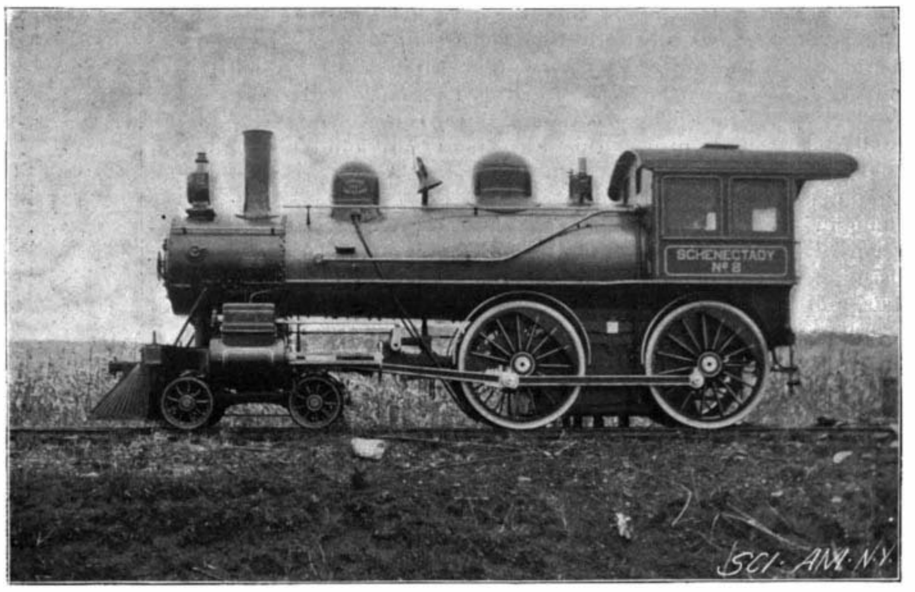
THE NEW EXPERIMENTAL LOCOMOTIVE FOR PURDUE UNIVERSITY.

The engineering world has benefited greatly from the laboratory tests which have been carried out from time to time upon the Schenectady locomotive which was built some years ago and shipped to the university for laboratory work. The advance which has taken place of late years in locomotive designs has rendered this machine somewhat out of date, and it is now to be replaced by a new locomotive of which we present an illustration. The engine is of the American eight-wheel type, and at first glance it would not appear to differ from the common type. As a matter of fact, however, it possesses many special features determined by the Purdue authorities, and various interesting details inserted by the builders.



LOCOMOTIVE FOR THE PURDUE UNIVERSITY LABORATORY.

Cylinders, 16 to 20 inches by 24 inches; drivers, 5 feet 9 inches; steam pressure, 250 pounds; weight, 96,000 pounds.

The cylinders are bored out to 20 inches diameter and are provided with bushings 2 inches in thickness, so that their present dimensions are 16 inches diameter by 24 inches stroke. The bushings will be bored out to give various dimensions, and the saddle has been so constructed as to permit of a 30-inch low pressure cylinder being added for the purpose of testing the locomotive as a compound. Allan Richardson valves are used. They have a maximum travel of 6 inches with a 1¼-inch outside lap. Steam ports measure 18 inches by 1⅝ inches and the exhaust port 18 inches by 3 inches. The boiler carries a working pressure of 250 pounds to the square inch. The firebox is 6 feet long and 34¼ inches wide, the grate area being 17¾ square feet. The drivers are 5 feet 9¼ inches in diameter and they carry a weight of 61,000 pounds, the total weight of the engine being 96,000 pounds.

The crank pins and crosshead pins, the piston rods and main axles, are all made of fluid compressed acid open hearth nickel steel annealed, and all except the piston rods are hollow and oil tempered. The great mortality of these parts in locomotives has led engineers to seek for some metal of high elastic limit and elongation which would successfully resist the severe alternating stresses to which they are subjected. When steel was first substituted for wrought iron in locomotive crank pins, a soft, low carbon steel was generally employed, and failures due to "fatigue of metal" were almost as frequent as before. The broken pins showed what has been called "a fracture in detail"—a gradual parting of the steel extending inward all around the piece, undoubtedly produced by the working strains repeatedly approaching the low elastic limit of the soft steel. On substituting a higher carbon steel with an elastic limit of 45,000 to 50,000 pounds per square inch, failures were greatly diminished without changing the diameter or shape of the pins. Steel of still higher elastic limit and proportionately greater elongation gives correspondingly better results, and many of the representative railroads of the country are considering the adoption of and others have already adopted nickel steel wherever it can be used on their locomotives; and where the form and size of the forgings will allow of such treatment, they are made hollow in order that they may be oil tempered to still further increase the physical properties of the metal. Test bars from the forgings for the locomotive show the following results in test specimens ½ inch diameter and 2 inches long between measuring points:

