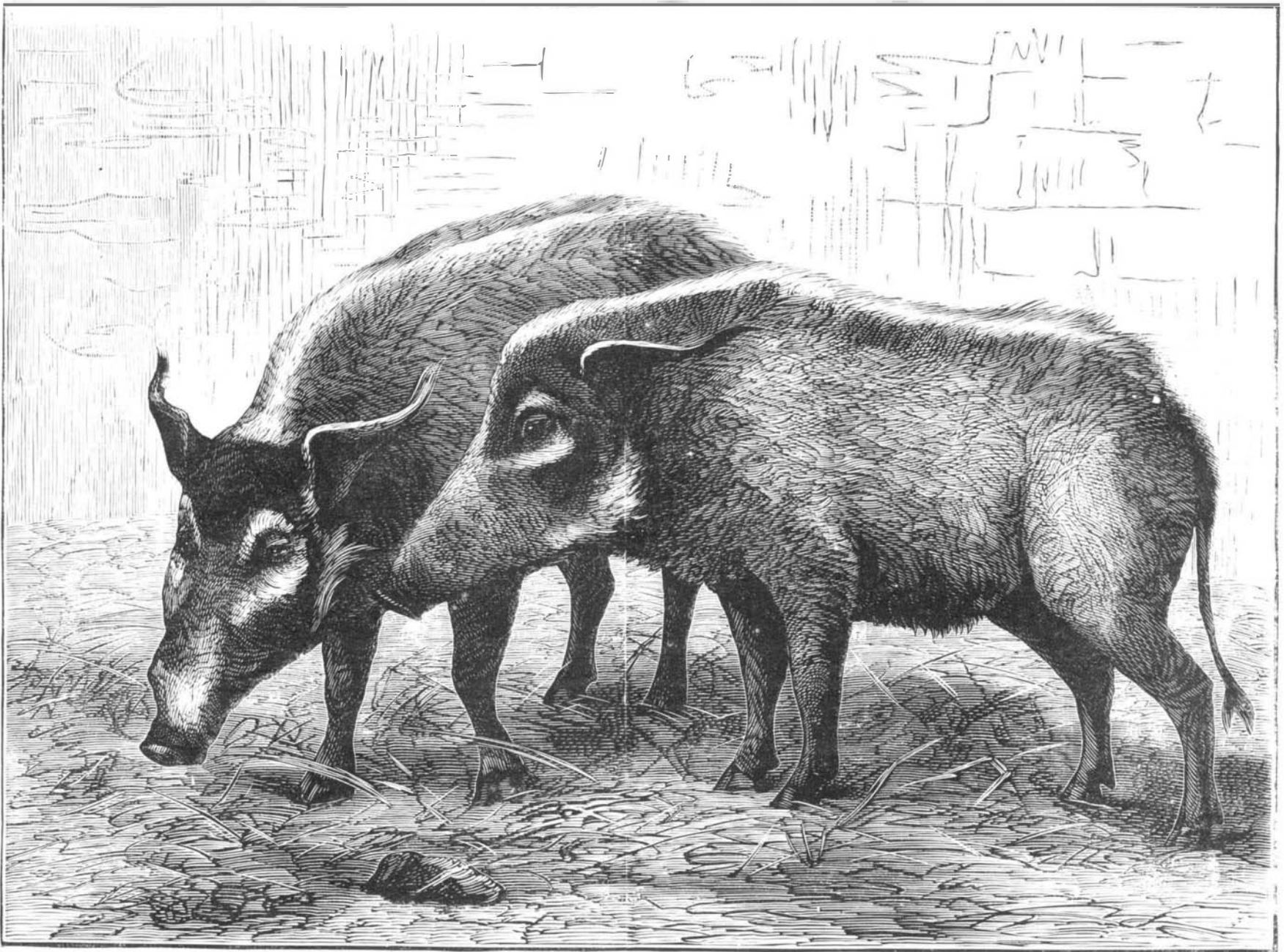
I pulled it out and found it to be a snake of the common 'striped' variety (*Butania*), and about two thirds as long as the milk snake. It had, of course, been swallowed head first, and the head was nearly digested."

