THE NEW FLOATING DRYDOCK FOR THE UNITED STATES NAVY.

There is nearing completion at the establishment of the Maryland Steel Company, at Sparrow's Point, Md., a steel floating drydock which is intended to be located upon completion, at the United States Naval Reservation at Algiers, La., opposite New Orleans. Its length is 525 feet over blocks; it has an entrance of 100 feet in the clear between walls, and will have a maximum lifting power of 18,000 tons. It will be attached to two steel columns on shore by two steel lattice booms, articulated in all directions. The dock will, therefore, be free to rise and fall with the river, which is subject to frequent severe freshets, and sometimes rises to 20 feet above Gulf level. This connection will, at the same time, allow the dock to be swung inshore out of the worst of the current, which occasionally attains a speed as high as six miles an hour.

The general plans of the dock were made by Clark & Standfield, of London, England, who were the designers of many similar docks, the principal of which was the one constructed for the Spanish government, built by Swan & Hunter, of Wallsend-on-Tyne, England, and towed to Havana, Cuba. Another large dock of the kind is a commercial dock, which was also built in England, and was towed to Stettin, Germany. Several modifications and improvements were added to the first plans submitted, to meet the requirements of the Bureau of Yards and Docks, the details of these improvements being worked out by the engineering department of the Maryland Steel Company. Among other changes the structural strength throughout the pontoons was increased, giving the dock a maximum capacity of 18,000 tons when the deck or floor is awash, or of 15,000 tons with a freeboard of about 2 feet.

The specifications with these changes included call for a transverse strength sufficient for docking a battleship of 15,000 tons with the entire weight carried on the keel blocks. The specifications require that the time required for lifting a vessel shall be 3½ hours from the time the keel is centered on the blocks.

The mention of the question of the lifting power forms an opportune occasion for pointing out how comparatively little power is expended by a floating dock in lifting a vessel in a given time. When docking a vessel in a graving dock the whole of the contents less the volume of the ship has to be removed by pumping; therefore the smaller the ship in dock the greater the amount of water to be removed; moreover, when it has to be emptied, merely to prepare a berth for a ship, the whole amount has to be extracted. In a floating dock, on the contrary, the ship being supported by the buoyancy of the dock, the weight of water to be removed is only proportional to the weight of the ship, plus an amount representing the dock itself, while when the dock is lifted light, to prepare the berth, only its own weight has to be dealt with. The saving thus effected is therefore very great and is not only apparent in the reduced first cost of the pumping plant, but remains constant throughout the dock's career, in the form of a reduced coal bill.

The following are the general dimensions of the dock:

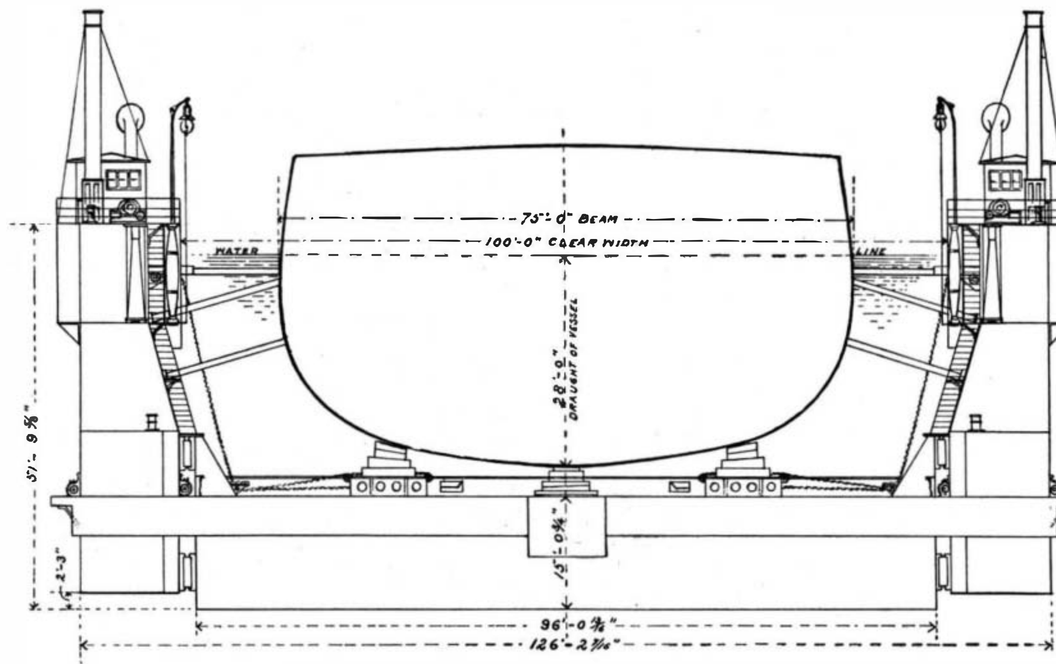
Length over all	525 feet.
Breadth over all	126 feet 2 7-16 inches.
Breadth between walls	100 feet.
Depth over sills	18 feet.
Depth of pontoons	17 feet 6 inches.
Maximum draft	49 feet 6 inches.
Number of pontoons	3
Length of middle pontoons	242 feet.
Length of end pontoon	141 feet 3-8 inches.
Length of walls	395 feet 5-8 inches.
Total weight of dock	6,865 tons.

