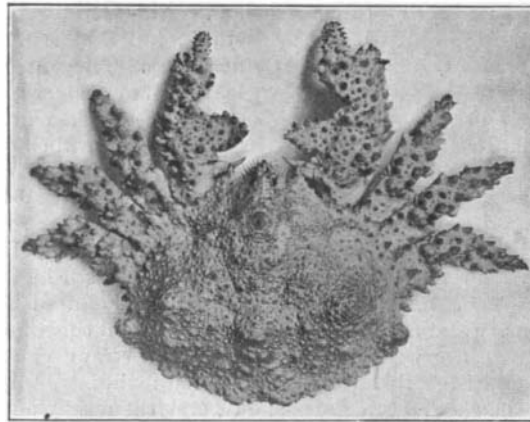


have had the opportunity of inspecting the operation of the door, and it impresses us as being an admirable solution of this difficult and most vital problem. Briefly stated, the absolutely essential elements of a successful watertight door system are first that every door may be closed simultaneously and instantly from the bridge or some central station, and that some telltale announcement shall show that they are closed; secondly, that it shall be possible to raise and lower each door independently, and from either side of the door, without conflicting with the operation from the bridge; thirdly, that it shall be possible to close the door either against a rush of water or through coal which may have accumulated in the doorway. These features, with others of minor importance, are all fulfilled in the present instance. The clear opening of the door can be of any desired size; for coal bunkers as shown in our engravings, it is generally about 4 feet 6 inches by 2 feet. The door is a steel plate riveted to a sliding frame. The guide-frame of bronze is bolted to the bulkhead, the guides being tapered $\frac{1}{10}$ of an inch to the foot. The sliding-frame is made with eleven wedges of the same taper as the guides, there being four on each side, two on top and one on the bottom. The surfaces nearest the bulkhead of both the guide-frame and the sliding-frame are scraped surfaces which form a water-tight joint by the wedge action which occurs during the last half-inch of closing. The guide-frame is open at the lower edge to prevent clogging or jamming.

The door plate carries a bronze rack into which gears a pinion keyed to a horizontal shaft which is carried at the top of the guide-frame. This pinion engages a smaller pinion on a second horizontal shaft, at either end of which is keyed a worm wheel, which in its turn engages a worm. The worm-shaft passes normally through the bulkhead and is driven by a one horse power electric motor, which is carried in a watertight casing on the opposite side of the bulkhead. Crank shafts are provided, which slip over the hexagonal end of the worm-shaft on either side of the bulkhead, and may be used for hand operation of the doors. The motor is compound-wound and of the short shunt type, the short shunt coils being relatively weak and wound outside the series coils. The circuits are so arranged that for raising the door only, the series coils are in circuit, giving a quick and easy starting; while for closing the door, where it may be necessary to cut through coal or other obstructions, the shunt and series coils are both in circuit. The current is controlled by a three-point spring lever switch on each side of the bulkhead. The switch is normally in its central position, in which the door closing circuit may be completed from the bridge or from any central station in the ship. The door-opening circuit can be completed only at the door, and this is done by moving the lever to the right or left, operations which raise or lower the door.

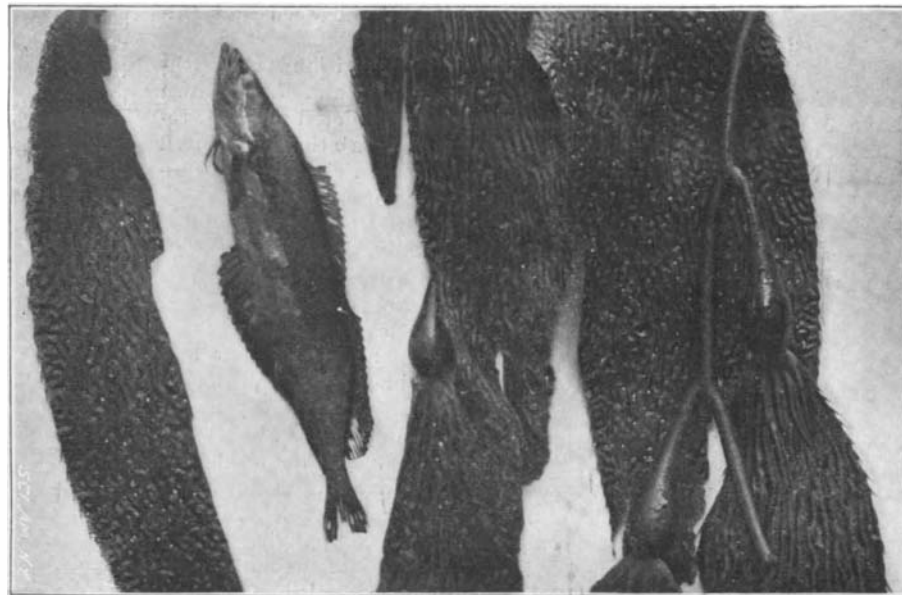
The operation of this system is as follows: In case of an emergency such as a collision, the officer on the bridge can immediately close every water-tight door throughout the vessel, a small signal lamp at the bridge, or other selected station, lighting up during the movement of the door and going out as soon as the door is closed. If any of the crew should be shut in a water-tight compartment, or should it be necessary to pass from one compartment to another after the doors have been closed from the central station, all that is necessary is to turn the spring lever at the particular door, when it will open, the lever returning to the central position and closing the door automatically when the person has passed through. Mechanically considered, the