**American Dinosaurs.**

On the flanks of the Rocky Mountains a narrow belt can be traced for several hundred miles, which is always marked by the bones of gigantic dinosaurs. The strata consist mainly of estuary deposits of shale and sandstone, and the horizon is clearly Upper Jurassic; the dinosaurian remains in this series of strata are mostly of enormous size, and indicate the largest land animals hitherto known. One new species (*Atlantosaurus immanis*) must have been at least 80 feet in length, and several others nearly equaled it in bulk. With these monsters occur the most diminutive dinosaurs yet found, one (*Nanosaurus*) not being larger than a cat. Some of these new forms differ so widely from typical dinosauria that Professor Marsh has established a new sub-order to receive them, called *Sauropida*, from the general character of the feet. They are the least specialized forms of the order, and in some of their characters show such an approach to the Mesozoic crocodiles as to suggest a common ancestry at no very remote period. In them the front and hind limbs are nearly equal in size; the feet are plantigrade, with five toes on each foot. The carpal and tarsal bones are distinct; the precaudal vertebræ contain large, apparently pneumatic

the business, says that there are not less than 300,000 head of cattle now in the territory. There are several herds numbering from 3,000 to 5,000 head, and one now reaches fully 7,000 head. The average increase ought to be 80 per centum of the number of cows, but one third probably comes nearer the general increase. Four-year-old steers are considered beeves and 25,000 have been driven out of the Territory this year. Montana beef will soon take rank among the staple meats of the Eastern markets.

In making purchases for stocking a ranch a cow and calf would count as one, a yearling one, two-year-old one, and sometimes in making large purchases three-year-olds are included, and the whole would cost from \$13 to \$15 a head. If there were many of the three-year-olds this last price would be demanded. Beeves readily sell for \$25. The larger the herd, the less the proportionate cost of keeping. In one case 50 cents a head a year will fully cover the cost, including taxes, but 75 cents would be nearer the truth generally. The grand "round up" for about six weeks in the spring and one month during the autumn, when the assorting takes place and the calves are branded, is the chief item of expense. Two years ago a gentleman bought 500 or 600 head of yearling steers at an average cost of \$9 each. They were kept near his sheep range, and the expense of keeping was not more than \$2 per head. They sold readily this year at \$25 each, leaving a clear profit of not less than \$14 a head. The profits resulting from this industry, at the



**PENCILLED EAR PIGS AT THE ZOOLOGICAL GARDENS, REGENT'S PARK, LONDON.**

brought to Liverpool from the River Comoro, and was bought in September, 1852, by the Zoological Society of London for their gardens. Mr. J. E. Gray described it in the "Annals of Natural History," in 1852, under the name of *Cheropotamus pictus*. As he, however, soon afterward found out that Cuvier had already given this to a fossil member of the hog family, he changed the original description to *Potamochoerus*. The *Potamochoerus pictus* and *Sus penicillatus* are one and the same animal, which Gray has established without doubt in the "Annals" of the year 1855, and the name "pencilled silver hog" has remained as a generic title. The color of the "pencilled ear hog" varies very much, and Du Chaillu has met with a white-faced one, which Dr. Gray has declared to be simply a variety of the species.

**Milk Snake Swallowing a Striped Snake.**

Mr. John M. Howey, of Canandaigua, N. Y., states that, in last August, while mowing out fence corners with a scythe, a milk snake (*Ophibolus*) started out of the grass in front of him. He struck it and cut it into two parts, the scythe passing within about three inches of its head. "Imagine," he says, "my surprise when a tail stuck out of the wound.

cavities; the sacral vertebræ do not exceed four, and each supports its own transverse process. The pubic bones unite in front by a ventral symphysis; the limb bones are solid. One of the species described and partly figured in Professor Marsh's paper, in the *American Journal of Science and Arts*, for November, is called *Morosaurus grandis*; when alive it was about 40 feet in length; it walked on all four legs, was probably very sluggish in its movements, and had a brain proportionately smaller than any known vertebrate

**Cattle Raising in Montana.**

While Montana is chiefly noted for its mineral wealth, it is claimed that not a little of its future glory will result from its value as a grazing country. The winters are long, yet horses, sheep, and cattle find subsistence on the nutritious grasses for which the Montana valleys are remarkable, and almost without care or attention. In the assessment for 1877 the enumeration of cattle was 182,659 head, all ages, valued at more than \$2,000,000. To this amount must be added fully 50 per centum for 1878, and then far less than the real value will be covered.

A writer, who professes to be personally acquainted with

lowest possible estimate, are more than 2 per centum a month on the capital invested. Indeed, many persons have borrowed money at that rate of interest and still made a handsome profit.

**Popular Errors Regarding Papyrus.**

In Adams' "Roman Antiquities" the Egyptian papyrus plant is described as about ten cubits high, and as having several coats or skins one above another like an onion, which coats were peeled off with a pin in the process of paper making. In Smith's "Dictionary of Greek and Roman Antiquities," it is said that the papyrus tree grows in swamps to the height of ten feet or more, and paper was prepared from the thin coats or pellicles which surround the plant. Liddell & Scott's Greek Lexicon says that paper was made of the inner bark of the papyrus. And similarly other works of high character, encyclopedias and the like, give a false account of this interesting plant.