The dock consists of five portions, and comprises three pontoons as the lifting portion of the dock, and two side walls, which latter, while affording a certain amount of lifting power, primarily serve to give the dock stability and to regulate its descent when the pontoons are submerged. The pontoons themselves are of different sizes and form. The center one is 242 feet long and rectangular in shape, but the rectangular length of two terminal pontoons is only about 80 feet, the remainder being finished off in the form of a blunt nose-point or bow. For a length of 55 feet these end pontoons are buoyant, and the remaining length forming the point proper is formed by a series of plate and lattice girders of strong construction. Each pontoon has three longitudinal bulkheads, the two outer ones being watertight while the middle one is designedly left with small openings.

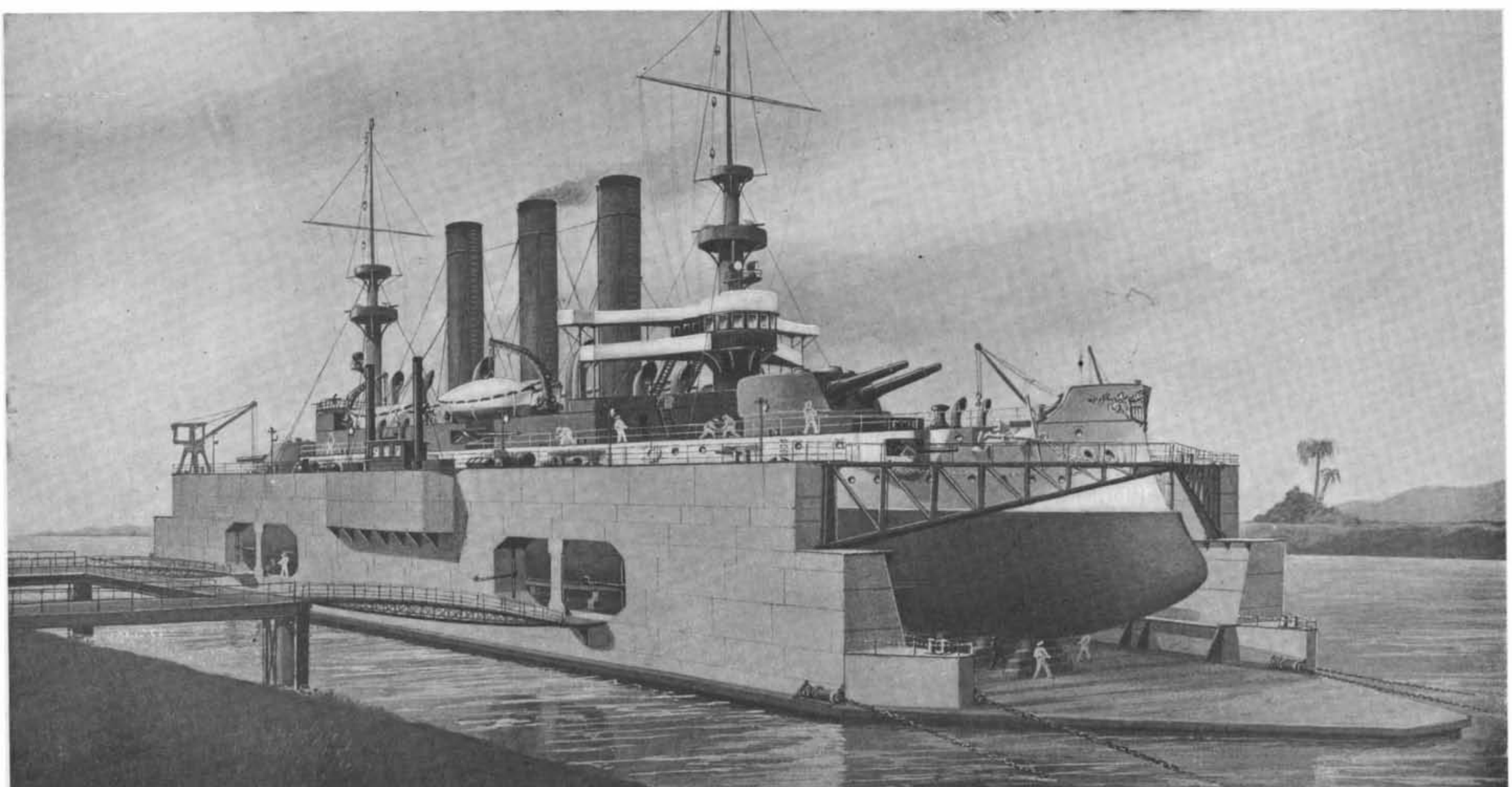
This central longitudinal bulkhead is intercostal between the transverse bulkheads, and has two vertical plates, connecting to the first and second intermediate frames by angles. These longitudinal frames are placed 2 feet 6 inches apart and are of a girder design, each frame calculated to withstand a strain of from 40 to 65 tons load per foot. This construction is carried throughout the entire central portion of all the pontoons, and covers the area required for affording the necessary stability for carrying the heaviest battleships now built. 'Thwartship bulkheads are introduced every 10 feet, every fifth and sixth being watertight. The side walls are similarly constructed with five transverse bulkheads, and are provided with two gangway openings on each side. These walls are connected to the pontoons by steel castings and fish plates, and secured together by taper pins and bolts.

