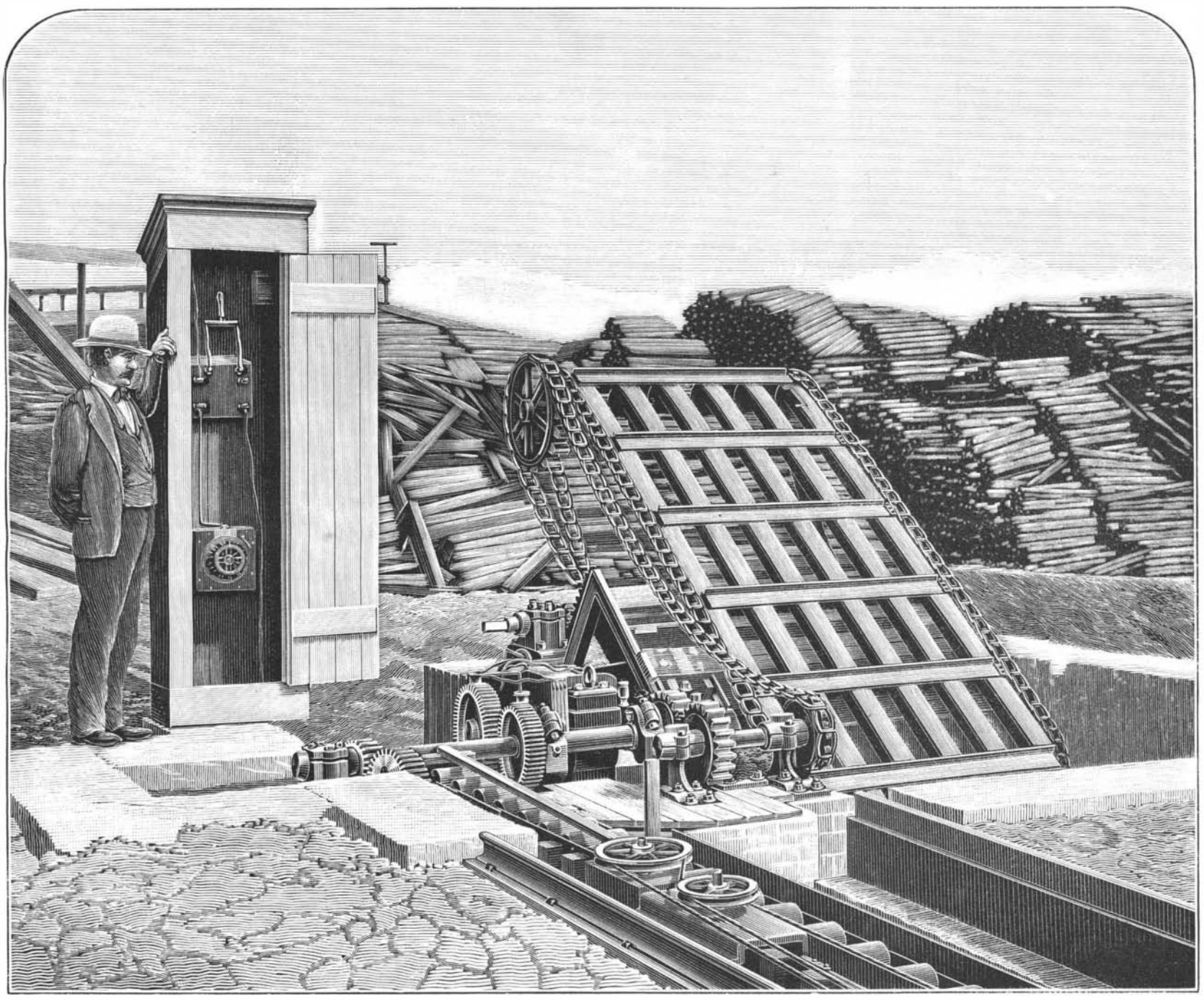
HANDLING STEEL BILLETS BY ELECTRICAL POWER.

