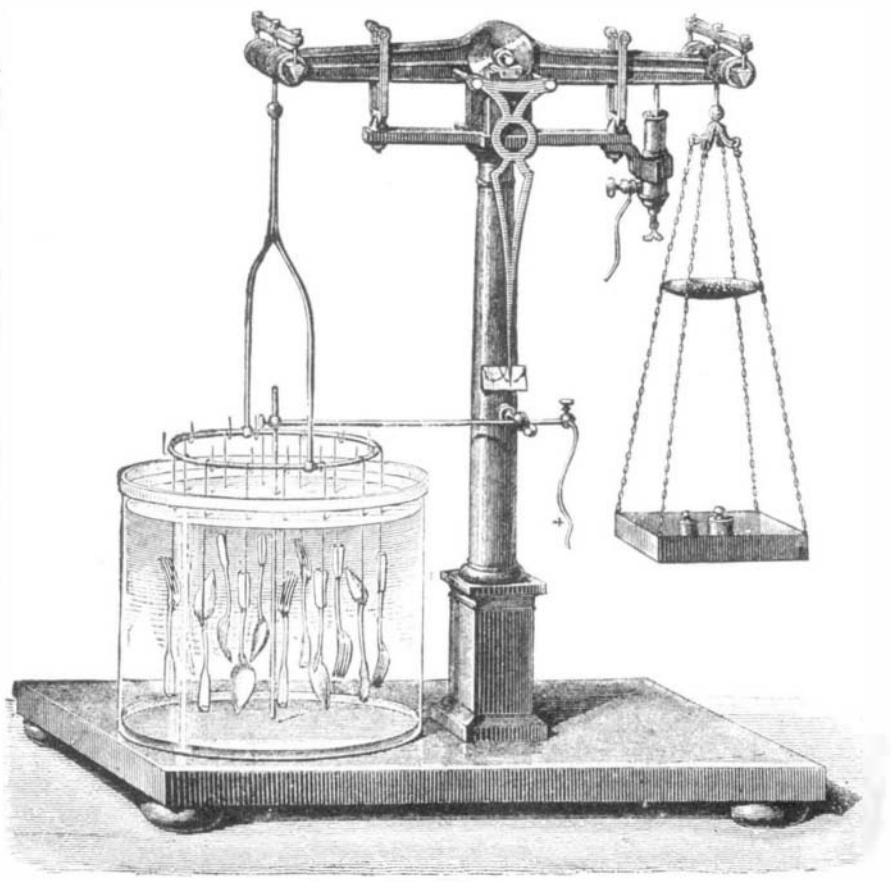
ELECTRO-PLATING BALANCE.

In the operation of electro-plating with gold or silver, a convenient means of regulating the exact amount of metal to be deposited on the articles is afforded by the automatic apparatus herewith illustrated, the invention of M. Roseleur, of Paris.

The objects are suspended in the bath, as shown, from one arm of a scale beam. A horizontal rod, fixed to the standard, supports at one extremity the soluble anode in the bath, and at the other connects with the positive pole of the battery. The opposite arm of the beam carries two scale pans, in the upper of which is placed a weight sufficient to produce equilibrium in the apparatus. In this position, the current does not pass, since the rods carrying the objects which form the negative pole are not in connection with the battery. But if in the lower pan of the balance are placed weights, corresponding to the amount of precious metal which it is desired shall be deposited, the equilibrium is destroyed. Necessarily the beam descends to the right, and, at the same time, plunges a metallic point into a cup filled with mercury which is in communication with the negative pole of the battery. The circuit being thus established, the operation progresses and continues without necessitating attention, until a quantity of the anode is deposited on the objects, of sufficient weight to cause equilibrium with the weights in the lower scale pan. The beam then becoming once more horizontal, the point is withdrawn from the mercury, the current is broken, and the action ceases.



ROSELEUR'S ELECTRO-PLATING BALANCE.

Fecundation of Vegetables.

M. Beer announces that he has put Hooïbreuk's process for the fecundation of vegetables in successful practice in the Botanic Garden of Vienna.

This process, which, it would seem, achieves important results, consists simply in touching the extremity of the pistil (the stigma) of the flower, just before it blooms, with a pencil dipped in honey or, better still, with honey mingled with the pollen of the same plant on which the operation takes place. The process has succeeded admirably, it is stated, on fruit trees, and even on certain particular branches of trees which had never borne. On the portions thus treated, fruit formed in natural course, while other parts remained in their normal condition.

