Para-amidophenol Citrate.

A solution of citric acid is, according to Liesegang, an excellent solvent of para-amidophenol — ninety-seven grammes of the latter being soluble in two hundred grammes of the citric acid solution of equal parts, the para-amidophenol being added little by little at a temperature of 18° to 20° C. The citrate of para-amidophenol so formed is employed as a developer in the following proportions:

Para-amidophenol citrate (concentrated solution)	1 c.c.
Sodium sulphite (concentrated)	4 "
Sodium carbonate	5 "
Caustic potash (ten per cent solution)	2 "
Water	50 "

This gives dense blue black images full of detail, the image, with normal exposure, appearing in about ten seconds. Brown tones are obtained if the para-amidophenol citrate is rendered alkaline with caustic potash. The citrate and sulphite are also applicable in aqueous solution as a developer for partly printed images on gelatino-chloride.—*British Journal.*

An American Grain Train.

The Pennsylvania Railroad Company recently ran a special grain train through from Chicago to Jersey City without uncoupling a car or changing locomotives. A distance of 824 miles was traversed, during which time the locomotive was not uncoupled from the train. The total length of the train was 1,602 feet, and it carried 2,640,000 pounds of grain, an average of 66,000 pounds to each car. The locomotive and cars were equipped throughout with Westinghouse brakes. The locomotive and tender weighed 88,500 pounds. The forty thirty-four foot box cars, with loads, weighed 3,824,000 pounds, and the caboose 18,000 pounds. The total weight of the train was 4,030,000 pounds or about 2,000 tons.

SWORD TRICK—A STAB THROUGH THE ABDOMEN.

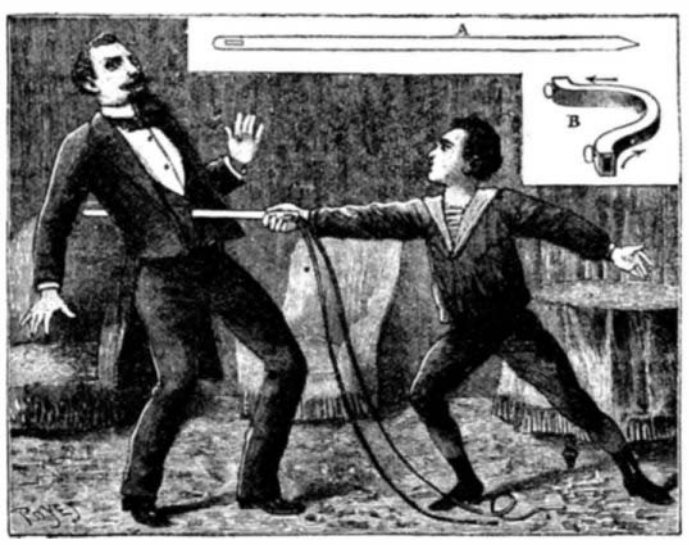
A trick in which a sword is apparently passed through a person's abdomen and drawn out on the opposite side of the body is explained by a contributor to *La Nature.*

The sword employed is a simple, thin, flexible blade of steel, not at all sharp, and the plan of which is seen at A in the accompanying figure. The point is sufficiently blunt to prevent it from doing any harm.

As for the prestidigitator, whose body the sword will simply pass around but not pierce, he carries concealed beneath his vest a sort of sheath that consists of a tube of rectangular section, and semicircular in shape, and the two extremities of which are bent in contrary directions in such a way that they are situated in the same straight line, the two orifices opening in front and behind at right angles with the abdomen. This apparatus, B, is held in place by cords attached to two small rings at the two extremities of the tube.

It is the prestidigitator himself who, appearing instinctively to grasp the point of the sword as if to protect himself, directs it into the metallic tube. It makes its exit between the tails of the coat. It might be made to come out at the center of the back, but in this case it would be necessary to have an aperture formed in the seam of the coat.

The illusion produced is complete, seeing that the flexible blade straightens out on making its exit from the tube, on account of the form of the latter's extremity. It is necessary to operate rapidly, so that the spectators shall not have time to see that the length of the sword has diminished at this moment, the curved line that it follows not being the shortest passage from one point to another.