At the works of the Illinois Steel Company, at Joliet, Ill., electrically transmitted power is now used in many operations with great economy and convenience. Our illustration represents an electrical apparatus employed to load steel billets on flat cars with the minimum amount of manual labor. After these billets come from the mill they are piled in the yard when not wanted for immediate shipment. The billets to be shipped are delivered to a long line of rollers, partly shown at the left in the illustration, and are thus carried along until they strike a deflecting plate by which they are conveyed to an endless moving apron, set at an incline, as prominently shown in the picture. This apron first elevates and then drops the billets on the car to be loaded, which is on a depressed railroad track on the farther side. This loading machine is driven by a twenty-five horse power 500 volt motor, the controlling switch and rheostat being conveniently placed in a small switch house.

Another recently introduced means of electrically using power at the same establishment is exemplified in two electro-hydraulic ingot charging machines used in the heating room. Each of these machines is practically a transfer table, 35 feet long and 15 feet wide, running on two tracks. In the center of this table, running lengthwise, is an adjustable frame, which is capable of being raised or lowered by hydraulic pressure from cylinders on either side. Running on this frame is a carriage carrying a heavy pair of jaws studded with steel teeth for gripping the ingot. These jaws can be opened, closed, raised or lowered, drawn in or out, at the pleasure of the operator, who is stationed on an elevated platform near the upright tanks, by means of levers which control the water pressure. The pressure is obtained by a triplex pump driven by a 25 horse power motor, so controlled that when the pressure reaches 500 pounds the motor is stopped automatically, but starts again when the pressure falls below this point. The traversing motion on the tracks is accomplished by a 15 horse power motor of the railway type geared directly to one of the axles of the track wheel.

In the operation of the machine an ingot is placed on the "buggy," which runs on a truck in front of the heating ovens, and stopped in front of the oven to be charged. The operator on the charging machine pulls a cord, and by means of compressed air the heavy iron door of the oven is raised. He then brings the machine to a position behind the ingot, and, by means of the levers, opens the jaws, grasps the ingot, which has been standing in a vertical position, and allows it to swing into a horizontal position. Then, by a second lever, he slides the ingot into the oven, raising or lowering it by a third lever. Should the ingot be heated on one side and it be desired to turn it over, it is gripped by the jaws, and by another lever the jaws are rotated so as to completely turn it over. The method of withdrawing an ingot is the same in reverse order. To move the table from one oven to another a lever controlling the rheostat operates the traversing motor. The heated ingot on being withdrawn from the oven is placed on the "buggy" and drawn in line with the rolls, where it is reduced in size and cut up into billets, which fall on an endless chain of rolls, which are operated by an independent motor of twenty-five horse power capacity. These rolls rise to an elevated trestle, which runs through the mill out into the yard for a distance of about 600 feet. By means of a deflecting arm these billets are distributed to any point in the yard. All of the motors are wound for 500 volts. The current for the charging machines is obtained from two overhead trolley wires, from which it is taken by two trolley wheels. Except the trolley wires, all the conductors are laid in lead-covered cables.



HANDLING STEEL BILLETS BY ELECTRICAL POWER.

A New Polar Expedition.

Mr. Frederick George Jackson, who is about to make an attempt to reach the North Pole by a route quite different from those of Nansen and Lieutenant Peary, arrived at Hull recently. Mr. Jackson, who has been spending several months within the Arctic circle for the purpose of gaining experience that will be likely to help him in his expedition, stated that he does not intend to take his ship further north than perhaps the southern extremity of Franz Josef Land. Thence he will make the journey to the pole by means of dog sledges or perhaps Russian ponies, which are very hardy. It has generally been thought that Franz Josef Land is an island, but Mr. Jackson thinks that in all probability this land extends right up to the polar seas which he, with Dr. Nansen, believes to exist. He also believes in the current to which Dr. Nansen has intrusted his ship, but hesitates to express any opinion as to whether this current will take the Fram up to the pole. After leaving his ship, the first thing he will do will be to erect a wooden house and there spend the first winter. When he sets out northward he intends, at distances of 30 to 40 miles, to set up food depots, which will be provisioned from the large cargo of preserved foods he will take out with him. These depots will be marked in such a way that on the return journey they cannot be missed, and they will not be more than one day's journey apart, so that his retreat will always, he supposes, remain open.

The Influence of the Mind upon the Body.

