water to bring it up to 50 grammes. To coat the glass, clean it first with nitric acid, and then place it on supports in a flat dish full of the silvering solution in such a way that its lower surface only touches the liquid. Great care must be taken that no bubbles of air interpose between the surface of the glass and that of the liquid, or they will give rise to bare spots. Sunlight or heat will facilitate the reaction. The liquid will at first blacken during the operation, and will then grow clear again in proportion as the deposition is effected. At the end of from half an hour to an hour the silvering will be complete, though sometimes it takes an hour and a half. When it is quite finished the glass is taken out of the bath and rinsed with distilled water, and so soon as the mirror is dry it is coated at the back with bitumen. If it be intended to keep it as a mirror only, it should be coated with some kind of elastic varnish, not liable to scale off, for if this should happen the mirror would be spoiled.

THE KEEPING OF GELATINE EMULSION.

PIQUÉE, a photographer at Troyes, has observed that gelatine emulsion can be kept under water, and that when it has been kept in this way for a sufficiently long time, its sensitiveness will be considerably increased; this, of course, is owing to the fact that decomposition of organic matter is avoided. His experiments have extended over a period of twenty days. M. Balagny, who is a very skillful operator with gelatine plates, is of the same opinion; he keeps his emulsion in a state of coagulation without being compelled to reduce it to the form of pellicle. This object he attains by placing his stock of emulsion in a cool place, and filling the flasks in which it is kept up to the top, so as to expose only a small surface to the air. A few drops of alcohol poured on the surface of the coagulated emulsion materially assists in preserving it, or a small quantity of solution of ammonia has the same effect.

THE STATUE OF GALVANI AT BOLOGNA.

THE city of Bologna has recently erected a statue in honor of one of its greatest citizens—Galvani. We reproduce herewith the aspect of the marble which is to perpetuate the physiognomy of the illustrious physicist. It represents him at the moment when the muscles of the frog are revealing to him the effects of electricity on the animal organism. This

STATUE OF GALVANI AT BOLOGNA. (From a Photograph.)

remarkable piece of sculpture is from the chisel of M. Adalbert Cincetti, the eminent artist of Rome, Italy.

Luigi Galvani was born at Bologna on the 9th of September, 1737, and died in that city on the 4th of December, 1798. From his very youth he made himself remarked by his ardor in the study of anatomy and physiology. At the age of twenty-five he was made professor of anatomy in the University of Bologna, in consequence of his thesis on the "Bones, their Nature and their Formation." The duties of this place did not prevent him from practicing obstetrics and surgery, and from performing operations in which he showed great ability. It was in 1791 that Galvani was put on the track of the discovery which was to immortalize his name. History gives several different versions of this discovery. It is said that in preparing some frogs to make a *bouillon* for his wife, who was dying of an affection of the breast, he happened to accidentally touch the lumbar nerves of one of the animals with different metals, and noticed that the hind legs thereupon contracted with great force. Again, it is said, that having skinned a frog, taking away its two legs with a part of the spine, he attached the whole to a copper hook which he had hung upon an iron railing near his laboratory. He stood watching to see if the electricity of the atmosphere would produce upon these legs the same effect as the electrical machine. After a time, having observed no sign of electrical influence, he decided to remove the frog's legs, and while doing so he perceived the very muscular contraction which he had been vainly expecting to see produced by atmospheric electricity. He soon discovered the condition of this contraction, which was the contact of the moist limbs of the frog with the iron rail. Having substituted for the copper hook and iron rail a metallic arc composed of pieces of these two metals, he found that he could produce the contraction at will. Galvani first published the results of these experiments in 1791, in his celebrated work, "De Viribus Electricitatis in Motu Musculari Commentarius." According to the theory proposed in this work, the muscles chiefly contain the animal electricity which manifested itself in the above experiments, and which he thought was supplied by the nerves and the blood. When these discoveries became known, the whole civilized world was seized with admiration, and the curiosity to witness his experiments became universal. The phenomenon was designated as *galvanism*. Although Galvani's opinion was held by numerous partisans, Volta victoriously refuted it, and demonstrated that the pretended nervous fluid was nothing else than ordinary electricity for which the organs of animals might serve as conductor, and of which they might even be generated. Galvani never yielded to these arguments of his adversary, and refused to abandon his theory up to his death. Although he really made a great discovery, he left Volta to reap the important fruits of it. At the very moment when Galvani was immortalizing his name, he was obliged to undergo the most cruel blows of destiny; for he lost his dearly beloved wife, Lucia Galeazzi, and a short time afterwards had the misfortune to be ordered by the Cisalpine Republic to take an oath which was entirely contrary to his political and religious convictions. He did not hesitate a moment, but promptly refused to take a vow which was repugnant to his feelings, and permitted himself to be stripped of his positions and titles. Reduced nearly to poverty he retired to his brother's house, and soon fell into a state of lethargy from which he could be aroused neither by medicine nor by the decree of the government, which, out of respect for his celebrity, restored to him his position as professor of anatomy at the University of Bologna. But the great physicist died without having again occupied the chair which he had rendered so illustrious.