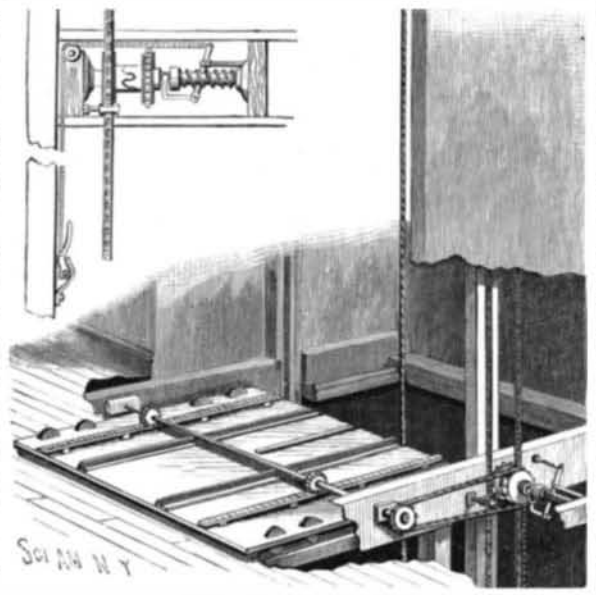


A SWORD TRICK.

The figure represents a variant of the trick, in which the sword is provided with an eye through which a long red ribbon is passed, and which follows the blade when the latter is pulled out at the opposite side of the body.

AN IMPROVED SLIDING HATCH DOOR.

An efficient and durable non-combustible door, adapted to close tightly an elevator opening, and with mechanism for closing the several doors in a building simultaneously, or either one of them separately, are



KIBELE'S HATCH DOOR.

shown in the accompanying illustration, and form the subject of a patent issued to Mr. Cuno Kibele, of Bluffton, Ind. The door is preferably made of sheet metal stiffened by angle irons riveted to its top, and slides on grooved rollers running on tracks on supports between the floors, the side edges of the door projecting beyond the tracks, so that the door will close the well and the slots adjacent to the side posts on which the elevator car runs. The inner edge of the door is slotted, for the passage of the hoisting cable, the slot being normally closed by freely swinging leaves so arranged that the door may be readily pushed over the cable, which is held in the inner end of the slot and inside the leaves when the door is closed. On the top of the door, near its edges, are parallel rack bars meshing with pinions on a suitably journaled transverse shaft, the latter carrying also a sprocket wheel driven by a chain connecting with a loosely turning sprocket wheel on a shaft at one side of the elevator well. The latter sprocket wheel forms part of an interlocking clutch mechanism arranged at each floor, and shown in detail in the small view, whereby the gears connected with each door may be thrown into or out of connection with the endless chain extending vertically through the building, by means of which the various sprocket wheels are operated. With the clutch mechanism in normal position, it is only necessary to pull downward on one side of the chain to close all the doors, or to pull downward on the other side to open them all. By means of a lever connected by a cord or cable with the clutch mechanism, any of the doors may be thrown out of connection with the endless chain.

The Orchilla Lichen.

Interesting reports from United States consuls, in Lower California, Cape Verd, and Ecuador, dealing with the orchilla lichen, have recently been published by the State Department. It grows on rocks on the coast of the Canary and Cape Verd Islands, Sardinia, Minorca, and elsewhere, and in some places is described as a miniature shrub rather than a lichen. It yields the archil of commerce, which gives a rich and extremely beautiful purple tincture. It was extensively used by dyers when, in 1853, the discovery of the orchilla in America and on the Galapagos Islands is said to have created a commercial sensation in Europe, because of its superiority over any lichen in use prior to that time. In 1872 a ship's captain discovered it in Lower California, and after a few years a certain Mr. Hale succeeded in obtaining a concession from the Mexican government of the entire orchilla lands on the Pacific coast of that State—a belt six miles broad and comprising nearly eight degrees of latitude. About 3,000 men were employed in the industry; but since the Congo Free State has become the main source of supply the Californian industry has languished. In the Cape Verd Islands it is plentiful, but difficult to obtain, for it grows on the sides of precipices. The export amounts to about 120 tons, and goes mainly to Lisbon. In Ecuador it is gathered by hand, put in the sun to dry and cure, and is then pressed into bales. The demand at present is small.