J. E. Wenman, M.D., in the *Eclectic Medical Journal* says:

In Mr. Warburton's work on Egypt he describes his experience with a famous magician of that country. He, being sent for, came to Mr. Warburton's hotel to give him an exhibition of his skill. The magician calls a boy from the street, and makes a mysterious mark upon the palm of his hand, requesting him to look steadfastly upon the mark. This the boy did for ten minutes without any effect. The magician called another boy, and repeated the same thing. This boy, being susceptible to the influence, was soon in a semi-mesmeric condition, the object of the mysterious mark on the palm of the boy's hand being the means of putting the boy in a passive condition. The magician now requested Mr. Warburton to call up whom he wished, and stated the boy would see him. Mr. Warburton called for the late Lord Derby: The boy instantly cried out: "Here he is! I see an old man, with spectacles, lying on a couch, having on a long black robe." Mr. Warburton next called for the late Lord Nelson. The boy said: "Here he is I see a soldier with one arm." After calling for several others, the boy minutely described them, to the astonishment of Mr. Warburton and his friends.

Now the trick consisted in getting the boy to suspend his thinking faculties, so that he would become in a semi-mesmeric condition, and thus be in sympathy with the mind of Mr. Warburton when he called for the different individuals. The boy saw in a kind of vision the very picture that was passing through Mr. Warburton's mind when he called for these individuals. This is a high development of a clairvoyant condition.

Science Notes.

Artificial Crystallization of Carbon.—In a paper upon this subject presented to the Academy of Sciences on February 12, Mr. Moissan gives the results of his most recent investigations in this direction. By his experiments last year upon the artificial reproduction of the diamond, he established the fact that under ordinary pressure carbon crystallizes in the form of graphite, whatever be the temperature, but that, under the effect of strong pressure, crystallization gives a denser carbon. He effected the crystallization under strong pressure by suddenly cooling in water an ingot of cast iron saturated with carbon. The crystals thus obtained had the density of the diamond, easily scratched rubies and in burning gave four times their weight of carbonic acid, but the largest of them weighed no more than six milligrammes. Mr. Moissan thought that this extreme smallness of the crystals might be due to the defective conditions of cooling of the ingot, for when the latter is raised to a temperature exceeding 2,000 degrees, the liquid, through the effect of calefaction, does not touch it, and it is by radiation through the cushion of steam that the cooling is effected. He, therefore, sought another method of bringing about a sudden solidification through a lowering of the temperature. He, in the first place, tried a bath of molten tin, but without success, because at the high temperature of the experiment an alloy of tin and iron was produced. With a bath of molten lead kept at a temperature of 400 degrees, the result was entirely different. Small globules of iron rose to the surface of the lead bath by virtue of their inferior density. These globules were collected with a skimmer. Upon afterward dissolving the iron by acids, small diamonds reaching half a millimeter in diameter were obtained. Some possessed a triangular form with a striated surface, and others were of a rounded form with little cup-shaped depressions scattered over the surface. Mr. Moissan points out that this latter aspect is entirely analogous to that of certain natural diamonds. Moreover, some of the triangular diamonds became segmented in a short time—a phenomenon sometimes exhibited by diamonds after coming from the earth.

Finally, through cooling in iron filings, Mr. Moissan prepared diamonds presenting the character that jewelers call *crapauds*. These latter diamonds easily burn in oxygen at a temperature of 900 degrees. The triangular diamonds may be burned, but they leave a residuum of brilliant grains, formed probably of silicide of carbon.

Dielectrine is the name by which Mr. Hurmuzescu designates a new dielectric designed for use in apparatus of static electricity, and possessing very remarkable properties. It consists of a mixture of paraffine and sulphur, which is much preferable to either of these substances isolatedly, it being harder and less fusible than the first and less brittle and less hygrometric than the second. Thanks to a special arrangement employed by Mr. Chabaud, this product may be moulded. It is obtained in a very homogeneous and hard form, easily worked in a lathe or by a file. So various forms may be given it. Mr. Hurmuzescu has exhibited to the French Society of Physics rings, supports, bobbins and an electrophorus in which the aluminum disk carried by a dielectrine axis rests upon an insulating stand of dielectrine. With this electrophorus sparks 0·02 m. in length are obtained. It remains charged for a very long time, and operates even in a moist atmosphere. Mr. Hurmuzescu likewise presented some electroscopes in which the support of the rod to which the strips of gold leaf are attached is a disk of dielectrine. This new substance, which is very inalterable, as is proved by specimens perfectly preserved since 1892, will render great services for insulations, especially in damp places.