PEARL INLAYING ON IRON.

THE method by which pearl inlays are made upon enameled or japanned cast or sheet iron is very simple, and at the same time the results obtained are very striking.

Cast and sheet iron and *papier mache* are the materials upon which pearl is generally laid. If the article be of cast iron, it is well cleaned from the sand which usually adheres to the casting, and is blackened with a coat of varnish and lampblack. When this is thoroughly dried, a coat of japan or black varnish is spread evenly upon it. Before the varnish becomes too dry, pieces of pearl cut in the form of leaves, roses, or such flowers as the fancy of the artist may dictate, or the character of the article may require, are laid upon the varnish and pressed down with the finger, and they immediately adhere to the varnished surface. The sheets of pearl may be obtained so thin as to be more like paper than anything else. After the pieces are in place the work is put into a heated oven and kept there for several hours, or until the varnish is perfectly dried. It is then taken from the oven and another coat of varnish applied indiscriminately on the surface of the pearl and the previous coating, and again placed in the oven to dry. This process is repeated several times, until the thickness of the varnish is such that the top of the pearl is level with the body of the varnish, which is then scraped off the pearl with a knife, and the surface of pearl and the varnish around it are found to be quite even. The pearl is then rubbed with a piece of pumice-stone and water, and the surface of the varnish is rubbed smooth with powdered pumice-stone, moistened with water.

It is in this unfinished state that the pearl has the appearance of being inlaid, and from which it derives its name. It is, in fact, inlaid in the varnished surface, to which it adheres with surprising firmness. Its final beauty and finish depend altogether on the skill of the artist under whose hands the shapeless and almost unmeaning pieces of pearl are made to assume the form of beautiful flowers, leaves, etc. The artist traces the stems and leaves of the flowers with a camel's hair pencil dipped in a size made of varnish and turpentine; upon this he lays gold leaf, which adheres where there is size, and the superfluous gold is carefully brushed off with a piece of silk. The flowers and leaves are then painted in colors, and when dry the picture and surface of the article are covered with a coat of refined white varnish. One point should be observed, which is too frequently forgotten by those who paint upon pearl in this country, and that is to use only transparent colors when painting on the pearl itself. This is the secret of the great brilliancy obtained in most of the European work upon pearl.

The kinds of pearl used are three—mother-of-pearl, in the pearl oyster, or white pearl, as it is called by the artist, and it is known by its clear white surface; aurora shell, which can readily be told by its wrinkled appearance and its various prismatic colors, and is made from the shell of the genus of *Mollusca* known as the sea-ear or ear shell, and known to the conchologist as *Haliotis;* the green snail shell, which can be told by its glistening colors of light and dark green, or soft yellow and bright beautiful pink, blended together.

To manufacture the pearl ready for inlaying, the workman cuts the rough shells in pieces with saws, and then grinds the pieces upon both sides upon a common grindstone until they are of the requisite thinness. Out of these pieces the artist cuts the forms of leaves, flowers, etc., with a pair of common scissors preparatory to placing them in the varnished surface. The necessary forms may be cut from the thin pieces of pearl by means of a punch and dies, with power applied by the foot of the operator. When a number of pieces are required of the same size, the pieces may be fastened together with glue as one solid plate, and then the required form marked upon the outside one; then these being held in a vise, the form can be carefully sawed out with a fine saw. By placing the cemented pieces in warm water, the glue softens, and the shells are easily separated and the glue washed off. The artist is no longer under the necessity of preparing the shells for himself, as they can be obtained all ready for use at almost any artist's material store in the country.