Tensile strength	91,000 pounds.
Elastic limit	57,000 "
Elongation	25·05 per cent.
Contraction	56·45 "

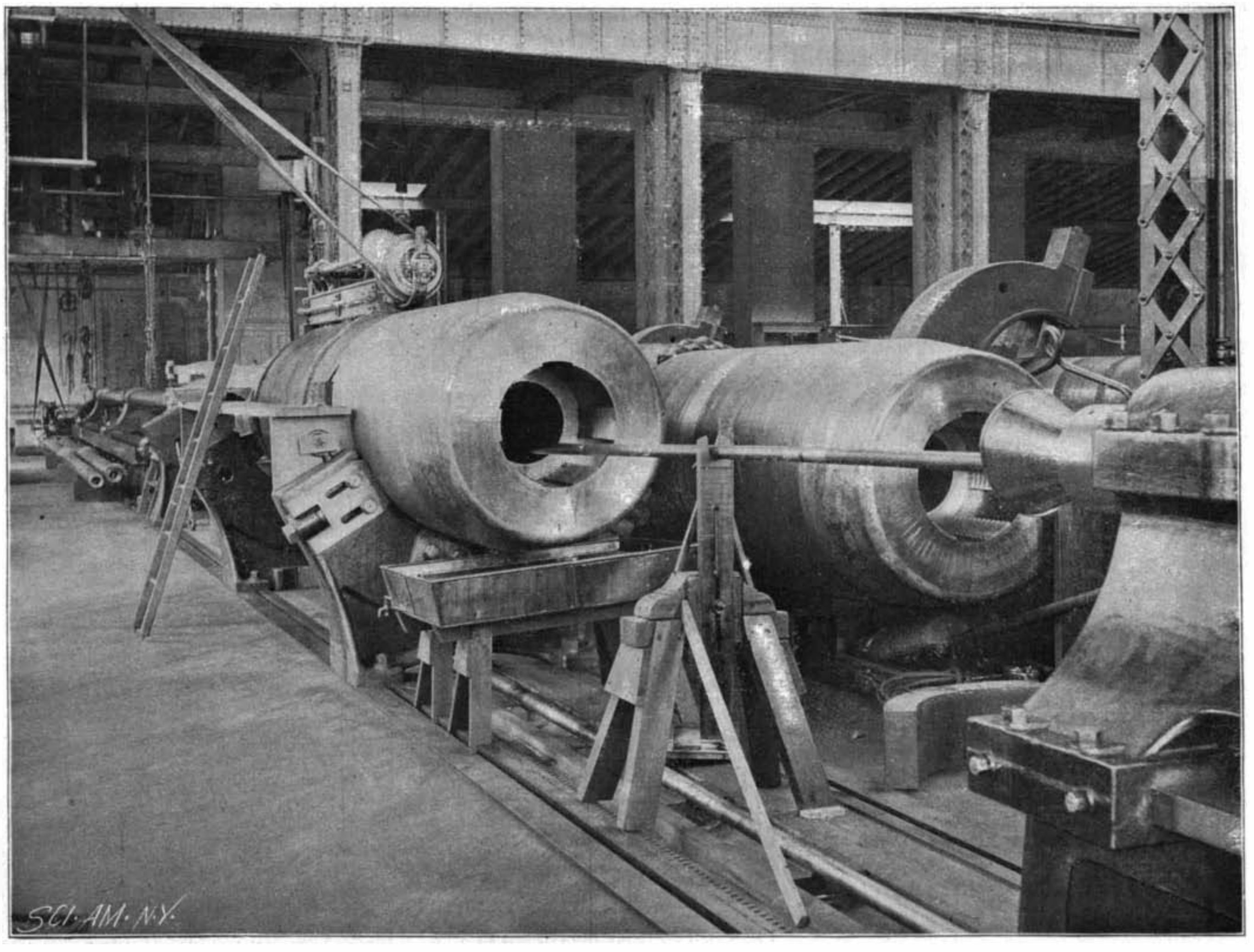
We are indebted for the above particulars to Prof. W. F. M. Goss, the director of the engineering laboratory at Purdue University.

THE GUN FACTORY AT THE UNITED STATES WASHINGTON, D. C., NAVY YARD.