Purification of Steel by Centrifugal Force.—For about two years, says the *Revue Industrielle*, the steel establishments of Nykroppa in Sweden have been successfully utilizing a process of purifying ingots of steel based upon the use of centrifugal force.

Around a vertical shaft is arranged a frame carrying four arms, to each of which is jointed a platform supporting four ingot moulds. The whole is so arranged that the ingot moulds remain in a vertical position when the apparatus is at rest, but incline until they occupy horizontal positions when the shaft is set more rapidly and rapidly in motion. The centrifugal force exerts a pressure thirty times stronger than that due to the column of metal in fusion contained in the ingot mould. Under the action of such pressure, the gases escape and perfectly sound ingots are obtained.

Electricity in Plants and Fruits.—There is no doubt, says *Le Genie Civil*, that nature makes use of an as yet ill known but important property of electricity in its different forms for making plants grow, flowers bloom and fruits ripen. It is a secret that it will disclose to us one of these days. Some quite curious experiments in electric culture have already been made in different places, and results have been obtained that appear to be satisfactory, but they have not yet the definiteness and permanence that would permit of profitably converting our fields and kitchen gardens into electric batteries.

It has been ascertained, however, that fruits are in a continual electric state. Upon puncturing them at the top and bottom and closing the circuit, it has been possible, by means of a multiplier, to study the variations of such electric state. The ascending sap of trees and the cortical sap, which have not, as well known, the same chemical composition, react upon each other and afford marked electric phenomena. From the pith to the cambium the layers are less and less positive, and from the cambium to the epidermis they are more and more so.

What will be the result of future studies upon this subject undertaken with commendable patience? We can only make a surmise. In the intensive hothouses called forcing houses fruits are already obtained at all seasons, and the electric light is used for giving the forced plants the impression of the dawn and of the high and setting sun. They are very sensitive thereto.

Perhaps upon combining this external action with the passage of an appropriate current into a soil charged with chemical products that it would decompose, we might succeed in producing astonishing fruits and flowers in hothouses, and, with the wand, make forests grow in bare gardens. There is nothing improbable in such magic, seeing that electricity, according to experiments already made, plays a role as mysterious as preponderant in vegetation.

Action of Light upon Water Colors.—Water color artists and the collectors of their work will be interested in and benefited by the results of a study recently made in England by Mr. Richardson relative to the action of light upon water colors. Mr. Richardson spread the colors upon Whatman paper and afterward placed them in a dry, damp or gaseous atmosphere, some in darkness and others in light. This research permitted him to classify the colors in two groups, the first comprising those that fade in consequence of the oxidation due to humidity, air and light and the second comprising those upon which light alone exerts a reducing influence. In the first group are placed the sulphides, cadmium, which, despite its old reputation, fades in a fortnight in damp air, trisulphide of arsenic, very sensitive to damp air, and indigo, which is not sensitive to dry air or an atmosphere of carbonic acid.

In the second group must be mentioned Prussian blue, which fades in the light and in carbonic acid, and resumes its former color in the air and in darkness. The lakes are decolorized, as are also vermilion and Naples yellow, under the combined action of light and dry or damp air. On the contrary, cobalt red, Indian red, yellow ocher and sienna undergo no modification. Upon the whole, light acting in a damp atmosphere is the principal enemy of water colors.

Kruppine.—In the *Elektrotechnische Zeitschrift*, Mr. Dettmar gives the results of an investigation of a new alloy (the composition of which is not stated) especially designed for industrial resistances.

This metal, manufactured by Krupp at Essen, and named kruppine in his honor, is characterized not only by a great resistance, but also by mechanical properties that permit of its being very easily worked. Its resistance, when it is well annealed, is 83 microhms-centimeters, that is to say, fifty times greater than that of copper. Its coefficient of temperature is equal to 0·0013, and is therefore less than that of copper.