This art of inlaying is not confined to the representation of flowers alone; landscapes, with houses, castles, trees, churches, and bridges are very easily made, and when represented as being seen by moonlight are very beautiful. The rising moon can be represented surrounded by clouds of gold and silver bronze, and when pieces of pearl are placed in certain positions to reflect their colors, the moonbeams are represented as glancing over the landscape in alternate light and shadow.

A varnished surface can be ornamented by transferring drawings or engravings to it, and the process is quite simple. A thin coat of copal varnish is spread upon the surface of the article, and when nearly dry the engraving is applied with its face downward and carefully pressed to exclude all air bubbles. When the varnish is sufficiently dry, the paper is thoroughly moistened with a sponge dipped in warm water, and the paper can be rubbed off, leaving all the lines of the print upon the varnished surface.

STILL ANOTHER LETTER COPYING PROCESS.

HERR ADLER has communicated to the Vienna Photographic Society a multiplying process based upon the use of the *glue plate*, consisting of gelatine, glycerine, and water (though the last-named ingredient is present in a smaller quantity than usual), used in the hektograph and other similar processes. For writing or drawing, Herr Adler uses a concentrated solution of alum, to which, in order to render the writing or drawing visible upon the paper) a few drops of some aniline color are added. Before laying the writing or drawing upon the gelatine surface pass a damp sponge over the latter, and allow the moisture to sink in for a few minutes so has to have a greater effect upon the alum. Then lay the written side downward upon the gelatine, and after the lapse of a few minutes, on removing it, the writing will be found reversed and eaten into the gelatine film as if it were engraved. By means of an India-rubber roller a little common printing ink is spread over the plate and absorbed by the lines sunk by the alum, and again rejected on the application of moisture upon the paper laid down upon it, and smoothed over it by the flat hand. When removed this paper will have upon it the first impression of the writing or drawing. For each succeeding impression the plate must be inked, as in lithography, by the India-rubber roller. A considerable number of impressions can be taken.

THE HEIGHT AND SPAN OF THE JAPANESE.

WE well remember that quaint little group of two-sworded, strangely-dressed men who, in the 1862 Exhibition, were pointed out as ambassadors from that then almost *terra incognita*—Japan. The curious would saunter past these eastern islanders in order to form a comparative idea of the height of men whose ample skirts made their height appear greater than their, in truth, diminutive stature warranted. China has since sent us for exhibition the gigantic "Chang;" but Japan, though puzzling us with its clever legerdemain and fascinating us with beautiful *objets d'art*, has as yet not shown us that it can produce men of fine growth. Possibly the Japanese agree with Shakespeare, that "small herbs have grace," whilst "ill weeds grow apace," for it would appear that many of the probable causes of their smallness are directly due to their own agency.

The data that we have for estimating the height of the Japanese are more exact now than the rough measurement above alluded to. Mrs. Chaplin Ayrton, M.D., has recently published* the results of nearly three hundred observations of the height and span of the Japanese. She found the average height to be 5 feet 3 inches, and their span 4 feet 11 inches. In the case of twenty-four women, taken at random, the tallest was a trifle over 5 feet 2 inches, and the average was 4 feet 8 inches, with an average span of 4 feet 6 inches. The shortness of the span as compared with the height is a general characteristic that is especially marked in the case of the women. This gives rise to the theory whether the habit of raising the shoulder-pole for carrying burdens, and the universal practice of tying the infant to the back, may not—by making the arms unused to great muscular exertion—arrest, in a measure, their development.

From the tables of height given the Japanese appear to be not only much smaller than the western nations, but also less variable in height. This may possibly be due to a less

* "Recherches sur les Dimensions Générales et sur le Developpement du corps chez les Japonais."—Thesis for the degree of Doctor of Medicine presented and sustained by Mrs. Chaplin Aryton before the Faculty of Medicine of Paris.