The modern cannon is a work of the highest mechanical order. In former days the gun founder often cast very beautiful cannon of artistically elaborate design. To-day the gun leaves the assembling shops a rigorously plain structure, yet in degree of accuracy of workmanship exceeding almost any class of mechanical work. Our illustrations give views from the Washington navy yard, where in the course of years a gun assembling plant has been organized which now represents about $2,000,000 investment. In its mechanical excellence it is believed to be the equal of or to exceed any similar shop. The operations performed in the navy yard are the machining and assembling of the different pieces received as forgings from the steel works. The parts composing the barrel or body of the piece are turned and bored. They are then put together with shrinkage. The breech mechanism is constructed and put together and the gun is ready for mounting and for trial at the proving grounds. The size of main battery guns is specified by stating the diameter of the bore. At the navy yard the calibers of such guns thus far manufactured are 4-inch, 5-inch, 6-inch, 8-inch, 10-inch, 12-inch, and 13-inch. The capacity of the largest lathe provides for a gun of 16-inch bore, though so large a piece is never made there now.

The gun is built up of three parts—tube, jacket and hoops. Taking the 4-inch gun as the simplest in construction, it consists first of the tube. This is a tubular piece of steel bored out to the 4-inch caliber and rifled, forming the barrel of the piece. It extends from the muzzle of the gun to the rear of the powder chamber. The gun is prolonged a few inches more to the rear, by the extension of the next piece, termed the jacket. The tube is turned in the main to an exterior cylindrical contour with some variations in diameter producing shoulders to give a lock or grip for the jacket or hoops.

Over the rear portion of the tube is shrunk on the jacket. This is another approximately cylindrical piece, which covers between one-third and one-half of the length of the tube. Thus in the gun described the tube is 160 inches long and the jacket is 74 inches long. The gun is further strengthened by additional pieces, termed hoops, also shrunk on. In the 4-inch gun a hoop 38 inches long is shrunk over the tube immediately forward of the jacket. A very short hoop 12 inches long is shrunk over the forward end of the jacket and rear end of the 38-inch hoop. These complete the parts of the gun. Hoops which are forward in position are termed chase hoops. The larger guns are more complicated. In some cases the chase hoops extend to the muzzle, and the jacket is strengthened by jacket hoops, so that the gun is in part built up of three layers. Thus one type of 13-inch gun has four jacket hoops, each directly forward of its neighbor, and forward of these come four principal chase hoops, besides two small finishing hoops, giving twelve pieces for the barrel.



POLISHING THE BORE OF A LARGE GUN AND CUTTING A KEYWAY ON THE EXTERIOR FOR A BRASS SLEEVE.

The gun forgings are made from open hearth steel cast originally in ingots, each weighing about twice as much as the finished piece is to weigh. The ingot is forged down, rough bored and turned nearly to the finished dimensions, and test specimens are taken from one or both ends after the forging has been annealed, oil tempered and again annealed. If satisfactory, it is accepted by the government.

The gun shop work is principally turning and boring, there being nine principal lathes. The work has to be done with the utmost accuracy; for shrinkage, it is done to 1/1000 inch. As standard, the workman receives a point gage. This is a simple rod of steel, with polished ends, whose length is precisely the diameter of the work. Its length, which is as accurate as can be determined by a dividing engine, is marked on it The workman sets his calipers by this gage.

The great masses of metal are clamped to the face plates of the lathes and have their weight carried in steady rests. Seats are turned often in the piece for the steady rests. The lathes are gigantic structures. The largest can take in a gun 48 feet 7 inches long and weighing 110 tons. It is about 115 feet long and cost nearly $100,000. It is now used for boring the

FINISHED GUN PROVIDED WITH TEMPORARY SHOP.

GENERAL VIEW OF INTERIOR OF GUN FACTORY AT WASHINGTON.

tubes. The general course of operations is as follows: The jacket is bored to the required diameter and is star-gaged. This involves an interior calibration at several hundred points. The tube is bored out nearly to finished size, and its breech end is turned exteriorly to a size as much in excess of the inner diameter of the jacket as the predetermined shrinkage requires. The tube is removed from the lathe and is placed in a vertical position in the shrinking pit. The jacket, meanwhile, has been heated in furnaces fed with naphtha. Twenty or thirty hours' heating may be needed to bring it to a uniform temperature of about 550° F. The jacket is then lifted out of the furnace and is lowered over the tube, and goes smoothly to its seat, if all goes well, as it generally does. Hours of cooling are required to restore the great mass to ordinary temperature. Next comes the turning of the forward part of the tube, for the chase hoops, the boring of the chase hoops and the putting them successively in place. All this is a repetition of the processes described for the jacket. If jacket hoops are to be employed, the jacket now in place on the gun is turned to receive them.

The amount of shrinkage is determined by calculation based on the lowest elastic limit shown by any of the test specimens taken from each forging. Thus each gun is an individual structure as regards the tension its members are subjected to. Each forging has also its individual mark. If these are cut away in the lathe, they are transferred to another place. In the finished gun every member bears its original mark, so that each piece can be identified and its history traced.