Mr. Dettmar, after measuring these two constants, endeavored to ascertain how many spirals should be wound upon a helix of one meter in order to absorb a maximum number of watts without producing a dangerous heating. It is not, as one might be led to believe, the greatest possible number of spirals that gives the best result. With helices of a diameter of 13 and 18 millimeters and wires of 1 millimeter and 2·3 millimeters, Mr. Dettmar finds that the best winding is that which leaves between two consecutive spirals a space equal to twice the diameter of the wire. He finds, besides, that two helices of different diameters (13 and 18 millimeters) support almost the same current when both are so wound as to give the maximum effect.

Flexible Glass.—According to the *Practische Maschinen-Constructeur*, a material called "flexible glass" is made by dissolving from 4 to 8 parts of gun cotton in 1 part of ether or alcohol and adding to the solution from 2 to 4 parts of a non-resinous oil and from 4 to 10 parts of Canada balsam. This mixture is spread upon a plate of glass and dried in a current of air of a temperature of 50°. There is thus obtained a hard and transparent mass, the thickness of which may be regulated at will, and that offers a perfect resistance to salts, alkalies, and acids. These plates are odorless, very flexible and tough. Their inflammability may be diminished through the incorporation of chloride of magnesium. The addition of zinc white gives them a beautiful ivory color.

Soap Paper.—There has recently been brought out in France a sort of fancy soap for the use of those who are obliged to do considerable traveling. It is a question of small pieces of paper, slightly larger than visiting cards, covered on each side with a thin layer of ordinary soap or of soap variously colored and perfumed. These soap papers are put into memorandum books, card cases, or pocketbooks, just as if they were business or visiting cards. Each sheet serves as soap for one time only, and is used like an ordinary cake of soap. In fact, it is an easily carried soap that may be offered to a traveling companion, for every sheet is intact, it having to be used but once.

The manufacture of this soap paper is very simple. It consists in immersing sheets of unsized paper in a bath of cocoanut oil soap prepared in the same way as for the manufacture of toilet soaps. The strips of paper are dried, and then passed between rollers, in order to render them smooth and give them a handsome appearance. The strips are then cut to the proper dimensions and stamped with such marks as may be desired.

Instead of paper there may be used squares of parchment paper, or better still, of tracing cloth. This industry is still new, and we do not yet know what development is in store for it.—*La Nature.*

A Precaution Against Consumption.

It is now pretty well established that tuberculosis is an infective disease, and if this is true, it is largely preventable. We believe that in this country especially there is not sufficient stress laid upon the communicability of consumption; the people are too apt to regard our climate (Southern California) as Nature's panacea. Phthisical patients fairly swarm upon us every winter, poisoning our hotels, our streets and our dwellings. The inspissated sputum retains, according to Sawizky, its virulency two and a half months. Here, since the advent of the one-lunged Yankee, children die of meningitis and youth of consumption. This we are told by some to regard as the unfathomable dispensation of a wise Providence, when it rather should be charged to the criminal negligence of an easy-going public.

Persistent and systematic precautions ought to be taken by both public officials and the people in general to stop this scourge. The health department should issue stringent orders, classifying this disease among those usually placarded.

The room occupied by a consumptive should receive as thorough a disinfection as the one used by a diphtheritic patient. If the phthisical patient died in a week or two, the quarantine should be demanded and carried out. If the public really thought consumption "catching," they would regard it just as natural to take precautions against its spread as it is to stamp out leprosy. In point of fact, there is no comparison between the contagiousness of these diseases—tuberculosis being much more communicable. A campaign of education is needed.

All tuberculous patients should be compelled for the public good to use spit cups. Public spittoons filled with sawdust or other matter easily combustible should be placed at convenient intervals. The American has been described as a spitting animal, but he must be trained to spit by law only in specially prepared receptacles. The old college saying, "Those who expectorate on the floor cannot expect to rate as gentlemen," should be impressed upon all.

Then, again, the dust of the streets ought to be removed frequently, but only after a thorough sprinkling. Public hospitals for the tuberculous poor ought to be established. In the present state of affairs only a very few of the very worst cases are treated—while thousands wander about the city polluting the very air with the germs of the greatest scourge that has ever afflicted mankind.