Calling attention to these misstatements, in the *Library Journal*, Mr. Ezra Abbott, of Harvard University, says: "The papyrus plant (*Cyperus papyrus* of Linnaeus, or *Papyrus antiquorum*, Willd.) belongs to the family of *Cyperaceæ*

or Sedges; it is an endogenous plant, with a triangular stem; and to talk about its "inner bark," and "layers" like the coats of an onion, is a simple absurdity. One might as well speak of "the inner bark" of a stalk of Indian corn or of a bulrush. The error has originated from ignorance or forgetfulness of the elements of botany, and the consequent misinterpretation of the passage in Pliny (*Hist. Nat.*, xiii. 11-13, al. 21-27), which is our chief source of information about the ancient manufacture of paper from this plant. One of the words which Pliny uses to describe the very thin strips into which the cellular substance of the stem was sliced in making the paper is *philyra*, which strictly denotes the inner bark of the linden tree, also employed as a writing material. Hence the papyrus has been conceived of as an exogenous plant, with its outer and inner bark, and has actually been called a "tree." The botanists of course have not made such a mistake.

Mr. Abbott points out a still more absurd mistake in the English translation of Guhl & Koner's "Life of the Greeks and Romans," which says: "The stalk . . . was cut longitudinally, after which the outer bark was first taken off; the remaining layers of bark, about twenty in number (*philyrae*), were carefully severed with a pin; and, afterward, the single strips plaited crosswise; by means of pressing and permeating the whole with lime water, the necessary consistency of the material was obtained." The word mis-translated lime water is *Leimwasser*, which means glue water.

#### Nitric Acid Produced by the Electric Light.

Mr. T. Wills, F.C.S., has been making some experiments on the production of oxides of nitrogen in the electric arc. The atmosphere of course consists mainly of oxygen and nitrogen, but simply in a state of mechanical mixture; if these gases become chemically combined, they form several oxides of nitrogen, most of which are strong and corrosive acids. At a high temperature small quantities of these gases can be made to unite. This is the case when electric sparks are passed through air; also during the combustion in air of a very hot flame, such as that of hydrogen; it therefore seemed probable that, as the temperature of the electric arc is undoubtedly very high, nitric acid, or some other oxide of nitrogen, might be produced by the electric light. The first experiment was rather surprising. A glass cylinder placed over an electric lamp (Foucault's regulator) for two minutes, and afterward examined, was seen to contain a perceptible amount of red fumes, due to peroxide of nitrogen ( $N_2O_4$ ). The air surrounding the lamp was next drawn through a solution of potash, and the amount of nitric acid estimated; this gave 10 to 12 grains of nitric acid produced per hour (it may eventually prove to be more, the difficulty being to collect the whole of it). The next step in the research will be to examine the various forms of electric light, with a view to determine the amount of nitric acid produced by each. One of the advantages heretofore claimed for the electric light over gas light has been that the products of combustion of the former were harmless, while gas light produces the deadly carbonic acid.

#### A NEW FIREARM.

The novel firearm shown in the accompanying engraving consists of a short barrel attached to a base plate that slides upon two rods projecting from the handle. The barrel is pressed forward by spiral springs which surround the guide rods. The handle or stock is similar to a saw handle, and contains a lock or spring mechanism which throws the needle forward into the cartridge when the trigger is pulled.

The recoil which follows the discharge of the weapon is taken up by the spiral springs, thus relieving the hand from the shocks which generally follow the discharge of firearms.

This weapon would seem to be especially useful in fighting at close quarters, as in the case of a marine engagement. Its large caliber enables it to carry formidable and effective ammunition, while its length is such that it can be used when rifles and ordinary pistols are useless. Either shot or shells may be used.

This firearm was recently patented by Mr. Jarvis Royal, of Rochelle, Ill., from whom further information may be obtained.

#### Wine from Oranges.

Experiments have recently been in progress in countries ravaged by the phylloxera, in regard to the substitution of orange juice for grape juice in wine making. The first wine made from oranges, in Spain, has just made its appearance in the market of Valencia. Four kinds have been produced, one of them a sparkling wine. They are all said to be of an attractive color, perfectly clear, of an agreeable, sweet, slightly acid flavor, and of an alcoholic strength of about 15 per cent.