The next operation is the finish boring of the bore and the boring out of the rear to an increased diameter to form the chamber for the powder. This is connected with the main bore by a conical portion of the bore, termed the compression slope. Back of the powder chamber is a short section of still larger diameter, termed the screw box. This has on its inner surface a female screw with sections slotted out, forming the interrupted screw for the breech plug. The short, conical portion connecting screw box and powder chamber is termed the gas check slope. The exterior of the gun is now finish-turned and the bore is rifled.

The rifling starts at a zero twist and increases toward the mouth of the piece to one turn in a distance represented by about twenty-five diameters of the bore. In the 4-inch rifle there are thirty equal grooves 0·025 inch deep and 0·279 inch wide; in the 13-inch gun there are fifty-two grooves, 0·05 inch deep and between 0·4 and 0·5 inch wide, their smallest width being at the muzzle.

The final finish of the bore is given by polishing with emery dust and oil applied with a lead lap drawn back and forth through the gun. This is done by the lapping machine, and the operation is illustrated in one of our cuts. In the same cut is shown an interesting operation; the cutting of a keyway on a threaded portion of the exterior of the gun. This threaded portion is designed to receive a brass sleeve. It is threaded in the left-hand direction. The rifling is right-handed. A tendency to left-handed rotation is imparted by the discharge as the projectile assumes its rotary motion. The brass sleeve being left-handed, the tendency of the gun under the firing stress is to screw itself more home in the sleeve. To make the sleeve secure, however, a long keyway is cut in the sleeve and on the gun. Our cut shows a portable milling machine cutting the keyway on the gun. A key is driven into the keyway when the sleeve is in place to prevent it from turning.

The gun thus far completed is now ready to receive its breech mechanism. This, consisting of relatively small pieces, has been made in the works and needs assembling and adjusting. It would manifestly be troublesome to transport a 100-ton gun to a special breech assembling shop. The work cannot be done advantageously in the main gun works. Accordingly, the opposite course is taken and the shop is brought to the gun. When a pair of guns are ready for their breech mechanism, they are run out of the shop on a railroad, are rolled off the trucks and are blocked up in a horizontal position with their open breeches facing each other, with about eight feet intervening. A small house shown in one of our cuts is then erected over the breech ends. This house comes to pieces and is transported about the yard piece by piece and erected where needed. Hooks and screw eyes are provided to hold it together. In it are placed the tools required for breech assembling and the final touch is thus given to the guns.

The working strain to which these guns are subjected in practice is limited to about 15 tons per square inch. They have been tested up to double this pressure without permanent deformation. The principal cause of deterioration is the erosive action of the powder near the seat of the projectile. This is increased by high pressure.

The following data referring to the largest gun now made for the navy are of interest:

Diameter of bore (caliber)	13 inches.
Length of gun (479·1 inches)	39 feet 9¼ inches.
Weight of gun	136,000 pounds.
Weight of full charge of powder	520 to 560 pounds.
Weight of projectile	1,100 pounds.
Velocity at muzzle	2,100 feet per second.
Velocity at 2,500 yards	1,805 feet per second.
Thickness of steel which shell will perforate at 1,000 yards distance	24·54 inches.

The New West Indian Cable.

The lack of facilities which has hitherto existed for sending cablegrams direct from England to the British West Indies, without having to pass these messages through foreign territory, has at length been removed by the extension of the Halifax-Bermuda cable to Kingston, Jamaica. This extension has just been completed, and the first messages dispatched across the Atlantic.

As some of our readers may be aware, the West Indian and Panama Cable Company has up to this enjoyed the undisputed privilege of conveying these cablegrams. The islanders disapproved of their cablegrams to the mother country being forwarded through foreign territory (the United States and Cuba), and feared the position in which they would find themselves in the event of England being at war with either of these two countries; and they also were dissatisfied at the reluctance of this company to facilitate the business of the islands by the reduction of rates, etc., and they decided some three years ago to approach the Halifax-Bermuda Cable Company with a request to extend their cable, via Turk's Island, to Jamaica, the bounty hitherto paid to the West Indian and Panama Cable Company being offered as an incentive to their doing so. This request, after some consideration and a great deal of correspondence with the imperial government, the company agreed to do, and the Telegraph Construction Company was accordingly commissioned to lay the cable, on the understanding that the work should be completed by the end of January of this year. Despite the fact that the Caribbean Sea is visited by severe storms during the winter months, the agreement has been carried through fully a fortnight before the time stipulated in the agreement, and what the English papers describe as "another link between England and her colonial offspring in the West Indies" has become an accomplished fact. The Construction Company reports that the work of laying the cable has been carried out without the slightest hitch, and that they were favored by exceptionally fine weather for the season of the year. To facilitate the laying of the cable within the time allowed by the imperial government, H. M. S. "Britannia," of the surveying department, was commissioned to perform the surveying trip, and an extensive survey of the route was made by her early in the winter. The desire of the company was to spare no pains nor expense in finding the best bed in which to lay the cable, thus lessening the fear so common in similar undertakings of being called upon in the future to make repairs to it.