Hygienic treatment should be advised in all cases. Preventive medicine is no longer the medicine of the future, but the medicine of to-day. Let us follow the example of Michigan, and officially declare consumption a contagious disease. Another point of great importance is the denying to consumptives the privilege of engaging in occupations whereby they may endanger the life or health of others.

The sanitary inspection of cattle and the condemnation of tuberculous cows should be rigidly enforced. Indeed, did our government take half the interest in preventing disease among human beings that it does in looking after the health of hogs and cattle, there would be thousands of lives saved annually.—*Southern California Practitioner.*

Russian Harbor on the Arctic Ocean.

The plan of constructing a large Russian naval port on the borders of the Arctic Ocean, close to the Norwegian frontier, where the sea is free from ice during the winter on account of the Gulf Stream, is not by any means abandoned. The plan also comprises the building of a new railway from Uleaborg, the northerly terminus of the Finnish railways, to the port in question. This railway will be about 470 miles long, and its terminus will be either at the Peschang Bay, close to the Norwegian frontier, or at Port Wladimir. There are no serious engineering difficulties in the way of such a railway, and as it will be built on a cheap system, much used in Finland, the cost would only amount to some £2,700,000—$13,000,000.

A Sewer on Piles.

Owing to the soft mud great difficulty was found in building the new sewer which is to occupy the Aramingo Canal from the river to Huntingdon Street, Philadelphia. After considering other devices, says *Architecture and Building*, the plan was hit upon of using an extensive system of piling.

Great yellow pine timbers. 12 inches square, are to be driven to solid bottom, 3 feet apart. Transversely in these will rest yellow pine planks, 8 by 8 inches. Broken stone will be filled in two feet deep around the heads of the piles to brace them. On the transverse timbers is a plank flooring, 6 inches thick, and above this the sewer is built, secured at the bottom by a bed of heavy stones laid in concrete. The main sewer will be 9 feet 6 inches in diameter. Below York Street there will be twin sewers, each 8 feet in diameter.

The construction of the canal sewer necessitates the entire reconstruction of the 10 foot sewer on Huntingdon Street as far westward as Sepviva Street, in order to secure the proper slope for drainage. The work will cost nearly $1,500,000, and will be completed under favorable conditions in about a year.

BICYCLE BOAT.

Small pleasure boats propelled by a screw actuated by pedals have been observed since last summer upon one of the lakes of the Bois de Boulogne. Their mechanism is ingenious. The idea of substituting a screw actuated by pedals for oars or paddle wheels is not new, but this is the first time that we have seen it realized in a sufficiently practical manner to assume the proportions of a genuine enterprise. The motive system of this new boat, devised by Mr. Vallet, has much analogy with that of bicycles, and it is for this reason that it has been called a bicycle boat. One of the models especially (the one represented at the bottom of the engraving and figured 2), which is designed for one person, recalls the bicycle. In another model, designed for several persons, the saddle is replaced by an arm chair, as shown in the general view at the top of the engraving. In both systems, the motor is the same. It consists of a horizontal shaft that passes through the stern of the boat and carries the screw. To this shaft are keyed two bevel wheels, A and B, either of which may be thrown into gear at will with a third mounted upon a vertical axis. This latter receives motion from the pedals through the intermedium of an endless chain running over a sprocket wheel. A hand wheel keyed to the top of this axis keeps up the motion and renders it regular.

The shaft of the screw is movable in the direction of the length of the boat, and this, through a system of levers, D C, that the pilot has within reach, permits of throwing either the pinon, A or B, into gear at will. There is thus obtained, without any necessity of modifying the motion of the pedals, a backward or forward movement or even a complete stoppage, if the shaft be given an intermediate position. As for the steering, that is effected through a bar, analogous to that of bicycles, which controls the rudder.

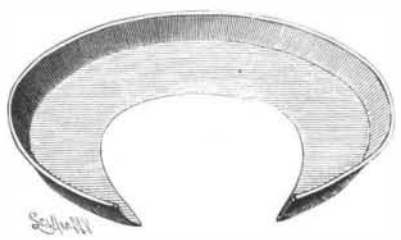
The ratio of the gearings is so calculated as to obtain a multiplication of five, and the pitch of the screw is 58 centimeters. Each revolution of the pedal therefore causes the boat to move forward 2·9 meters. Supposing that one stroke of the pedal be given per second, an advance of 174 meters will be made per minute or 10·5 kilometers per hour. But practically it would be impossible to keep up one stroke of the pedal per second very long, and it is necessary, too, to take into account the resistance of the water, which increases very rapidly with the speed of the boat. From our own experiments, we believe that it is possible to attain a speed of about eight kilometers per hour in calm water and without wind.

