

**Preparations of Large Crystals.**

R. Van Melckebeke (Pharm. Jour., iv, p. 535) prepares large crystals by a method of systematic culture. He first obtains, says Merck's Market Report, very regular detached small crystals by immersing linen threads in a saturated solution of the substance, which is then allowed to cool very slowly. The small crystals formed on the threads are examined with a lens, and all imperfect ones removed. The threads are then again immersed in a saturated solution of the salt, the vessel being covered with a bell glass, which also incloses a dish containing sulphuric acid. When the edges of the crystals measure 4 or 5 mm., another saturated solution of the salt is prepared at a temperature much above that of the surrounding atmosphere, filtered, and allowed to stand all night, some small crystalline particles being added so as to avoid oversaturation. The volume of this solution should be proportionate to the size of crystals desired; thus, for a crystal of 1 kg., 1 liter of solution should be prepared. The next day the solution is decanted into a confectioner's glass jar, and toward evening the crystals are immersed in it.

A convenient apparatus for this purpose is made like a scale pan. Two circular pieces of glass are supported by means of three copper wires, which are joined at the top, where a hook is formed, and wire triangles, midway and at the bottom, support the two plates. The apparatus is first moistened with the solution, the selected crystals are then placed on the glass plates, and the whole is then immersed and left until next morning, when the crystals are removed and carefully dried with a fine linen cloth. The strength of the solution must next be made up by dissolving in a small quantity of it the equivalent of the salt deposited during the night. The amount to be added will vary with the temperature and the size of the crystals, and must be found by experiment. If the solution be oversaturated, there will be an excessive deposit upon the crystals and plates, and if too weak the crystals will be eroded. When the resaturated solution is again of the temperature of the surrounding air, the crystals should be once more immersed over night, and the whole process must be repeated daily until the crystals are large enough. To insure the transparency of the crystals they may be moistened with alcohol before immersion in the solution, the surface layers of air being thus removed.

A perfect octahedron of potash alum, weighing 2 kg., and the edge measuring  $13\frac{1}{2}$  cm., was obtained by this process in about seven months.

**The American Institute Fair.**

After a lapse of four years, the American Institute Fair is to be held this year in the Madison Square Garden, New York City. The fair will open on September 28 and will close October 29. It will be on the same lines as those held in the past. All of the departments will be on the main floor, with the exception of the machinery, which will be placed in the basement. Medals and diplomas will be given. The first exhibition of the institute was held in Masonic Hall, on Broadway, near Pearl Street, soon after it was organized in 1829, and successive fairs were held in Niblo's Garden, Castle Garden, and in the Crystal Palace, which was destroyed by fire in 1858 during the fair. The next year the fair was held in Palace Garden, in Fourteenth Street. In 1863 it was held in the Academy of Music and in 1864 in the Fourteenth Street Armory. In 1869 the Empire Rink, on Third Avenue, was first used for exhibition purposes, and in it the fairs were held until 1892. It was intended to hold the next fair in a new building to be erected on the same lot at an expense of \$200,000, but as no agreement could be reached with the owners of the land, it was not built, and the exhibitions were suspended for four years. The "Fair of the American Institute" was quite an institution in New York and will doubtless be as well attended in the future as in the past.

ONE pound of cork is said to be amply sufficient to support a man of ordinary size in the water.

**X RAY PHOTOGRAPHY.**

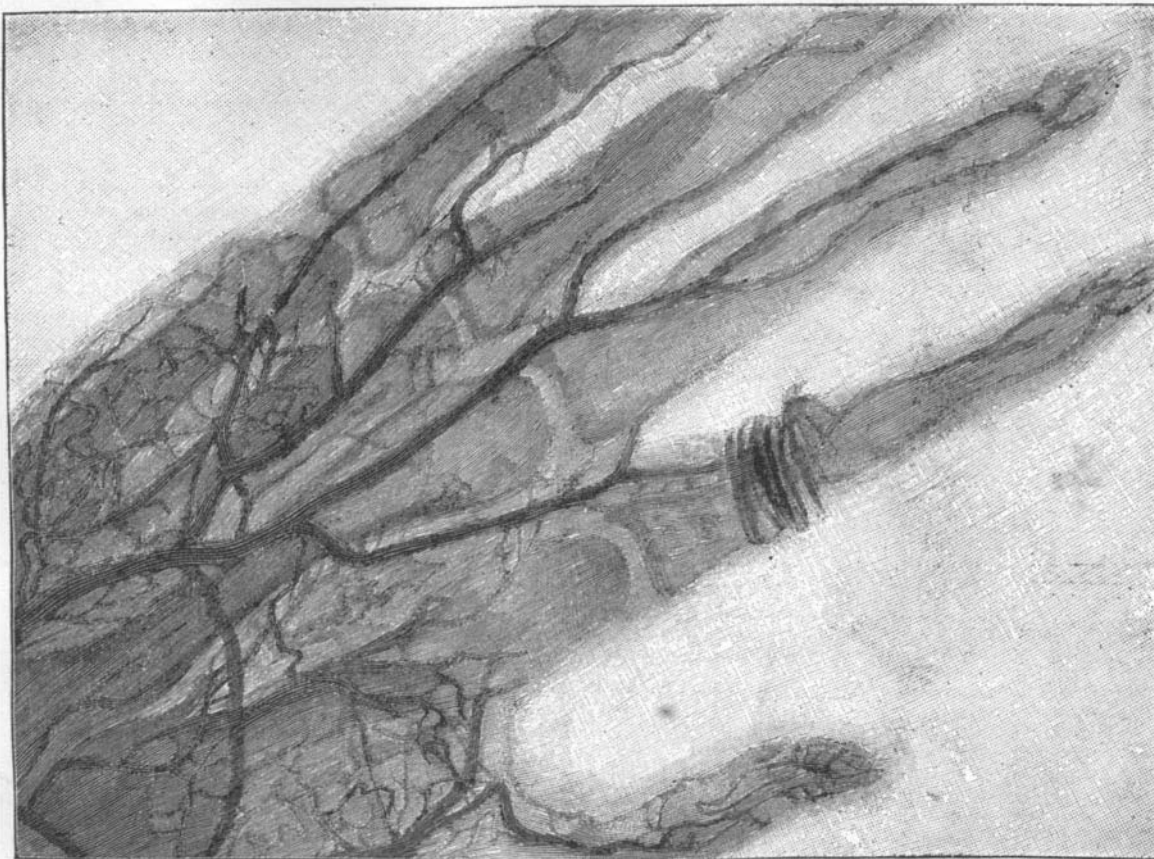
We reproduce from the Illustrirte Zeitung two very beautiful examples of X ray photography. The hand is of especial interest as being the first photograph that we have seen that shows clearly the position of the veins in the hand. The effect was produced by injecting a fluid in the hand of a corpse, thus making