The operating plant consists of engines, boilers, and pumps, which are installed in the two walls, each being a separate and complete plant within itself. The main pumps are placed in the bottom of the walls, and are connected by vertical shafting and gearing to engines which are of the compound type. They are furnished with automatic flywheel governors. A notable feature in the governing device of these engines is that the speeds of the pumps can be regulated with a variation of from 310 to 410 while the engine is in motion. The two side walls are also provided with flying gangways, which are placed at the bow end of the dock, and are hinged so as to swing together. They are provided with a platform and hand railing, which provides a means of passing from one side wall to the other. There are also on the inside of the side walls convenient ladders and stairways to reach the upper and intermediate deck from the deck of the pontoons. Each gangway deck and opening is provided with light swinging hand cranes for handling material from offshore connections or from lighters.

The actual mooring of the dock will be by four chair



END VIEW OF THE ALGIERS FLOATING DRYDOCK, WITH A 15,000-TON BATTLESHIP SHOWN IN OUTLINE.


THE NEW ALGIERS FLOATING DRYDOCK AS IT WOULD APPEAR WITH THE BATTLESHIP "MAINE" ON THE BLOCKS.

cables of the stud-link pattern, to which will be attached mushroom anchors, the handling of which is done by heavy capstans connected to powerful winches; the cables are provided with coil-spring buffers where they make fast to the dock. There are also provided auxiliary winches, fairleads and all the necessary appliances for handling the lines for docking a vessel. The operating valve houses are located on the top deck of each side wall, from which position the entire manipulation in docking a vessel is conducted. Four mechanical side shores, two in each wall, are also operated from these top decks, so that a vessel can be easily and directly centered over the keel blocks.

