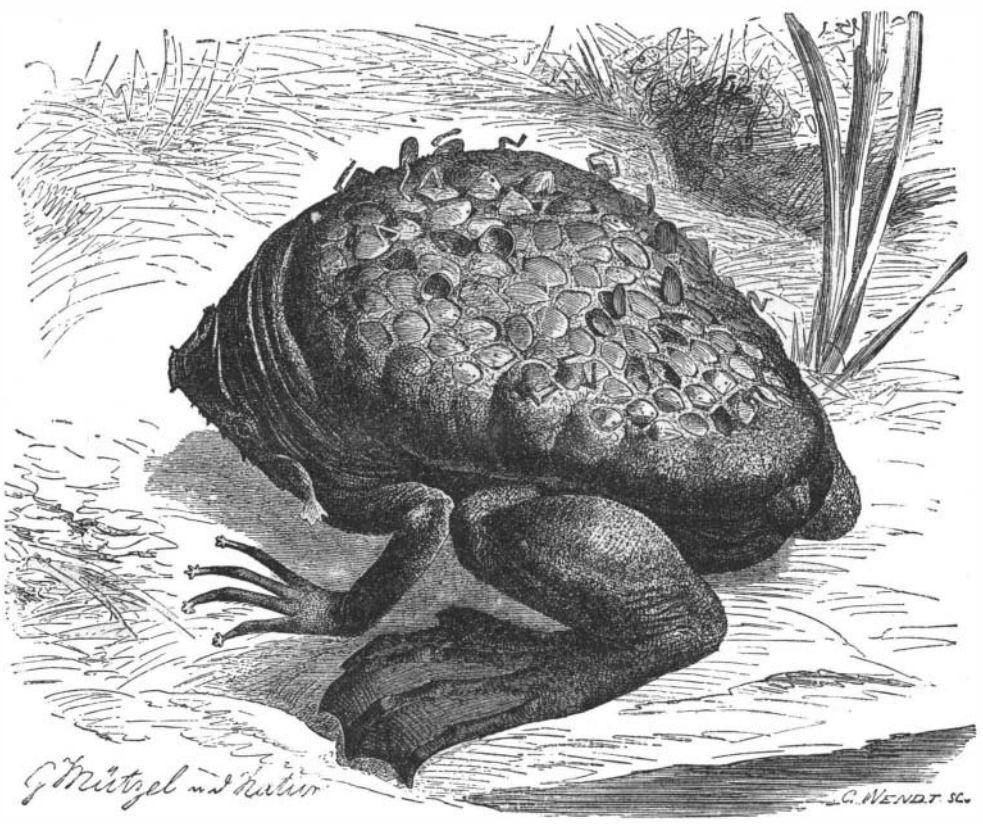
Electrolytic Process for Antimony.

According to the *Moniteur Scientifique*, Koepp, of Rheingau, Austria, has invented the following process for obtaining antimony from its ores. It consists in treating sulphide of antimony with certain salts of oxide of iron alone or in connection with haloid salts in an apparatus from which the antimony is deposited electrolytically. The trisulphide of antimony is decomposed in contact with ferric salts, sulphur is liberated, and the ferric oxide passes to the state of ferrous oxide, and at the same time antimonious oxide passes into solution. The reaction is rapid, and is complete when it takes place in the presence of free hydrochloric acid, or, better, in the presence of a haloid salt, such as common salt. The following reaction is explanatory: $2Fe_2Cl_6 + Sb_2S_3 = 2Fe_2Cl_4 + Sb_2Cl_4 + S_3$. The antimonial solution freed from the sulphur by filtration is submitted to electrolytic action, and the antimony is precipitated at the negative pole, the iron being oxidized at the positive pole, giving a solution of ferric chloride which can be used for the treatment of fresh quantities of sulphides of antimony. The anode and cathode are composed of lead plate. The bath is heated to about 50° and maintained in constant movement. In order to obtain a compact deposit of antimony, it is necessary to employ a current of 40 amperes or thereabout for each square meter of surface of the cathode.

THE PIPA AMERICANA.

This animal raises its young in a very peculiar manner. The male pipa places the eggs on the back of the female, where they are held by a secretion from the skin until each one is inclosed in a little hexagonal case shaped like the cells of the honeycomb, and developed in the skin of the mother frog. Each casing is closed by a little cover. In these little cases the sixty or seventy young of every pipa pass the eighty-two days which constitute their period of development.