#### A Little Seaport's Monopoly.

The little seaport of Scituate, Mass., is almost the only place in the country where "carrageen," or Irish moss, is gathered and cured, although it may be found everywhere along the coast of eastern New England. Scituate is the great center of the moss business, and supplies the entire Union from its beaches. The moss is gathered by means of long rakes into dories, and the wives and daughters of the boatmen prepare it for the market. Everybody knows its

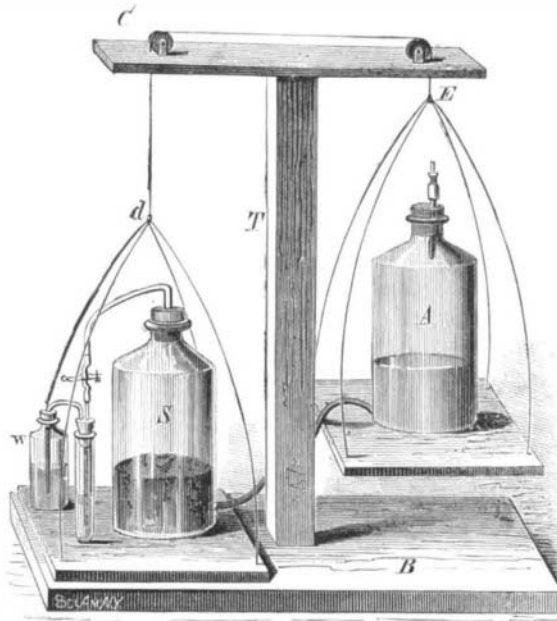
use in jellies and blanc mange, and it is also largely used in the manufacture of lager beer. The annual product is 10,000 or 15,000 barrels, worth to the producers about \$50,000. About 150 families are engaged in harvesting the moss.—*Worcester (Mass.) Spy.*

#### A NEW FORM OF SULPHURETED HYDROGEN APPARATUS.

BY LE R. C. COOLEY, PH.D.

Since hydric sulphide is one of the most indispensable and troublesome of chemical reagents, no apparatus can be more welcome to the chemist than one which is able to yield an abundant supply of this gas and at the same time shield the laboratory from invasion by its disgusting odor.

To furnish the gas at any moment, to generate it only when in use, to retain the excess, which escaping in bubbles from the fluid under examination contaminates the atmos-

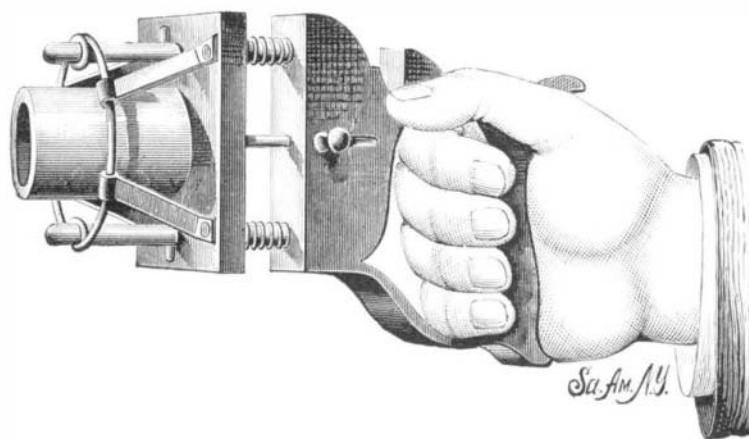


phere, and at the same time to be easily and cheaply constructed and conveniently used; these are the most desirable qualities of the apparatus, but qualities which hitherto have been found very difficult to combine. Believing that no other form is at once so efficient, so nearly odorless, so cheap, and so convenient in use, I offer the following description of an arrangement represented in the accompanying cut:

Notice, first, the plain but strong wooden frame, consisting of the base board, B, the standard, T, supporting the crosspiece, C, on top of which, near its ends, are two iron pulleys.

Notice, next, two platforms, each provided with four stiff curved iron wires, which meeting at the points, D and E, are fastened to the opposite ends of a strong cord passing over the pulleys at the top. By this means the two platforms, like a pair of scale pans, have a free vertical motion.

The materials for generating the gas are placed in two bottles, A and B, one on each platform. These bottles being



ROYAL'S IMPROVED FIREARM.

tubulated near the bottom are connected by means of a piece of thick rubber tubing, which is rendered more impervious to gas by immersion in melted paraffine. The bottle, A, is to be filled to one half its capacity with the dilute acid, while in the other bottle, S, fragments of the ferrous sulphide rest upon a thick layer of broken glass or of silicious pebbles.

The gas bottle, S, is provided with a tightly fitting rubber or paraffined cork stopper, through which passes the delivery tube, which may be opened and closed at pleasure by means of the usual nipper-tap arrangement shown in the cut.

