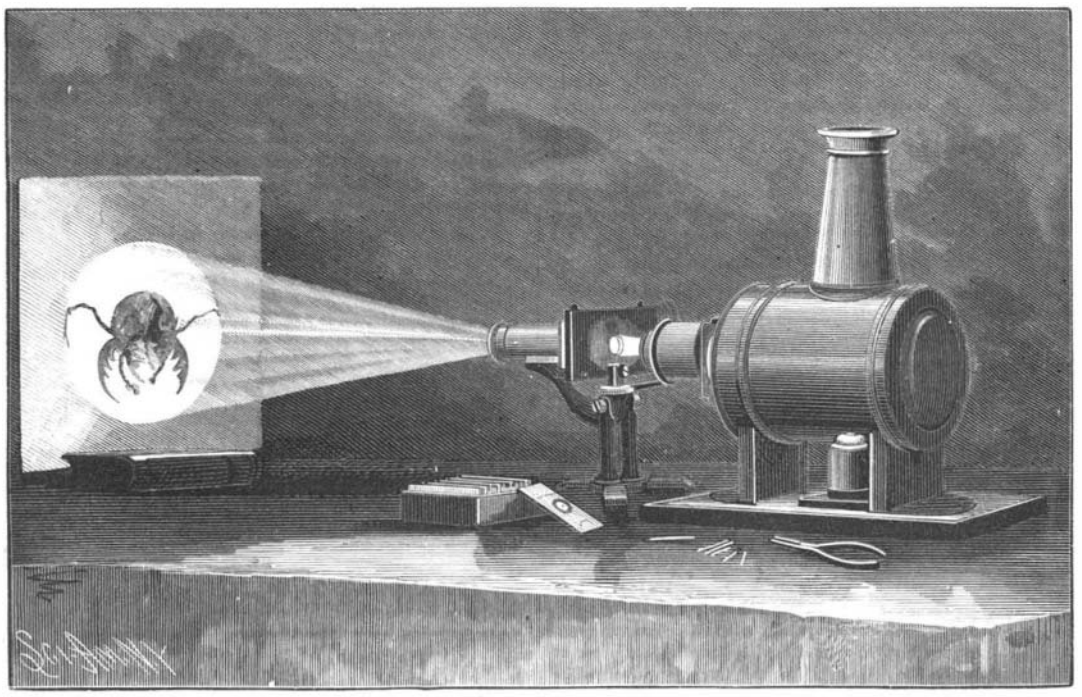
SCIENCE IN TOYS.

XI.

MICROSCOPIC PROJECTION.

In mechanics it is a generally accepted principle that a tool or a piece of apparatus applicable to a large number of uses is too much like the Jack of all trades; but this principle is hardly applicable to physical apparatus, as it is seldom in continual use. In fact, it seems desirable to find as many uses as possible for the different pieces of physical apparatus one possesses, and this remark applies to scientific toys quite as appropriately as to the more expensive apparatus.

In the case now presented, the toy lantern and the toy microscope described in previous articles are pressed into the service of microscopic projection, the lantern serving as the illuminator, the microscope stand as a support for the object, and the eyepiece of the microscope as a projecting objective.



MICROSCOPIC PROJECTION.

To arrange the microscope for projection, the focusing tube is withdrawn from its guide, the draw tube is removed from the focusing tube and inserted in the place of the latter, after being wrapped with one or two thicknesses of paper to make it fit. The eyepiece is now inserted bottom up in the draw tube, that is, with the eye lens next the stage of the microscope. The tube is then turned down into a horizontal position, as shown in the engraving, an object of some kind is placed on the stage, and the lantern is arranged so as to project a bright, sharp image of the flame upon the back of the object. The illuminating power of the lamp may be increased by turning its flame edgewise or at angle of 45°, and (as suggested in the article on the toy lantern) the addition of a small piece of gum camphor to the oil in the lamp intensifies the light.