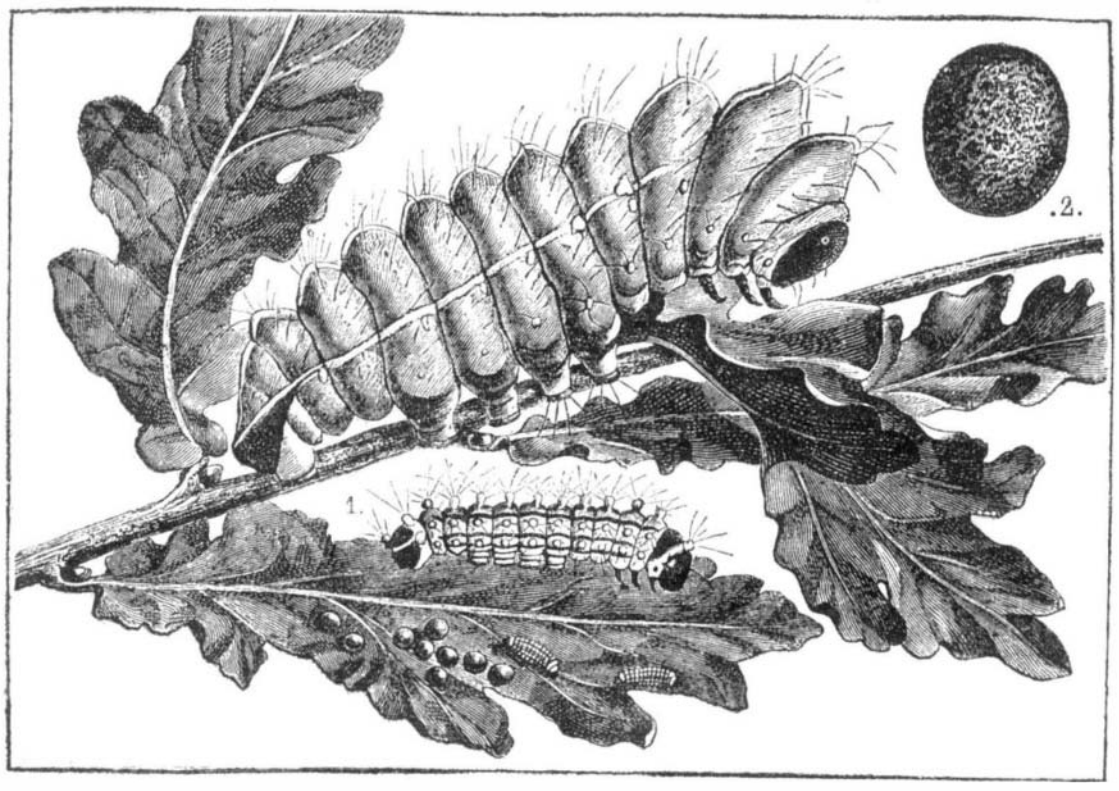
THE YAMA-MAI, OR OAK TREE SILKWORM.

The Yama-maï is a species of silkworm common in Japan, which derives its sustenance from the leaves of oak trees. It has recently been introduced in Europe with considerable success, and is readily acclimated. In Austria, it is stated that Baron Bretton has obtained from a third generation 4,000 cocoons and 300,000 eggs. Our illustration, for which we are indebted to *La Nature*, shows the worm fully developed and in its natural size, the young enlarged (1), and also the egg considerably magnified (2). The egg is round and slightly flattened in form, of a brown color, more or less dark, and is covered with black granules. Its greatest diameter is 0·09 inch, and its thickness varies according to the state of incubation. As soon as the young worm emerges, it rapidly attains, owing to its contact with the air, a size greater than it had in the egg. In a short time it grows to a length of 0·21 inch, as indicated in the lower portion of our engraving. The head, first thoracic segment, and the legs, are of a reddish mahogany tinge, without spots, and the rest of the body is a golden yellow, the color of gamboge. All the segments, from the second to the eleventh, are traversed by five longitudinal and sharply distinguished black lines. At the end of the first age, which lasts sixteen days, the caterpillar, after its change of skin, is 0·45 inch in length and of a subdued green color, slightly yellowish underneath. At the third age, after a second change of skin, the length increases to 1·1 inches, and the green color becomes brighter. Subsequently, during the fourth age, the body grows to 2·7 inches, and finally to 3·2 inches, when it becomes fully developed. The color at this period corresponds very closely to that of the leaves on which the worm feeds.

The caterpillar now begins its cocoon, uniting two leaves with several threads, which are, in turn, secured to branches. Its nourishment consists in the tenderest branches, contrary to the ordinary habits of other worms. Finally, it ejects a large drop of transparent liquid and begins to spin. The chrysalis, which is the sixth age of the caterpillar, is contained in a closed cocoon. In order to open the latter, a reservoir of liquid is supplied at the rear end, which fluid has the property of softening the silk, so that the butterfly can readily break its way out. The cocoon strongly resembles that of the ordinary mulberry leaf silkworm, and the raw silk is readily mistaken for the work of the latter.

After a repose of fifty days the butterfly appears, and is of a bright golden yellow tinged with orange on the wings and body. The head is reddish, with light colored antennæ, and the under sides of the wings are brown with gray spots.