At the lower end of the delivery tube is a long tapering rubber stopper perforated with two holes. One of these holes is lined with a piece of rubber tubing, the ends of which project a little beyond the stopper. The end of the delivery tube is thrust into this rubber tube until it reaches half way through the stopper. This arrangement permits the insertion of a separate piece of glass tube into the lower end of the stopper, by which a solution may be fed with gas, and

its removal for cleansing after each operation. From the other perforation of the stopper a bent tube passes over into a bottle of ammonia water, W. The cut represents this apparatus in operation.

The fluid to be tested is placed in either a test tube or flask. For small quantities the tube is very convenient. The operation is as follows:

Insert the short glass tube into the lower end of the stopper. Press the tube or flask containing the fluid up until its mouth is tightly closed by the tapering stopper. Depress the platform carrying the gas bottle, and carefully open the nipper tap. The acid flowing from the bottle presses the gas from the bottle, S. It bubbles through the liquid in the tube or flask, and the excess then passes over into the bottle, W, where it is completely absorbed by the ammonia. Close the nipper tap, lift the platform carrying the gas bottle, remove the test tube or flask and also the short delivery tube from the stopper; the apparatus is then ready for the next experiment.

Whether the apparatus is used continuously or at intervals, the joints being well made and the foregoing directions carefully followed, the laboratory will be free from the odor of the noxious gas, except that due to the small quantity that remains filling the tube or flask when it is removed.

A single apparatus with bottles of one gallon capacity has furnished the gas needed in the Vassar laboratory for the last three years, the classes numbering from 25 to 50 students. The exhausted acid is easily replaced, and the ammonia removed from time to time, as may be necessary.

#### Brier Root Pipes.

Much of the wood used for making the so-called "brier root" pipes is derived, it appears, from Corsica. The white heath, or *bruyère* (of which "brier" is a corruption), grows in great luxuriance and very abundantly among the trees and shrubs which form what is called the "maquis" covering the mountain sides.

In the course of the last few years, since brier wood pipes have become such a large article of trade, the heath trees have become a source of lucrative industry. The roots are dug up and cut into rough forms of tobacco pipes by circular saws worked by the water power of the mountain streams. The pieces, when cut up, are sent in sacks to France, and thence to America, to be eventually manufactured into "brier root pipes."

#### Cincinnati Faience.

The fine enameled ware known as Cincinnati faience originated with Miss M. Louise McLaughlin, of that city, whose experiments were first successful in 1877. It is fired in a kiln at the temperature of 9,000°, the famed Limoges faience of France being fired to no more 5,400°. The enamel of Cincinnati faience is exceedingly brilliant in color, and so hard that the point of any steel instrument is said to make no impression upon it. This invention is indirectly a result of the excellent schools of design for which Cincinnati is justly honored.

#### New Mechanical Inventions.

Mr. Christian Bissmann, of New York city, has patented an improved Spring Balance that takes up less space than the ordinary weights and pulleys, and by which the raising and lowering of the sash are accomplished easily and without noise.

An improved Alarm Bell has been patented by Mr. Charley H. Smith, of Delphos, Ohio. This is an improved fire alarm, which is simple in construction and is easily and conveniently operated.

An improved Cane Shaving Machine has been patented by Messrs. Charles L. Jones, James W. Smith, and Henry H. Adams, of Gardner, Mass. The object of this invention is to construct a cane splitting machine that will permit of changing the knives without loss of time, and also to make the knives adjustable according to the size of the cylinder.

Mr. Julius Bluemel, of San Francisco, Cal., has patented an improvement in Breech Loading Firearms, the object of which is to obtain rapidity in loading and firing shotguns and rifles, and prevent liability of accidental discharges.

Mr. Hosea T. Stock, of Toledo, O., has patented an improvement in Supporting Frames for Excavating Machines, which can be loaded, supported, and moved from place to place on a railroad track, upon an ordinary flat or platform car. Only certain portions need be removed in order to enable the apparatus to be transported like an ordinary railroad car.

#### New Caustics.

Two caustics, which promise to be most valuable, have recently been introduced to the notice of the medical profession by Dr. B. W. Richardson. They are sodium and potassium alcohols. When applied to the skin these alcohols are said to cause "gradual destruction of tissue, which may be so moderated as hardly to be perceptible, and may be so intensified as to act almost like a cutting instrument."

These caustics have the advantage that they will dissolve opium, like ordinary alcohol, and also that their action can be stopped immediately by dropping on the eschar a little chloroform, which decomposes the caustic into chloride of the metal and triethyl ether, which is inert locally.