A screen, preferably of white cardboard, is placed about five feet distant from the microscope, and the image is focused by sliding the draw tube. It will, of course, be understood that the room in which the microscope is used must be made as dark as possible. With these appliances, ordinary objects may be projected so as to be easily visible to twelve or fifteen persons. The nearer the screen is to the microscope, the brighter will be the image.

The eyepiece belonging to this microscope is of the negative kind, that is, the image is formed between the eye lens and the field lens, when the eyepiece is used in the regular way. Very good results may be secured by the use of a single lens. Either of the lenses of the eyepiece may be used by removing the other, but in this case the diaphragm must be taken out to allow the full beam of light to pass.

The objects that may be shown in this way are the larger animalcules found in stagnant water, parts of insects, sections of wood, stems, leaves, etc., crystals, woven fabrics, feathers, etc. The objects selected should be as thin as possible, and if unmounted should be pressed flat between two glasses. An inexpensive cell for containing objects in water may be made by pressing two plates of glass, one inch wide and three inches long, upon opposite sides of one or two segments of a rubber fruit jar ring, and binding the glasses together upon the rubber by means of very strong thread.

Some care is necessary in placing the microscope tube and lantern tube axially in line. It is necessary to support the microscope at such a height as to cause the brightest part of the image of the flame to fall upon the object. A clear, sharp image may be produced in the manner described, but, of course, its size is limited by amount of light available. With a strong light, such as is used in larger lanterns, the size of the image may be greatly increased.

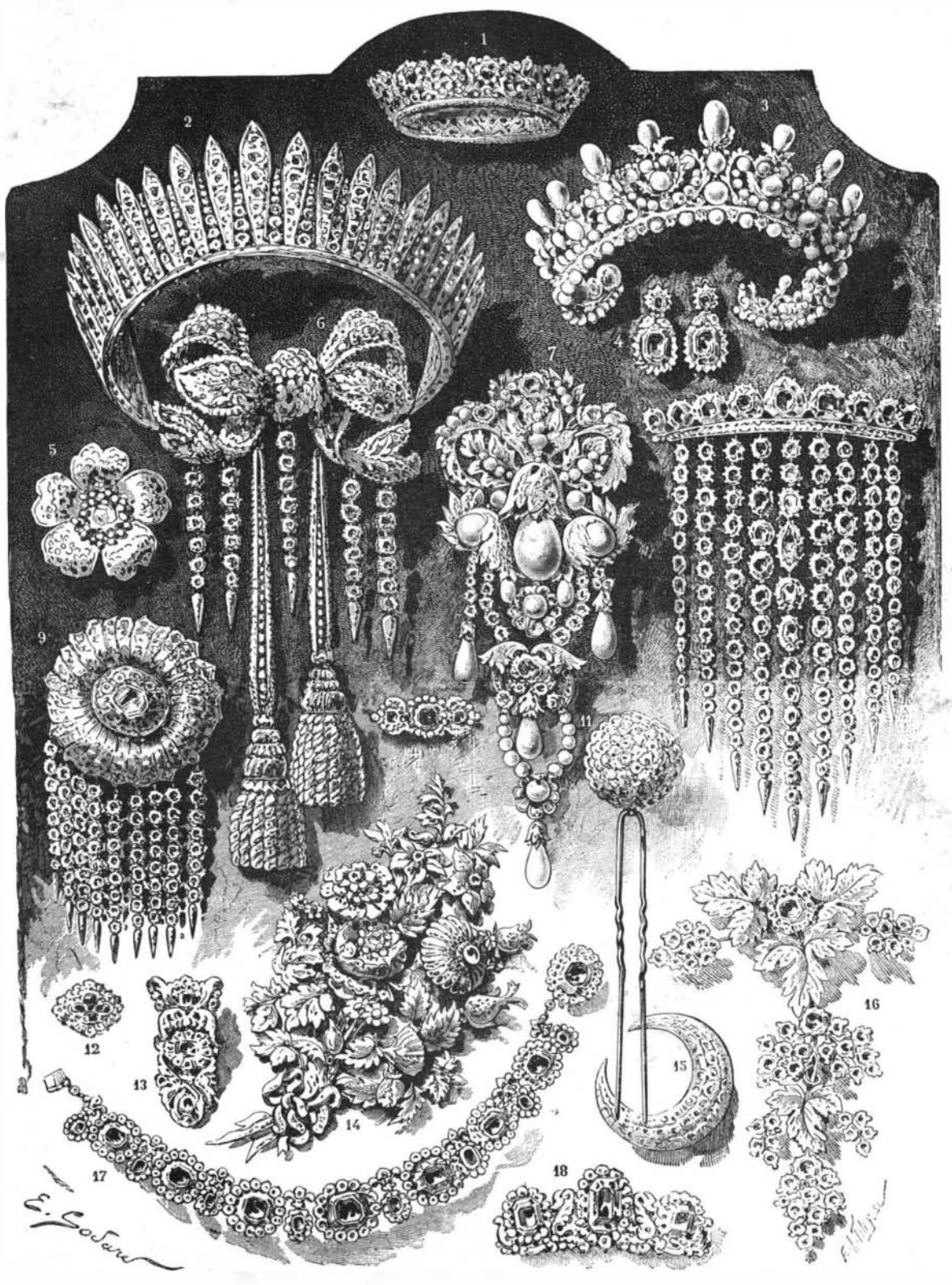
G. M. H.