The importation of silk worm eggs from Japan to Europe is now in extensive progress, and it is an interesting fact that, in place of transporting them *via* the Isthmus of Suez, as heretofore, the transcontinental route is preferred. The first shipment ever thus made, consisting of nine tuns of eggs, valued at $200,000, recently arrived at San Francisco, from Japan, and were dispatched in a freight car to the Atlantic coast for transmission to Milan, Italy. They were packed in leaves, in layers, in airtight tin boxes, which, in turn, were covered with matting. The interior of the car was kept below the freezing point, and light carefully excluded.



THE YAMA-MAI OR OAK TREE SILKWORM.

A variation of seven degrees of temperature, it is said, would be sufficient to kill the germs. By this route the time required to reach Milan, from Yokohama, is forty-two days; while, by the passage through the Indian Ocean and the Suez canal, it could be effected in thirty-nine days. The number of transhipments would be the same in both cases; but the American route passes through temperate latitudes, while the other would expose the eggs to the extreme of tropical heat.

A SOLUTION of pearlash in water, thrown upon a fire, extinguishes it instantly; the proportion is 4 ounces, dissolved in hot water, and then poured into a bucket of common water.

Preservation of Vegetables by Drying.

The vegetable designed to be acted upon is first picked and washed, then placed in a large drying room, fitted with shelves and sieves for the spreading, shaking, and turning of the vegetables during the drying, and supplied with dry air at a temperature of from 95° to 100° Fah., and from which the moist air is discharged through the chimneys. After this they are subjected to pressure, formed into tablets of a certain size, wrapped in tin foil, and then packed in tin cases for preservation and for sending away. To prepare this for use, it is only necessary to steep it for one hour in warm water, and then cook the same as fresh vegetables.

The following is an extract from the Annals of the Central Horticultural Society of France: "It appears that there is established in Paris, at No. 5 Rue Marbœuf, under the direction of Messrs. Chollet & Co., a manufactory for the preparation, by the process of M. Masson, of vegetable substances, with which the French navy and commercial marine are furnished. The Horticultural Committee pronounced the opinion that the desiccating process of M. Masson preserves vegetables without altering their constitution, and reduces them to a small bulk without impairing their flavor or nutritive qualities. M. Masson's processes are applied with entire success to most vegetables and several fruits. Thus all cabbages, spinach, parsley, cress, chervil, succory, and sorrel, are dried and pressed to a very small volume. It is the same with carrots, turnips, parsnips, celery, salsify, and viper's grass, which are cut in thin slices and into small pieces, to make Julienne. Cauliflowers, Brussels sprouts, asparagus, and string beans, in order to resume their natural appearance, should not be pressed. Potatoes are perfectly preserved in thin slices. Peas and beans, in a green state, are succeeded with very well. Lastly, various fruits, and especially apples and pears, in slices, are also dried, and keep perfectly."

Charcoal and Tar as a Surgical Dressing.

The London *Lancet* strongly recommends the use of a mixture of charcoal and coal tar, containing 33 per cent of the latter, in pulverized form, as a dressing for wounds. The powder exercises no irritative action, and is easily removed by lotions of cold water. The charcoal absorbs gases due to fermentation, coagulates the albumen, and prevents decomposition, in this respect materially aiding the action of the carbolic acid contained in the coal tar. For wounds which cannot bear the contact of the powder, 100 parts of pulverized coal tar are macerated for some hours in 400 parts of rather weak alcohol. The solution is said to be very efficacious.

Salt in Sickness.

Dr. Scudder remarks: "I am satisfied that I have seen patients die from deprivation of common salt during a protracted illness. It is a common impression that the food for the sick should not be seasoned, and whatever slop may be given, it is almost innocent of this essential of life. In the milk diet that I recommend in sickness, common salt is used freely, the milk being boiled and given hot. And if the patient cannot take the usual quantity in his food, I have it given in his drink.

This matter is so important that it cannot be repeated too often, or dwelt upon too long.

The most marked example of this want of common salt I have ever noticed has been in surgical disease, especially in open wounds. Without a supply of salt the tongue would become broad, pallid, puffy, with a tenacious pasty coat, the secretions arrested, the circulation feeble, the effusion at the point of injury serous, with an unpleasant watery pus, which at last becomes a mere sanies or ichor. A few days of a free allowance would change all this, and the patient get along well."

New Method of Preparing Aluminum.

The oxide of aluminum is first prepared by any of the processes now in use, either from kaolin or clay. It is then mixed with wood charcoal in the proportion of 40 parts charcoal to 100 of alumina, and heated to a red heat. While still hot, the mass is placed in retorts heated to dark redness, and chlorine gas is passed over it from a gasometer. The volatile chloride is condensed in the receiver, and afterwards decomposed by the battery; the chlorine which is set free is returned to the gasometer to be used over repeatedly. Garneri employed a magneto-electric apparatus.