The engraving is copied by the *Illustrirte Zeitung* from the seventh volume of Brehm's "Thierleben," which has lately been completely revised by Dr. Böttger.



THE PIPA AMERICANA. (ONE HALF NATURAL SIZE.)

The Washington and Georgetown New Cable Plant.

The Washington and Georgetown Street Railway Company has just equipped the Pennsylvania avenue and Fourteenth street branches of its road with a new cable plant at a cost of $3,000,000. This, together with the Seventh street road owned by this company, and already using the cable system, makes the most complete and one of the largest cable systems in the country. The company's tracks cross the entire length of the city, from east to west, over Pennsylvania avenue, and across the width of town, north and south, by double tracks on Seventh and Fourteenth streets. The entire system contains twenty-two miles of single track, all Johnson's girder rail, eighty pounds to the yard. The track gauge is 4 feet 8½ inches, and the maximum grade is 6 per cent, occurring on a stretch of about 1,000 feet, on what is known as Capitol Hill. The entire system has a capacity of four hundred cars, but only two hundred and ten in regular daily use.

The power house of the new plant is at Fourteenth and D streets, N. W. It is in the center of the business section of town, and the site, which is 141×241 feet in extent, cost alone $556,000. The ground, however, was insecure, which necessitated the sinking of two thousand one hundred piles, from 25 to 30 feet long, on which the masonry foundation was laid. The building, while plain in outline, is a handsome structure of selected red pressed brick, with red Seneca sandstone trimmings. It covers the whole of the square of ground bought by the company. It has a height of 98 feet in three stories. The ground floor and a part of the second floor will be occupied by the company for the cable plant and offices, and the remainder will be let for offices and manufacturing purposes.

The engines of the new plant are of the Reynolds-Corliss type, and are furnished by the Edward P. Allis Company, of Milwaukee. They are 36×72 inches cylinders, and 750 nominal horse power. The fly wheel is 30 feet in diameter, and weighs 100,000 pounds, and has a normal speed of fifty revolutions per minute. The 15 inch line shaft is 66 feet between the engines. Steam is furnished to the engines from a battery of eight Babcock & Wilcox boilers, of 184 horse power each. The fuel is fed to the furnace by the Rooney mechanical stokers, and the ashes are disposed of in the same way. The Berryman feed water heater is used, and all the steam connections of the building are by Blake & Williams, of New York. The driving plant was furnished by Robert Poole & Son Company, Baltimore.

Three cables are operated from the house, one known as the West avenue section, containing 23,760 feet, the Fourteenth street section, containing 27,900 feet, and the East avenue section of 31,660 feet. An auxiliary cable of 4,000 feet carries a line of cars from the main line of the road, at the foot of the Capitol, to the Baltimore and Ohio depot, by an ingenious device, the design of Mr. Upton, chief engineer of the road, and it is as simple as it is ingenious. It is practically a small driving plant on the plan of those at the power house, but minus the engine. The East avenue cable, on its way to the navy yard, is passed by a turn round the drum of this secondary driving plant, which is sunk in a vault 14 feet deep, beneath the pavement, and in this way the 4,000 feet of auxiliary cable is kept going at a rate of six miles per hour, without interfering with the rest of the line.

Besides the power house, in the center of the city, there are two new car barns, one at Mount Pleasant, the terminus of the Fourteenth street road, J. L. Parsons, Washington, D. C., contractor, and the other at the navy yard, the eastern terminus of the Pennsylvania avenue line, S. H. & J. F. Adams, Baltimore, contractors. Both these buildings are of pressed brick, with red sandstone trimmings, and are quite an ornament to the neighborhood.

The road was designed by W. B. Upton, chief engineer of the road, in consultation with Daniel Bontecou, of Kansas City, consulting engineer, and the construction was carried out under the supervision of D. S. Carll, erecting engineer.

The driving plants for the three cables at the power house are entirely independent, and by means of friction clutches any cable may be operated by either of the engines without regard to the others. The total length of the 15 inch drum shafting is 95 feet. The cable drums are 14 feet in diameter, fitted with Walker differential rims, which, in the Seventh street power house, have given wonderful service, and after two years' wear were measured but a short time ago, and failed to show a wear of $\frac{1}{32}$ of an inch. The cable drums are of six grooves each, and are both operated by a rope drive, an entirely new departure in cable construction. The pulleys on the line shaft are 9 feet 8¼ inches and those on the drum shaft are 26. On the West avenue and Fourteenth street sections the line shaft drums have seven and nine grooves in each set, but on the East avenue section, which is 3,760 feet longer than any of the others, the pulleys have twelve and fourteen grooves. The power is transmitted from the line shaft drum by "stevedore" manila ropes, to the 26 feet pulleys on the cable drum shaft. The cable is 1¼ inches, Lang lay, six pieces of nineteen strands each over a hemp core, and was made by the John A. Roebling Company.