Repairing Large Holes in Single Tube Tires.

Is there any sure way, says a correspondent of The Cycling Gazette, of repairing large holes in single tube tires, by vulcanizing, so that they will not bulge out at that place when the air pressure is in the tire?

In the repair of single tube tires the greatest amount of ingenuity at the command of a workman is often required. And it is in the repair of single tube tires that a wide field is open to those who care to excel and endeavor to perfect themselves in work usually thrown aside as impossible. Every day single tube tires are discarded that are still good tires, with the exception of some one bad hole which the average repairman would not attempt to fix.

In repairing any hole or cut in a single tube tire first trim the edges of the hole carefully and then cut away the rubber tread down to the canvas all around the hole and out from it each way about half an inch. Now take a small wire with a rag wrapped around one end which is loaded with gasoline, and clean the interior surface of the tire around the hole as much as possible in this manner. Cut a piece of patching rubber about three-quarters of an inch larger all around than the hole in the tire. Clean one side with gasoline and fold it up, clean side in, into a sort of cone, with the center of the piece as the apex. Push this through the hole, point downward, using a pair of plug nippers if necessary. When it is freed on the inside of the tire it will open out flat, clean side up. Be careful to hold the tire during this operation so that the patch will not drop around to the other side of the tire. Now with a small stick coat the inside of the tire around the hole with rubber solution, and when this has had time enough to become "tacky," press the tread down and pick up the rubber patch. The inner tube of the single tube tire is now patched. Take a needle and some strong linen thread, and darn the hole from the outside. Take the stitches far enough back from the edge of the hole to insure against pulling out, and be sure not to let the needle pierce the patch just put on. Do the darning as closely as possible, and see that it does not project above the level of the tread. When the darning is finished it will be strong enough to stand the air pressure, and as the patch on the inside is airtight, the rubber tread at this point will not have to stand the pressure or hold the air in. After the darning a coat of the uncured rubber solution is applied and the hollow filled with the pure gum as usual. Then vulcanize.

If the original hole be a small one, it will be advisable to enlarge it to at least one-quarter inch in diameter.

Miscellaneous Notes and Receipts.

A Resistive Resin Powder for etching purposes is prepared, according to the Photogr. Mittheilungen, by melting together over a low fire 20 grammes of resin, 60 grammes of shellac and 10 grammes of asphaltum; the colophony has to be melted first and the shellac and asphaltum are gradually added while stirring. The molten mass is poured in cold water, dried and ground as finely as possible. The shellac renders this resin powder extremely acid resisting.

Characteristics of Inferior or Bad India Ink.—Ground or liquid India ink dried in porcelain dishes should not crack, peel off, or rise in scales and should have no tinge of graphite gray or brown. Imitation India ink often smells of carbol and other antiseptic agents, sometimes even of putrid glue. Lines drawn with bad India ink can be made broader by passing a wet brush over them after they are dry; they also soon become grayish or brownish, if the rubber is used over them. Bad India ink tires the hand, and gives a grating noise in grinding and imparts color slowly. The presence of one of the unpleasant qualities enumerated suffices to characterize the India ink as inferior, but, as a rule, spurious or bad India ink exhibits several of them at one time.—Technische Mittheilungen für Malerei.

Protection Against the Tarnishing of Silver Ware.—All silver ware as well as plated goods are liable to tarnish, if not used for some time, especially if coal is burned in the house or in the neighborhood, because the sulphur contained therein blackens the silver. Entire protection from the tarnishing can be had, however, according to the Deutsche Maler Zeitung, by first slightly warming the silver and then coating it, by means of a fine brush, with collodion strongly thinned with alcohol. This coating dries at once and forms a very thin transparent as well as invisible covering, which protects the silver completely and may be removed, if necessary, with hot water. In the English stores this method has been employed for a long time, to save the silver ware in the show windows from tarnishing.

A Ship Bottom Paint consisting of seaweed, which, while green and moist, is ground in oil and mixed with litharge, lead acetate, turpentine and linseed oil, has been patented in England, says the Färben Zeitung. The coating is said to be not only a good protection against the adhering of shells, but also prevents worms from entering wooden ship bottoms or any wooden submarine constructions. The mode of manufacture is as below:

Into a certain quantity of linseed oil, say 48 liters, put ½ pound of litharge and ½ pound of sugar of lead and boil for five hours at 600° Fah. Now bring this mixture to the right painting consistency with turpentine and add ½ liter of seaweed which has been ground in oil, in the green and wet condition, as gathered on the shore. For coloring, various substances, such as ocher, etc., may be added, whereupon the paint is ready for use.