door is an excellent piece of work both in design and construction. Judging from its operation as now installed on the "Atlanta," it appears to admir-



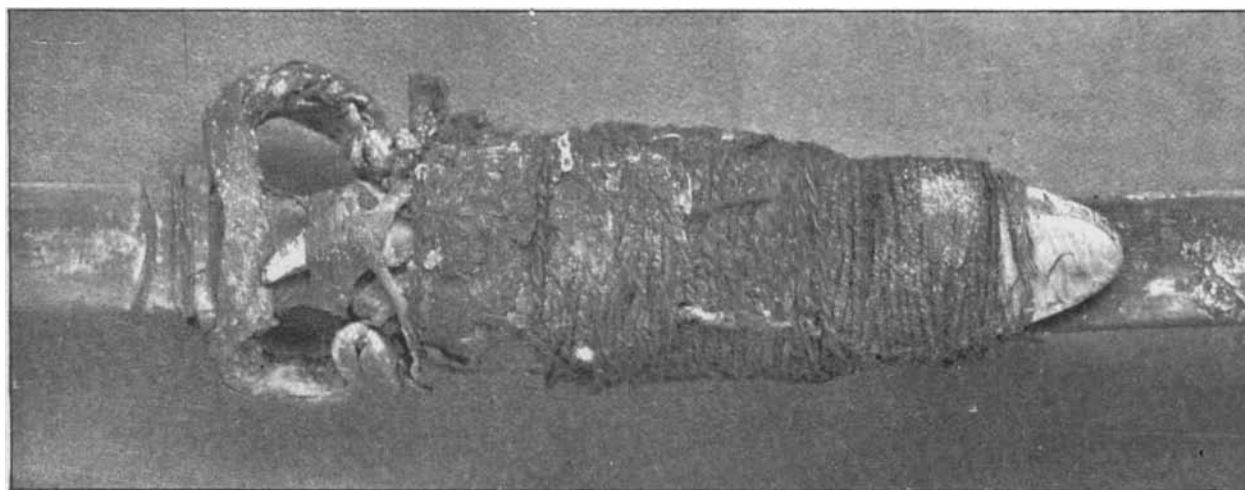
STONE CRABS THAT RESEMBLE ROCKS.

ably fulfill the requirements of a perfect water-tight door installation. We understand that Mr. Bowles' system will probably be exhibited at the Paris Exposition, where, by the way, the valuable Pollok prize is to be