Fasting and Poisons.

The advance of rational therapeutics will be characterized by increased precision in instructions as to the mode of taking medicaments, their relation to food, their state of dilution, difference of action according to temperament, and so forth. Fasting is already known to exercise an important influence on the effect of certain substances, and M. Roger has further investigated the influence of the state of hunger upon the power of animals to resist the poisonous action of alkaloids. It was found that such alkaloids as quinine, atropine, or nicotine were only four-fifths as toxic if introduced during fasting into the peripheral venous system of a rabbit as compared with their action when introduced while digestion is in progress. But if introduced into the portal venous system during digestion, the toxicity is only half that during fasting. It is assumed, then, that fasting diminishes the power of the liver to arrest the alkaloid, and this coincides with a diminished power of glycogen formation. Sugar given to the animal three hours before experimentation causes the liver to recover its functions. —*Lancet.*

THE CROWN JEWELS.

The sale by auction of a vast number of jewels is a matter of no mean importance, especially so when they are the imperial jewels of no less a country than France. The jewels themselves were of rare worth, owing to their size, purity, and beauty, and their value being many times enhanced by their historical associations. In spite of the meager details that have reached here concerning the sale of the 12th of May and following days, the interest taken in the event has been marked; and although the illustration, which is borrowed from the French paper *L'Illustration*, is as perfect as could have been expected, it can only convey a feeble idea of the beauty of some of the choice gems. Nos. 1, 12, and 13 are a small crown, and pendants of rubies and diamonds. No. 2 is known as the Russian crown. No. 3 the grand pearl crown. Nos. 4, 10, 18, pendants and pins of sapphires and diamonds. No. 17 is a necklace of the same stones. No. 5 a rose. No. 6 a knot with two tassels. No. 7 a brooch with pearls and diamonds. No. 8 a comb with large diamonds. No. 9 a buckle for a belt. No. 11 a rosette for the hair. No. 14 a bouquet to be worn on the corsage. No. 15 a crescent. No. 16 the brooch Sevigne.



THE CROWN JEWELS OF FRANCE, RECENTLY SOLD AT AUCTION IN PARIS.

Many of the jewels sold will be brought to America, several purchasers from this country being represented at the sale. Messrs. Tiffany & Co., of New York, the well known jewelers, purchased a necklace for 183,000 francs. It consisted of four revieres made up of 222 diamonds, weighing 363 carats.

A FORGE hammer has been invented in England which is driven by gas instead of steam.