Hog's Bristles from China.—The trade in hog's bristles is one of the numerous new sources of industry which have been created in China by the opening of the coast harbors to foreign commerce, says the Zeitschrift fuer Buersten, P. u. K. Fab. During the last two decades this export has developed to such an extent that many persons are now engaged in the gathering, buying up and preparation of the bristles for export.

Formerly the bristles were worthless in China. The manufacture of brushes is still in its infancy in that country, as they are hardly known and very seldom used. If one is used, it is usually very small, and no larger than 3 to 4 square centimeters, exclusive of the handle. Brushes are only used for cleaning the cloth shoes, as the clothes are dusted with a whisk broom in China. Sometimes brushes are used for cleaning horses, but these are also small and resemble in shape and size those which are used for applying blacking. Therefore, the bristles were not considered of any value in China. When the brush maker needed some, he got them from the butcher for nothing. This has now changed. The butchers now gather the bristles and sell them.

Chinese bristles have become an article much in demand in Europe, especially the long black ones known under the name of Tientsin bristles, which are widely different from the white, short bristles coming from the South. The difference finds its explanation in the dissimilarity of the South Chinese and the North Chinese breeds of pigs. The South Chinese domestic hog is the product of careful raising. They are mostly raised for the shambles and receive a certain care as regards feeding, when it is intended to fatten them. Furthermore, the climate may have contributed to shorten the bristles and other hirsute covering. These bristles, which are mostly white, are seldom longer than 3 inches. The case is different with the domestic hog of North China. No care is bestowed upon his breeding. They run around loose on cold winter days and are mostly without shelter in the night. Therefore, they have remained very much in their primitive stage. The North Chinese hogs are black, long-bristled, scrubby animals, very much like the wild boar.

New Coral Theory.

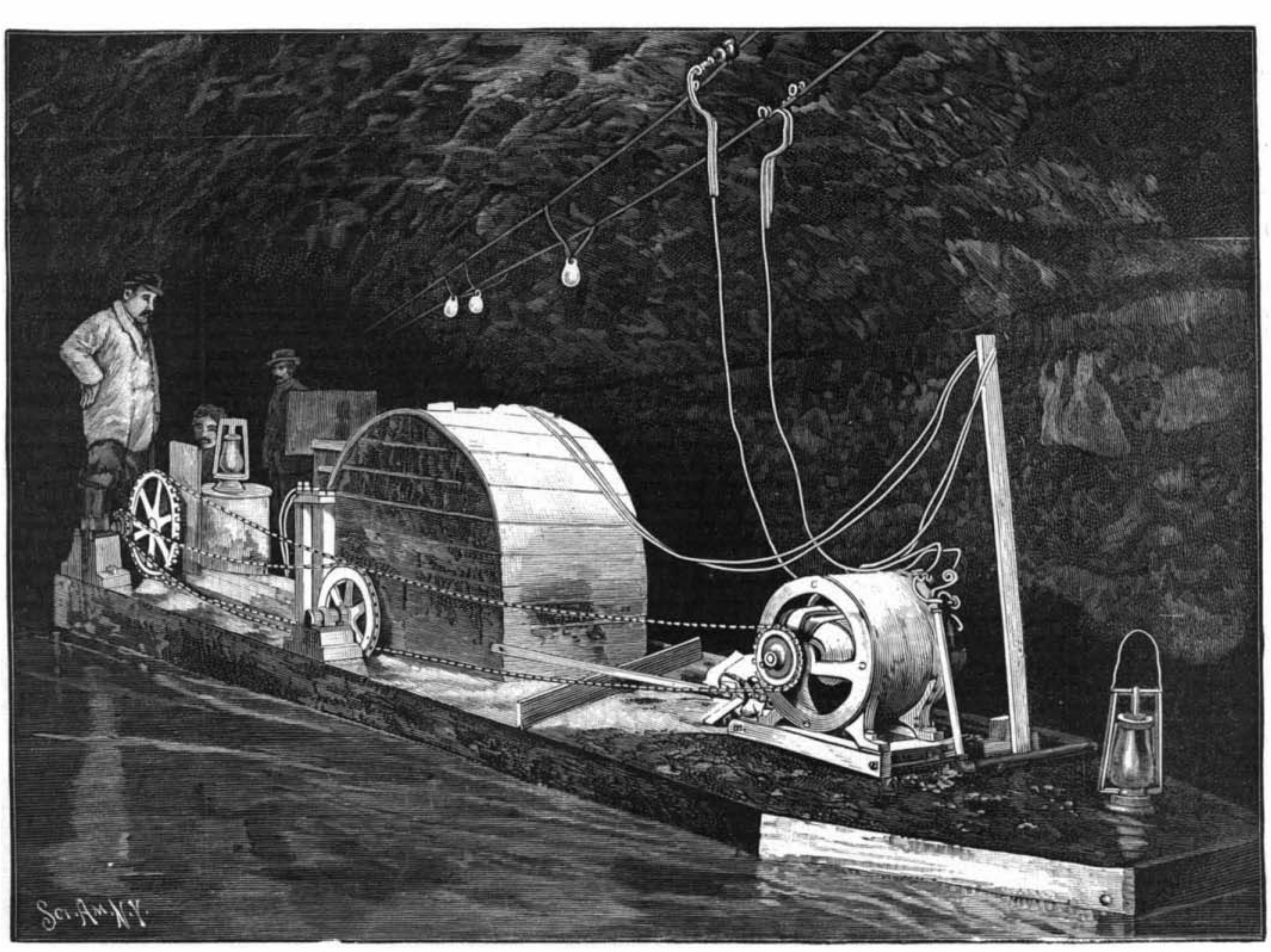
Prof. Alexander Agassiz arrived at San Francisco from Honolulu, February 12. He has spent several months in the South Sea, mainly devoting his time to the study of coral animals. Both Darwin and Dana held that coral is made, sinks and is replenished on the surface. This they taught continued indefinitely, and this process was called the theory of subsidence. Prof. Agassiz now believes that coral is a comparatively thin crust formed upon a mountain that has been submerged or upon a volcanic pile, and in nearly every case where the borings have been made the coral has been found to be shallow. In a few places where it seems to have a depth that might sustain the theories of Darwin, Prof. Agassiz proves that material into which the deep borings are made is lime of a former age of the earth. He shows that the admixture of sand with the coral establishes the surface or shallow reef. The foundation for coral in every instance has proved it to be of such material and of such shape as to warrant the conclusion that the coral is a cap to submerged mountains and volcanic upheavals.