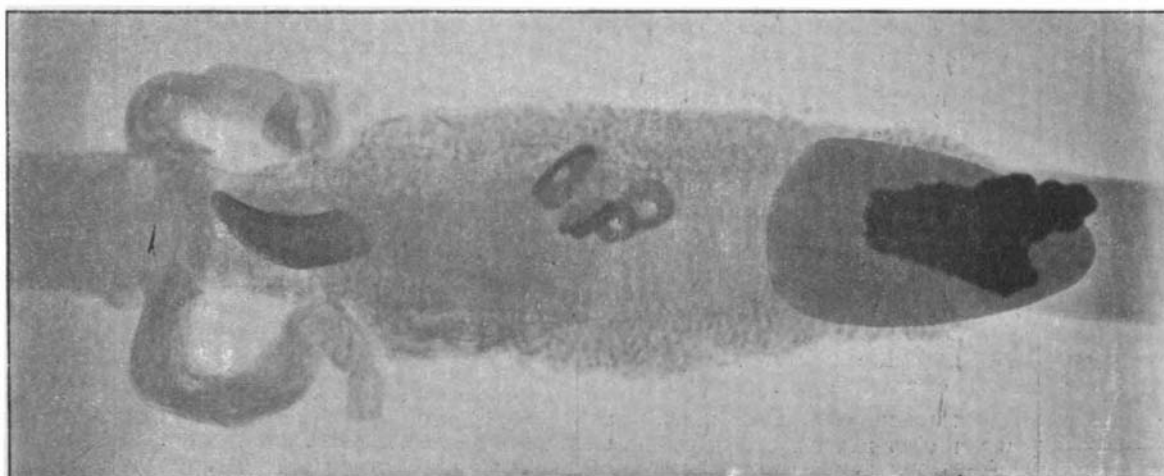


KELP FISH (*Heterostichus rostratus*), SHOWING ITS VERTICAL POSITION IN THE TANK, MIMICKING THE KELP IN SHAPE AND COLOR.

awarded for the best marine life-saving device submitted. Fuller details regarding the system can be gathered from a paper read by Assistant Naval Constructor Watt at the recent meeting of the Society of Naval Architects and Marine Engineers, and published in the Proceedings.



Finger Loops with Wrappings and Fetiches of Throwing Stick, from Cliff Dwelling, Mancos Canyon, Colorado.



Radiograph Shows Inclosed Stone Beads Concealed by Wrapping

AN ARCHÆOLOGICAL USE OF THE ROENTGEN RAYS FOR THE EXAMINATION OF A THROWING STICK.

Such is the "Atlanta" as she will appear when leaving the navy yard for her trial trip. The renovation and reconstruction have been so admirably planned and carried out, that except for the fact that she possesses only a partial armored deck, this vessel will now be well up to the standard of modern cruisers of her class.

ARCHÆOLOGICAL APPLICATION OF THE ROENTGEN RAYS.

Shortly after the announcement of the discovery of the Roentgen rays, Prof. Stewart Culin, of the Free Museum of Science and Art of the University of Pennsylvania, foresaw the possible future of the new rays in examining the internal construction of valuable museum specimens. After suitable apparatus had been installed in the Pepper Clinical Laboratory by Dr. Charles Lester Leonard, an attempt was made to test the practical application of its value in archæological work. Dr. Leonard made a successful radiograph of a Peruvian mummy, and the photograph disclosed the fact that the closely wrapped bundle contained the skeleton of a child having a string of stones or shell beads about its neck. Another radiograph was obtained of a desiccated human foot with a leather sandal. This gave promise of the utility of such pictures in the examination of such objects. Mr. Cushing expressed the opinion to Prof. Culin that a piece of turquoise was concealed beneath the heavy wrapping of brown yarn that binds the finger loops of every fine prehistoric throwing stick from Mancos Cañon, Col., in the University Museum. Mr. Cushing was of the opinion that the turquoise was the heart of a fetish bird. It occurred to Prof. Culin that the verification of this conjecture might be secured, and photographs of the wrappings with corresponding radiographs were made, with the result as shown in our engravings, which we are enabled to present through the courtesy of Prof. Culin.

It will be seen that four stone beads, presumably of turquoise, are revealed as Mr. Cushing had surmised. The extreme fragility of the wrapping was such as to render an examination by other means impossible without serious injury to a most valuable specimen. In the current issue of the SCIENTIFIC AMERICAN SUPPLEMENT appears Prof. Culin's article, accompanied by additional side views of the specimen.

MIMICRY OF THE KELP FISH.

BY CHARLES FREDERIC HOLDER, PASADENA, CAL.

It is said of certain natives of South Africa that when they go into battle they carry bushes in their hands and move so slowly along that it is almost impossible to distinguish them from the mass of verdure about them. When an American warship is about to begin an engagement she is painted lead color, the object being to make her simulate the color of her immediate environment. Even the men behind exposed guns on the cruisers during the late war were ordered to paint their clothes the prevailing hue, so that the sharpshooters of the enemy would not pick them off.

This is called mimicry; the subjects imitating their surroundings as a protective measure; and that man has obtained the suggestion from nature is evident to any one who has made even a superficial study of the subject, as in every branch of animal life some forms are found which protect themselves from enemies in the manner described, namely, by imitating more or less their surroundings.

This singular mimicry is exhibited in a particularly interesting manner among fishes, and the accompanying illustration shows one