This question of speed, however, is of no great importance, for we have a pleasure boat rather than one for racing, and the speed is of slight consequence, provided that it be adequate. We have been surprised at the easy motion of the pedals and at the facility with which the maneuvering is done without fatigue. It is a very agreeable mode of locomotion, that we find more convenient and more within reach of every one than that effected by the oar or paddle.—*La Nature.*

TRICK PHOTOGRAPHY.

In the SCIENTIFIC AMERICAN of March 3 we described how, by a simple attachment to an ordinary kodak, one could easily take pictures of the same person in different attitudes on one plate. The illustrations given were the work of Mr. Frank A. Gilmore, of Auburn, R. I., who has also sent us the photograph from which is made the accompanying representation

HEAD OF LADY PHOTOGRAPHED ON A PLATTER.



PAN CUT AWAY TO REPRESENT PLATTER.

HOW THE PHOTOGRAPH IS MADE.

of what appears to be the head of a living person on a platter, forming part of the furnishing of a dining room table. Although the way in which the work is done is very simple, pictures made in this manner have been extremely puzzling, and are of especial interest to amateur photographers, as they suggest other methods of producing novel effects. In this case a center leaf was removed from an ordinary extension table, the lady to be photographed then being seated so that her head appeared just above the table top, on which the cloth and other articles were arranged as nearly as possible in the usual way, as shown in one of the views, the table being built up in place of the removed leaf sufficiently to support the cloth and other articles. To make the illusion complete, a pan, cut away so that it may be conveniently placed around the neck, as shown in the small picture, has the appearance in the photograph of being an ordinary platter, bearing the head of a living person.

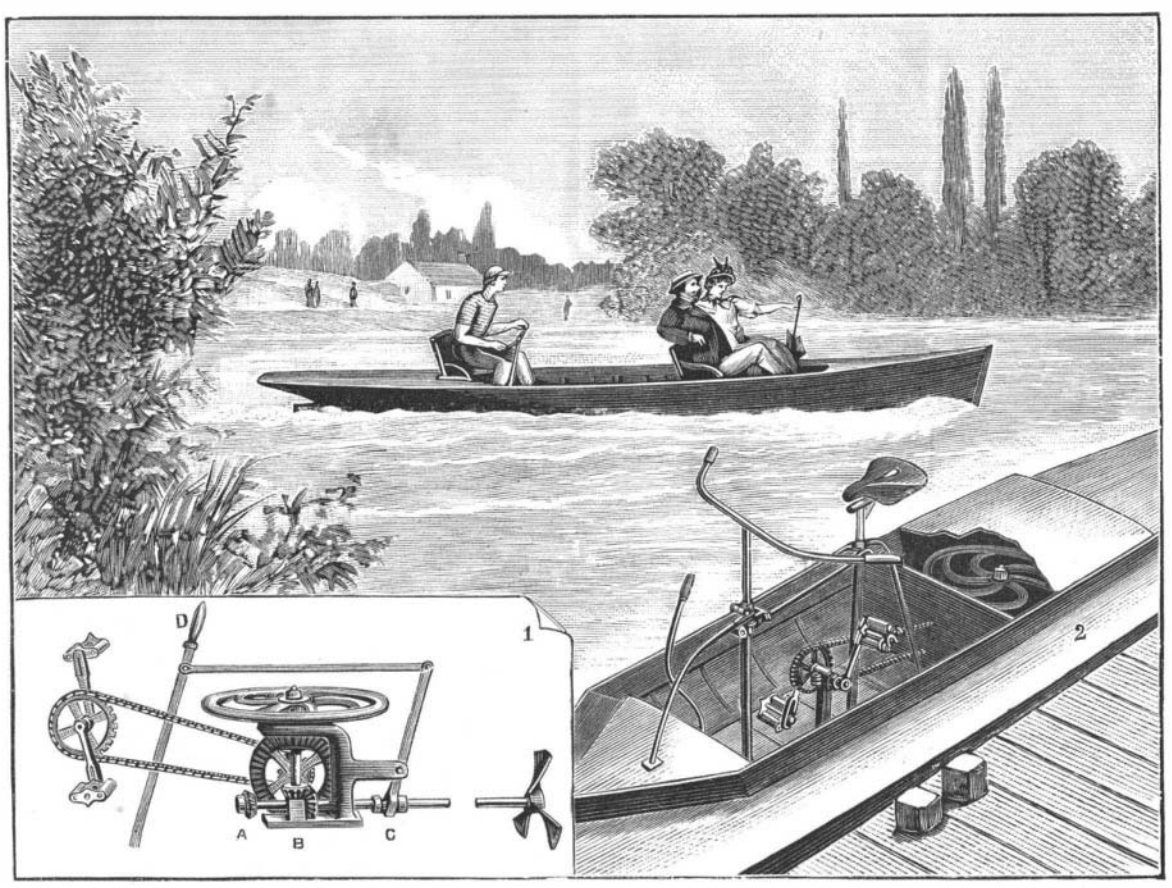
Influence of Horticulture on the Manners and Customs of the People.