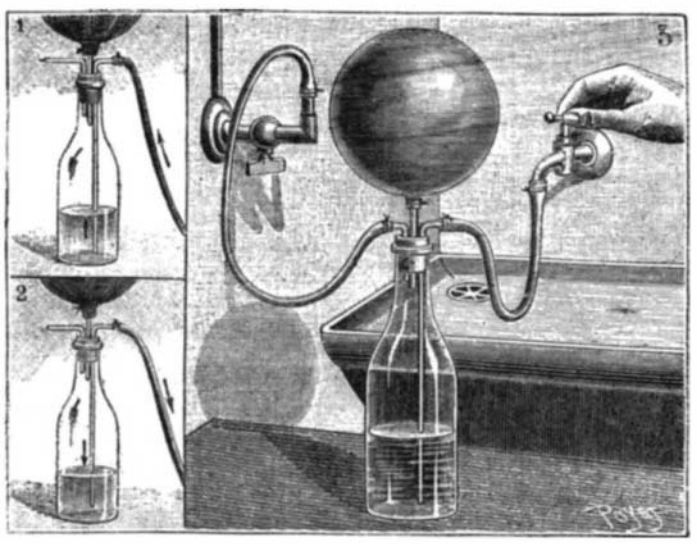
It is used in Europe, especially the Galapagos variety, because of the delicate color, luster, and tone that it gives to silk.

INFLATION OF RUBBER BALLS.

Rubber balls, large or small, protected by an envelope of leather, gradually contract and thus lose all their elasticity, and from this moment are out of use unless one possesses the means of reinflating them. It is then necessary to carefully loosen the rubber that compresses their tubulure, to introduce air under pressure into them, and to reclose them. The pressure that can be exerted with the lungs is far from sufficing, and, for want of a force pump, it is necessary to seek for an arrangement capable of replacing that apparatus. We shall describe here the small installation that serves us for this purpose. It is, we think, within the reach of every one, and will be able to render service to some of our young readers.

A bottle of good quality is provided with a wired cork containing three apertures, designed to receive as many glass tubes. One of the latter extends to the bottom of the bottle, the second is provisionally corked, and the third is drawn out to a point and smoothed with a lamp so as to present no sharp angle. The first is put in communication with the water conduit and to the third is firmly attached the ball to be reinflated. After this, the water from the conduit is allowed to flow into the bottle, and this forces air under pressure into the ball. Then, when the ball is judged to be sufficiently inflated, the cock is closed; but, if the entire contents of the bottle are insufficient, the cock is closed a little before the latter is full of water. A provisional ligature is applied to the ball, then the rubber is detached from the conduit and the contents of the bottle are allowed to flow out after opening the tube No. 2.

The first operation is begun again, care being taken not to reopen the ball until a little water has been allowed to enter the bottle. If there is a cock at one's disposal, it should be placed between the tube, 3, and the ball, and the latter need not then be reattached before the end of the operation.



METHOD OF INFLATING A RUBBER BALLOON.

In order to introduce illuminating gas into rubber balloons, it will suffice to lead it to tube, 2. The bottle being first full of water, and the balloon empty of air, one will siphon in allowing the gas to enter, then the cock of the latter will be closed, and the gas will be forced in by allowing the water to re-enter. This operation seems to be complicated, but in reality it takes less time to perform it than to describe it. Fig. 1 shows the arrangement of the apparatus for the compression of the air. In Fig. 2 the bottle is being emptied in order to give what may be called a second piston stroke. Fig. 3 gives a view of the installation as a whole for inflating a balloon with illuminating gas.—*La Nature.*

Fertilizers.

The usefulness of nitrogen and phosphoric acid in slowly available forms, as they exist in bone, has been amply proved in practice, especially for slow-growing crops, in orchards, meadows and in such other cases where a gradual increase in general fertility is regarded as important. A mixture of fine ground bone and muriate of potash, in the proportion of three parts of bone to one of potash, is used quite largely and has proved a very effective and profitable manure for general use in grain farming. It furnishes all the essential ingredients, it costs less per ton than the average complete fertilizers, and it contains quite as much nitrogen and very much more phosphoric acid and potash.

Under the present condition of the fertilizer trade and for the purposes indicated, the substitution of ground bone, in part at least, for the more expensive though more available complete fertilizers, is in the line of wise economy.—*N. J. Ag. Ex. Station Bul.*