AN X RAY PHOTOGRAPH OF A BIRD.

the veins opaque to X rays and enabling them to be photographed.

Among the experimenters who have lately had remarkable success in photography by means of the Roentgen rays is Dr. Fritz Giesel, of Braunschweig, whose photographs in natural colors have already made a reputation for him in the photographic world. His pictures of still life, showing the natural colors of fruit, flowers and birds, may certainly be classed as some of the best work of this kind ever done, and his success with the puzzling Roentgen rays is proved by the accompanying reproduction of a photograph of a canary bird taken immediately after death. The rays passed unimpeded through the feathers, nothing of which shows, the fleshy parts are lightly outlined, but the impenetrable bones have come out distinctly. The photographer was enabled to obtain this remarkably sharp impression by wrapping the plate in black



AN X RAY PHOTOGRAPH, SHOWING THE VEINS OF THE HAND OF A DEAD PERSON.

paper, instead of putting it in a plate holder, and fastening the bird to it. The sharpness of the photograph increases, of course, as the distance of the object from the plate is decreased. Dr. Giesel exposed this plate for about twenty minutes.

It is to be hoped that the vacuum tubes may be improved so that the Roentgen rays can pass through

them, giving the rays a much greater intensity outside of the tubes and thus doing away with the long and tiresome exposures now required. An improvement of this nature will be of the greatest importance in the application of the rays to diagnoses in medical practice.

Our second illustration is the photograph of the hand of a corpse, taken by means of the Roentgen rays, by Mr. Haschek and Dr. Lindenthal, in Prof. Franz Exner's physico-chemical institute, in Vienna. To them belongs the honor of being the first to apply the wonderful discovery of the Wurzburg investigator to a new branch of research. The veins, etc., in the hand—which was the hand of an old woman—are shown by the injection of Teichmann's mixture, which consists of lime, cinnabar and petroleum.

Turning now to other sources of information, we find that comparatively little that is new has been developed lately. Very good results have been obtained by Prof. Pupin, of Columbia College, using a six plate Holtz machine for exciting the Crookes tubes. This is an advance in the simplification of the process at least. Prof. McKay, of the Packer Institute, Brooklyn, exposes a number of plates at once to the rays emitted by a so-called perfect vacuum tube. He finds that it makes no difference in what position the plates are placed with reference to the tube. From Harvard University comes a new X ray lamp, with aluminum walls of conical shape. F. L. Lawrence, its originator, has obtained excellent X ray photographs with it on five seconds exposure, with 25,000 to 30,000 estimated potential difference. With higher voltage it is hoped that the exposure may be further shortened. In the German Reichstag, the Parliament Chamber was employed for a lecture on the subject by Prof. Speiss, who spoke of the probability in the near future of letters being read while in the mail boxes. Lead boxes would, he said, be a preventive. In Berlin, Prof. Bergmann performed the first surgical operation using X rays as yet executed there, extracting shot. He seemed apprehensive that their use might induce surgeons to extract missiles better left undisturbed.

Another interesting development is the production of direct optical shadow effects on a disk charged with barium platino-cyanide. This is the fluorescent salt used by Roentgen in his first experiments. A disk coated with a preparation of this salt is fastened over the end of a tube, phosphorescent surface inward. It is obvious that if X rays are allowed to fall upon the outside of the disk, it will appear luminous to an eye applied to the other and open end. On it Roentgen or X ray shadows can be produced by simply interposing a body opaque to the rays between the Crookes tube and the disk.

**The Life of the Steel Rail.**

Mr. J. F. Wallace, writing in the Engineering Magazine for December, states that while it is true that there has been a steady and uniform decrease in the price of steel during the last quarter of a century, the average standard weight of rail for main lines has at the same time increased from 60 lb. to 99 lb. per yard, and the quality has materially depreciated. As an example of the deterioration that has taken place in quality, he states that during the past year he has relieved from a main track on tangents rails that weighed 75 lb. to the yard which had been in the track only five years; whereas, on the same district, and under precisely the same traffic conditions, there still remain in the track 60 lb. rails that have been in service for over fifteen years, which it was not considered necessary to renew this season. While this may be an exceptional case, he considers the steel rail which was furnished by the manufacturers fifteen to twenty years ago about 50 per cent better than the rail now manufactured. This is not intended to apply to special high class rails, which

may be furnished by a few rolling mills under superior specifications, but to the ordinary rail supplied to and purchased by the majority of railroads.

ONCE every year the Emperor of China, amid great pomp and ceremony, plows a furrow in order to dignify agriculture in the eyes of his people.