This was the subject of a most interesting and instructive paper lately read by Mr. Harper, custodian of the Aberdeen Duthie Park, to the members of a working men's guild in Aberdeen. After a historical introduction, in which he referred to the Garden of Eden, Mr. Harper said the floralia of the ancients survive to-day in the "battle of flowers" to be seen in Algeria and Italy. Cleopatra paid £200 for the roses employed at one banquet. The first school of gardening was the Jardin des Plantes at Paris, yet the science of horticulture was less generally known in France than in this country. Modern British gardening received its first stimulus in the reign of Henry VIII. It changed under Charles II., again under George II., and in the reign of George III. was profoundly affected by the introduction of flowering plants from North America. The establishment, in 1824, of the experimental gardens at Inverleith Row, Edinburgh, did a great deal for gardening in Scotland. In our own time horticulture is slowly but surely influencing our people to a more correct taste and appreciation of beauty. The parks are being more appreciated every year; a neat flower bed commands the attention and respect even of the vulgar. Horticultural exhibitions are of the greatest use to those engaged in horticulture. Mr. Harper spoke strongly of the work of the guild in the culture of plants in houses. In the child's love of flowers we have the voice of nature; it falls into decay as vice and selfishness harden the tender heart. Speaking of open spaces in the heart of the city, Mr. Harper said they could not fail, if well kept, to be a great benefit to the whole community. A modern feature is the tasteful arrangement of autumn foliage, a form of decoration at once effective and inexpensive.

Aluminum Yachts.

Two examples of aluminum built yachts are at present to be seen in French waters. One is the ten ton yacht Vendenessa, launched recently from the stocks of the Societe de Chantiers de la Loire. The other is a 33 foot sailing boat. The former craft has been built for the well known French yachtsman, Comte de Chabannes, La Palice, from the designs of M. V. Greilloux. It is computed that if this vessel had been constructed of steel frame and wood planking, like other boats of her class, her hull would have weighed some 4 tons 5 cwt., but in aluminum the weight is only some 2 tons 6 cwt. The other craft referred to is named the Jules Davoust, and with it Lieutenant Hourst intends to set out on a survey expedition on the Niger. This craft affords additional proof of the great suitability of aluminum as the structural material for boats intended for exceptional purposes, such as river survey and exploration. The boat complete only weighs 18 cwt., a fact which sufficiently indicates the extreme portability of the craft when overland transport is involved.

THE Gates Iron Works, Chicago, manufacturers of the gyratory rock and ore breaker, known as the Gates Crusher, have recently purchased the entire plant—tools, machinery, stock, patterns, drawings, etc.—of the Chicago Iron Works. With this valuable addition to their plant, the Gates Iron Works are in a better position than ever before to build any kind of machinery required for the reduction and treatment of ores of whatever nature. The Gates Company have had half a century of experience in this line of manufactures, and furnish modern machinery of the highest merit, both as regards material and workmanship.



BICYCLE BOAT OF THE BOIS DE BOULOGNE.