The cable tension device is one of the most interesting features of the whole plant. It is the design of W. B. Upton, chief engineer of the road, and was designed especially with a view to remedy the surging of the cars by means of an automatic variation of the tension. It was tried on the Seventh street road for several months with entire success, and all three of the cables in the new power house are fitted with it. The tension carriage is also Mr. Upton's design.

The principle of the device is a weight, suspended between lever arms, in such a way as to bring the tension heavier or lighter on the levers, as the tension is heavier or lighter on the cable.

The cable speed will be nine miles per hour.

Work on the road was begun in May of 1891, and finished in July, 1892, but the construction was not pushed during the whole time.

The cars are operated with a grip and single trailer, or with two trailers in the crowded hours of the day. The seventy grip cars were manufactured by the John Stephenson Company. They are 14 feet long, and have a seating capacity of twenty. The one hundred and eighty passenger cars are from the American Car Company, St. Louis. The closed cars have a seating capacity of thirty-two, and the open cars will carry forty. Cars are switched at the ends of the line, no turntables being used.

The power house was designed by W. C. Root, of Kansas City, and was placed in the hands of J. E. & A. L. Pennock, contractors, of Philadelphia. All of the architectural iron work was furnished by the Champion Iron Company, of Ohio. The work was greatly delayed by the insecure ground, which necessitated the sinking of piles for the masonry foundation, and by bad weather during the winter, which hindered the brick workers.

The Washington and Georgetown Street Railway Company was organized in May of 1862, using a very poor quality of horse power on bob-tailed cars. It has grown constantly with the growth of the city, its improvements keeping well abreast of the times, in spite of occasional adverse Congressional criticisms to the contrary. The Congressional provision for the change in motive power was made just two years ago from the 6th of the present month, and was a very short time for the accomplishment of such an undertaking; but, by constant, steady work, the change was made and the first car was run over the line on the last day of the two years time limit allowed by Congress. The present officers of the road are Henry Hurt, president; C. M. Koomes, secretary and treasurer; and C. C. Sailer, superintendent. —*Street Railway Review.*

California Beer Seed.

A correspondent sends a small package containing some "California beer seed." He says: "It is used with sugar and water for making domestic beer. This sample was dried the present summer. When in its best condition it causes a brisk alcoholic fermentation, about the same as common yeast. This may not be as active as the best, but it is the freshest I can procure now, and is enough for a pint of water, with 1½ ounces of sugar dissolved in it and kept at a proper temperature for alcoholic fermentation. The beer that this came from was made with sorghum molasses, from which it derived its dark color. In its normal purity and wet it is perfectly white. It is self-propagating, that is, it increases in quantity while fermenting sweetened water."

Answer by Dr. C. V. Riley.—I have had this substance before and have watched the interesting fermentation of water and sugar under its influence. The action is due to a bacterium and a fungus the species of which in our American substance have not, as Prof. Galloway, the micologist of the department, informs me, been settled definitely. It is similar, if not identical, to the so-called "ginger beer plant" of Europe, and in this case Marshall Ward, in the Proceedings of the Royal Society, Volume L., No. 304, London, 1891, determines the organisms involved as *Bacterium vermiforme* and *Saccharomyces pyriformis*. Mr. Charles L. Mix, in the Proceedings of the American Academy of Arts and Sciences, Volume XXVI., speaks of this subject under the following title: "On a Kephir-like Yeast found in the United States." He summarizes the European literature concerning the milk ferment of the Caucasus, and concludes that the American ferment is almost if not quite identical with the European kephir, in which the bacterium is *Dispora caucasica*, and the fungus is *Saccharomyces cerevisiae*. Beyerinck, in the "Centralblatt fur Bakteriologie," Volume VI., p. 44, describes the *Saccharomyces* as a new species, making it distinct from *cerevisiae* and giving it the name of *kefyr*. This name Mix adopts for the American fungus, although this adoption seems to be provisional. For the present we can do no better than to accept Mix's conclusions.