An important feature of the dock is that any portion of it can be made accessible for repairs or inspection. To reach the bottom of one of the walls, say the port one, it is only necessary to heel the dock to starboard.

In the case of the pontoons, the middle one is made large enough to raise those at the ends out of water. Suppose it is desired to get at the bottom of the middle pontoon: the dock is allowed to float light; men then knock on the tapered pins of the two rows of fishplates which secure this pontoon to the side walls; then the dock is allowed to sink, the middle pontoon floating free, until the lower row of fishplates on the pontoons is level with the upper row on the walls; the pins are then driven in, the dock pumped out and the middle pontoon is lifted clear of the water. To unlock, the reverse course is followed. The end pontoons are similarly treated. The interior of the walls and pontoons is easily accessible through numerous manholes.

Should a disabled ship draw one or two more feet than the capacity of the dock permits, the dock master would not hesitate to sink the dock the extra depth, as he walls have a minimum freeboard of 4 feet 9 nches. Also, should a ship, from any cause, have a list, the dock could be given the same list within limits, the ship taken in, and the two then brought to an even keel.

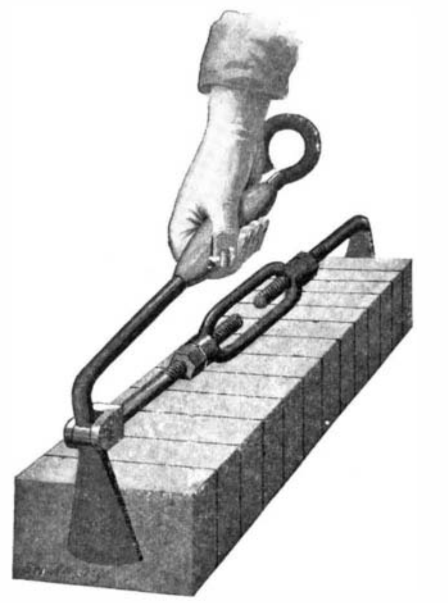
It is a curious coincidence that the launch of two identical warships built for the United States navy should be taking place within a few weeks' interval at two establishments so widely separated as that of the Union Iron Works, San Francisco, and that of William Cramp & Sons, at Philadelphia. The "Ohio," recently launched in San Francisco by the President of the United States, is a sister ship to the "Maine," whose launch is scheduled to take place about the time that this issue will be in the hands of our readers. Another vessel which is being built from the same plans, and will be named "Missouri," will shortly be launched at Newport News, Va. As the "Maine" and her sisters are the largest vessels in the United States Navy, our artist has shown her docked in the new Algiers drydock; and it will be noticed that, large as this vessel is, she does not by any means exhaust the capacity of the dock. The principal dimensions of the "Maine" are, total length 388 feet, beam 72 feet 2½ inches, mean draft 23 feet 6 inches, displacement at mean draft 12,300 tons, full load displacement being 13,500 tons, or 4,500 tons less than the maximum lifting capacity of the dock. The contract speed is 18 knots. The "Maine" is surrounded at the waterline by a coffer dam filled with water-excluding material in the shape of a preparation of cellulose. The belt of side armor extends from 3 feet 6 inches above to 4 feet below the waterline. Amidships it is 11 inches in thickness at its upper edge and 7½ inches at its lower edge. A complete casemate armor belt, 6 inches in thickness, extends from the upper edge of the side belt to the upper deck. The vessel is armed with four 12-inch, 40-caliber guns, sixteen 6-inch, 50-caliber, rapid-fire guns, and six 3-inch 50-caliber rapid-fire guns; besides eight 6-pounders, six 1-pounders, two 2-inch field guns and two Colts. The 12-inch guns are carried in pairs in turrets protected with 11 to 12 inches of Krupp armor. The armored deck varies in thickness from 2¾ inches on the flat to 3 and 4 inches on the slopes. The supply of ammunition is plentiful—a most important feature in ships armored so largely with rapid-fire guns. The "Maine" carries 240 rounds for the 12-inch gun, over 3,000 for the 5-inch, 9,000 rounds for the 6-pounders and 4,000 rounds for the 1-pounders. The motive power is of the very latest type, steam being supplied by twenty-four Niclausse boilers with a total heating surface of 58,104 square feet. When the battleship is in commission, she will carry thirty-five officers and 511 men.