ELECTRIC TOWBOAT IN A SEWER.

The city of Worcester has a large sewer 18 feet wide and 13 feet high. The sewage of the city is treated chemically to render it fit to flow back into the Blackstone River, so that it is desirable to separate the storm water from the sewage to lessen the expense of the chemical treatment. In order to accomplish this end a smaller sewer, 6 feet wide and 4,000 feet long, is being built inside the larger one, utilizing the bottom and one of the sides of the sewer. A cofferdam is constructed to enable the other wall of the sewer to be built, and in order to deliver materials to the workmen an electric scow was rigged up, which has been found very satisfactory. Electricity is also used to light the sewer, to operate ventilating fans and to work electric pumps. All of the lighting and power are generated on the premises in a small building outside the sewer. About midway between the ends of the sewer a small dock has been constructed and the materials are delivered to it by an incline through a hole made in the top of one wall.

The towboat is a catamaran 22 feet long and 5 feet wide. Each of the small boats is 18 inches wide. In the middle of the catamaran is a small paddle wheel box which is to prevent splashing. This is driven by means of sprocket wheels and chains which are connected with an electric motor of 2¼ horse power. At the stern end is a rudder and controller, so that one man can operate both. Only one electric boat is used. It tows six scows, which have already handled 12,000 bricks, 50 barrels of cement and 100 barrels of sand daily. The double trolley system is used, the wires being hung from insulated brackets secured to the top of the arch in such a way that a trolley can be run on it. A scow is also fitted with a centrifugal pump which is used for pumping out the cofferdam, and it is driven by another motor of 14 horse power. The application of the electric towage to sewer construction is novel and the results obtained are most satisfactory.

The electric scow was designed by Mr. Harrison P. Eddy, Superintendent of Sewers, Worcester, Mass. Mr. Robert N. Kendall is the assistant in charge of the electrical work.



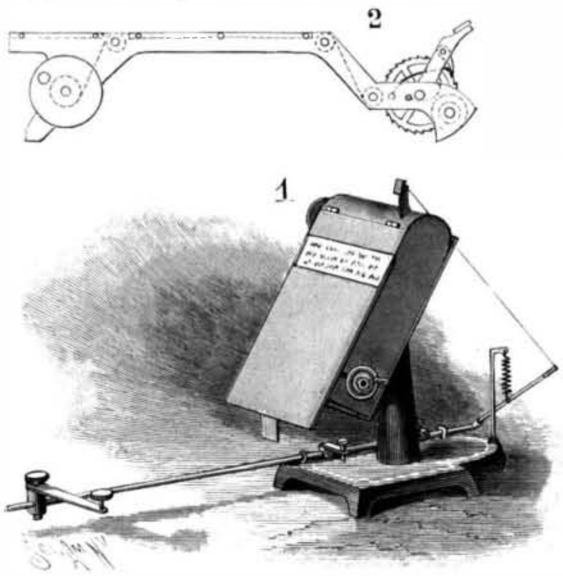
ELECTRIC TOWBOAT IN MAIN SEWER, WORCESTER MASS.