It is a fact not generally known that nearly all of the common lizards change color like the chameleon, but the change is less rapid. The ordinary fence lizard will be black after remaining upon black soil for about half a minute, but upon an old-fashioned rail fence the animal soon assumes the motley gray hue of a weather-worn rail. Upon a green leaf he same lizard will take on a decidedly greenish tint. The change of color, both in the chameleon and the common lizards, appears to be nature's subterfuge for the protection of the animal.

A SIMPLE BRICK-CARRYING DEVICE.

Our illustration pictures a clamp for carrying brick, which comprises essentially a turnbuckle engaged by oppositely-threaded shafts. Of these shafts one terminates in a grip and the other in a clevis. A bar is pivoted in the clevis and is provided at one end with a grip and at the other end with a handle and a loop.

The bricks are arranged side by side. By means of the oppositely-threaded shafts, the device is adjusted to pick up a certain number of bricks. The handle-bar is lowered, and the grips are slipped over the sides of the two end bricks. When the device



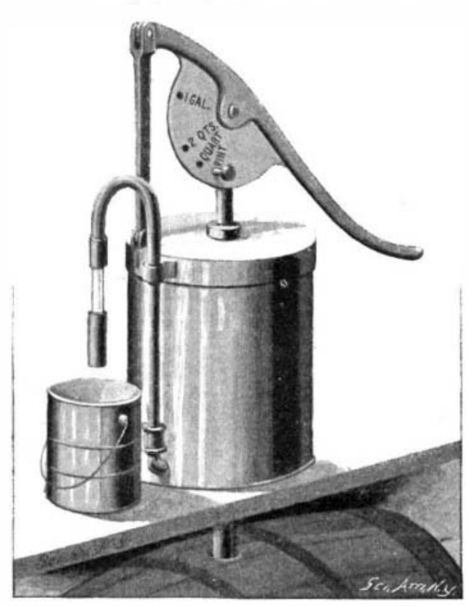
A NEW BRICK-CARRIER.

is lifted by the handle the grips firmly clutch the end bricks. The inventor of this brick-carrying implement is Frank E. Sproat, of Allegheny, Pa.

A SELF-MEASURING PUMP FOR LIQUIDS.

A pump which automatically measures the amount of liquid which it raises from a vessel is a novelty recently patented by Marshall Comincavish, a resident of the town of Fort Wayne, Ind.

Integral with the handle of the pump is a segment composed of two parallel parts straddling the piston-rod. The segment parts are provided with registering openings through which a pin may be passed, designed to come into contact with the piston-rod when the handle is raised and then limit the stroke of the piston. The bottom of the cylinder is perforated to receive a suction-pipe leading to the vessel containing the liquid. A valve in the suction-pipe is opened on the up stroke of the piston and closed on the down stroke. The liquid pumped in the cylinder is forced up into a goose-neck pipe connected with the cylinder and provided with a valve opened on the down stroke of the pump.



A SELF-MEASURING PUMP FOR LIQUIDS.

The short leg of the goose-neck pipe is composed in part of a glass-section to which a rubber tube is attached.

In operation the handle is raised until the pin strikes the piston-rod, thus limiting the stroke. On the upward movement of the piston liquid is drawn up into the cylinder. On the downward movement of the piston the liquid is forced up into and out of the goose-neck pipe, the valve in the suction-pipe being closed and that in the goose-neck opened.

The glass is used for sampling the liquid. This may be easily done by running a small quantity of the liquid into the rubber tube and squeezing the ends to retain the liquid. By detaching the tube the liquid may be tasted.

Electrolytic Apparatus for Hypochlorites.

In a recent article upon the electrolytic preparation of chlorates and hypochlorites on an industrial scale, M. Brochet describes several of the most recent forms of apparatus for the production of hypochlorites, these having a special value in the industries as being used to replace chlorine and chloride of lime for bleaching purposes. In the Hermite system, the electrolytic apparatus has anodes formed of platinum gauze held in ebonite frames. Between the anodes are placed the cathodes formed of zinc disks mounted on a shaft by which they are given a rotary movement; there are two such revolving cathodes for each pair of anodes. The shafts are mounted upon the top of the electrolytic tank, which serves equally as cathode. The solution used contains 50 parts of common salt and 5 parts of chloride of magnesium for 1,000 parts water. The apparatus forms mainly hypochlorous acid and magnesia, the latter being deposited upon the cathodes, from which it is removed by scrapers. The industrial apparatus of this type takes about 1,000 amperes at 5 to 6 volts, representing 8 or 9 horse power. It produces in 24 hours a solution which has a bleaching power equal to 275 pounds of chloride of lime, or 88 pounds of active chlorine. An apparatus of the Corbin type is used in a large paper works at Lancey (France). The electrodes are formed of platinum plates fixed in ebonite frames; these frames fit into the tank and divide it into compartments. The apparatus contains thirteen such plates and absorbs 120 volts and 150 amperes, or about 25 horse power. A dilute solution of salt, 2½ per cent, is used. The liquid circulates continuously; it comes out of a reservoir, passes into the electrolyzer, then into the bleaching vat, where it comes in contact with the wood-paste, which has been already partially bleached by the Mitscherlich process with bisulphite of lime. The vats measure 6 by 15 feet and 3 feet high; they contain 1,700 pounds of paste, which is made to circulate continuously by an agitator. The liquid is caused to circulate by means of a drum which takes it from the vat in a constant manner and sends it into a double-bottomed tank, from which it is raised to the first reservoir by a centrifugal pump. When the paste has remained long enough in contact, it is sent into the double-bottomed tank where it is drained. As it takes about 20 parts by weight of chloride of lime to bleach 100 parts of wood-paste, it results that each apparatus bleaching in 24 hours 1,700 pounds of paste, produces the equivalent of 340 pounds of chloride of lime, or 110 pounds of chlorine. The Kellner apparatus, constructed by Siemens & Halske, is used to a considerable extent in Germany. It consists essentially of an earthenware tank carrying on opposite sides a series of grooves in which slide a series of perforated glass plates, thus dividing the tank into twenty compartments of one-inch width. These glass plates serve as supports for the electrodes, which are formed of platinum gauze fixed on each side of the glass plate, and united by wires passing through the holes. The electrolyte is a solution of salt of 10 per cent strength; it enters at the bottom of the tank and comes out by overflow holes placed betwen the plates The speed of circulation is regulated so that the liquid coming from the tank contains 0.05 per cent of chlorine; it then descends to a lower chamber containing a spiral of hardened lead pipe in which circulates a current of cold water. A centrifugal pump, also of lead, raises the liquid to the tank, and it thus circulates in a continuous manner until its strength reaches 0.7 to 1.0 per cent of chlorine. An apparatus of this type consumes 112 volts and 114 amperes, or 19 horse power, and gives in three hours 90 gallons of a solution containing 0.85 per cent of chlorine, representing 12 pounds of active chlorine.

The Current Supplement.

The current SUPPLEMENT, No. 1328, is begun by an article on M. Berthelot, accompanied by an engraving, showing the great chemist in his laboratory. "The Hospitals of Japan" is a very instructive article. "Low Grade Gold Mining and Milling" is accompanied by illustrative diagrams. "Electrically Operated Radial Drills" shows several new types of machine tools. "Animal Change and Environment" is by Prof. Thomas H. Montgomery. "Animals that Clothe Themselves" is an interesting entomological article. "Syntonic Wireless Telegraphy" is by Guglielmo Marconi. "Germany's Machinery Trade in 1900" gives full statistics.

Contents.

(Illustrated articles are marked with an asterisk.)