The X Rays in the Silk Culture.

The masculine silk cocoon yields more silk than that of the feminine; hence for raising purposes such varieties as give more masculine eggs are by far preferable. Up to the present it was not easy to distinguish the masculine from the feminine cocoons; the distinction was solely based on the greater weight peculiar to the feminine cocoon. The X rays have greatly facilitated the distinction. On account of containing the unripe eggs rich in mineral salts, the hind part of the feminine cocoon is found to be by far less transparent than that of the masculine. The dark shade in the vicinity of the ovary admits of readily recognizing the feminine silk chrysalis.

AN IMPROVED COPY-HOLDER.

The accompanying illustration represents a copy-holder designed to facilitate the taking of notes, and afterward holding the paper on which the notes are written in convenient position for transcribing, the



PAXTON'S COPY-HOLDER.

paper used being in the form of a continuous web. The improvement forms the subject of a patent issued to Elmer E. Paxton, of Honolulu, Hawaii. Fig. 1 represents the device in use, Fig. 2 showing a view of one side of the paper-carrying frame, which is held in a sheet metal casing, with a cover plate that is movable to provide a large or small space for the writing, the paper being advanced by a lever or by thumb wheels as desired, and the plate affording a rest for the arm. For conveniently retracting the web when the notes are to be transcribed, means are employed in connection with a base on which is a column carrying a flanged supporting plate on which the casing of the paper-carrying frame rests. In bearings on the base is a rock shaft on whose forward end is an arm adapted to extend near the keyboard of the typewriter, while the opposite end of the shaft carries an arm to which is attached a retractile spring, and which is also connected by a cord with the free end of a lever projecting from the upper end of the casing, so that by rocking the shaft extending forward from the base the web is advanced to expose the copy to the typewriter. When the web of paper has been filled with writing, the web should be wound back to the first position before the copying or transcribing can be done.

Sensationalism, not Science.

Scientific discoveries . . . have often been so wonderful in character that it ought not to excite surprise to find intelligent people ready to accept without question announcements of inventions and discoveries of the most improbable and absurd character. Along this line the evil influence of a sensational press is enormous. It was bad enough ten years ago, but it has been greatly magnified by the recent, and, on the whole, unfortunate cheapening of processes of illustration, to the seductions of which nearly every newspaper in the land has yielded.

To this has been added the newspaper "syndicate," by which men who know really nothing of science are employed to furnish sensational articles on scientific discovery, illustrated by sensational pictures, all of which is the more injurious because often founded upon a slender, microscopic tissue of fact. Unfortunately, some men who may be said to inhabit the fringe of genuine scientific activity lend themselves to this sort of thing and are made much of accordingly.

Whole pages of this modern journalism are filled with accounts of discoveries that are going to be made, for writers of this class are shrewd in taking advantage of the fact that human interest and human memory are now practically restricted to about twenty-four hours in time. The publication of a broadside describing an alleged improvement of the telescope or microscope, in which there is absolutely nothing new that is true or true that is new, adorned with a series of cuts largely imaginary and many of which have no relation to the subject matter, has served the purpose intended when its author has received his pay from the "syndicate" and when the syndicate has scored a triumph in what in these days is called "enterprise."

Even the most conservative among men of science are made to appear as willing purveyors of sensationalism by what ought to be looked upon as an unwarranted and illegitimate use of the results of carefully conducted investigations, often before such results have received final construction and approval at their own hands.

If all impressions made by this false popularization of science were to disappear in twenty-four hours, the evil would be greatly lessened; but, unfortunately, there are many very intelligent and thoughtful people, who ought to constitute the best support of scientific work, upon whom they are more lasting. To such the line separating the genuine accomplishments of honest scholarship from the output of sensationalism, which ought to be clear and sharp, is becoming very nebulous, and there is imminent danger of a revolt against the whole thing.

The extent to which credulity has been carried was beautifully illustrated not long ago when a widely known scientific man amused himself and many friends by caricaturing, in the columns of one of our standard scientific journals, some of the phases of modern psychophysics. So perfectly did the burlesque reflect the form and substance of some recent contributions to that science that it was immediately accepted as serious by the large majority of readers.—Prof. T. C. Mendenhall, in Science.

THE work on the middle arch of the Bonn Rhine bridge, which is at present the largest in Germany, being 184 meters wide, is now completed. The result of lowering the enormous iron burden of 1,700,000 kilogrammes upon the bridge piers was looked forward to with great expectation. The same has turned out surprisingly favorable, for the two piers only show a lateral displacement of 3 millimeters, which furnishes the best testimonial for their construction. The arch has settled 35 millimeters in the upper edge.