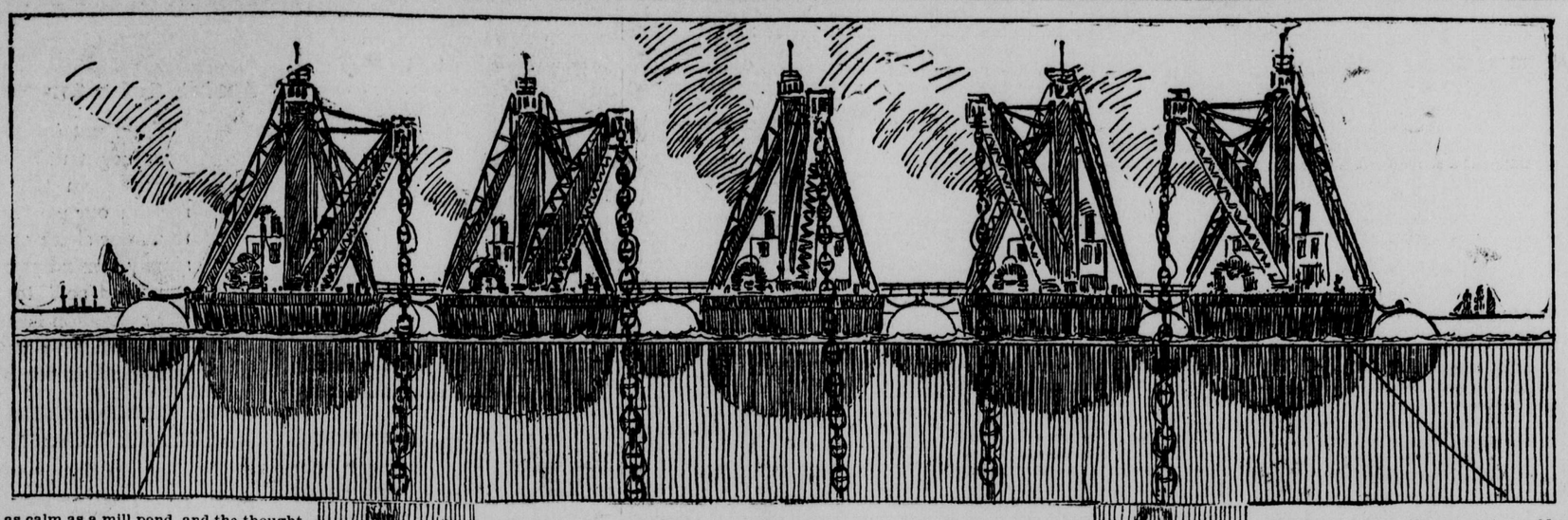
AN ASTOUNDING ELECTRICAL FEAT THAT WILL ASTONISH THE WORLD



A FEAT which will assuredly be one of the most wonderful science has ever attempted has been proposed to the British government. It is to raise the great battleship Victoria, which at present lies at the bottom of the Mediterranean sea, by means of monster magnets.

If this is successfully performed, and electro-scientists of note believe that it will be done, it will revolutionize the wrecking industry, as well as mark a giant stride in electric science.

The suggested experiment on the part of the British government is of especial interest at the present time, in view of the sinking of the American battleship Maine in Havana harbor.

To say that the proposition has astounded scientists in this country is putting it mildly. And yet, when those who at first smiled at the idea have seriously considered it, they have been forced to admit that the plan is not only feasible, but is likely to prove an unqualified success.

Before going into the details of the British government's plan it is necessary to say something about the sunken battleship. In the minds of most people the incident of its loss is still fresh. The British fleet was steaming in double column up the Mediterranean. The sea was as calm as a mill pond, and the thought of a ship going to the bottom was furthest of all things from the minds of those in the fleet. The order came from Admiral Tyron, the officer in command of the ship, for the execution of a maneuver that had always been a favorite one with him when the vessels were practicing difficult evolutions.

It was simply a turning right about face of the entire fleet, by the simple process of the leading ships swinging bow in towards each other and continuing to turn until side by side again with the prows pointed in an exactly opposite direction to that in which they had been steaming. It was the simple wheeling inwardly of two parallel ships, turning as on a pivot until they had turned to be where they had been when beginning the maneuver, but with the directions reversed.

It is generally supposed that the short-sightedness which led an admiral of Tryon's experience to direct the maneuver when every one in the fleet could see that a collision would result, was caused by his staying too long over the wine at the mess table. Even the most charitable minded were forced to place some such construction upon the want of foresight that caused so terrible a disaster. As the admiral paid for his recklessness with his life, however, it is perhaps as well to pass lightly over that part of the catastrophe.

The ships had only half completed the wheeling process when the massive sides of the Victoria were crumpled like so much paper by the ram of the Camperdown, and into the hole thus made water poured so suddenly that, although the sailors of the fleet made the most heroic efforts to save life, twenty officers and three hundred and thirty-six men went down with the ship.

She lies at the bottom of the Mediterranean, in 450 feet of water, off the harbor of Tripoli. All attempts to raise any portion of the equipment have been futile. It is too deep down for divers to reach her. The value of the equipment alone is immense, for the Victoria was a modern steel armored fighting ship, 350 feet long, and armed with 110-ton rifles.

To raise the mammoth ship the British admiralty is considering the following method:

Above the spot where the Victoria is known to lie they will moor a fleet of wrecking pontoons. The chief instruments to be used will be monster magnets, which will be let down from the sides of the pontoons attached to great chain cables.

The magnets will sink until the attraction of the steel sides of the Victoria will draw them towards the ship, when they will be attached in a strong embrace by the mysterious force that every schoolboy has tested on a small scale. What the diver cannot do, because he cannot get down deep enough to attach chains to the sunken fighting machine, the magnets will do by the attraction that electro-magnets have over steel. When one magnet has been lowered, and the points are firmly attached to the sides of the ship, another will be dropped at a little distance, and this process continued until the sides of the battleship are firmly joined to the pontoons by the chains that are attached to the magnets.

So large will these magnets be that the lifting capacity of the magnetic power will be no less than one hundred tons to a magnet. That is to say, they will stick to the armored sides of the Victoria with force enough for each one to bear the pressure necessary to lift one hundred tons' weight. The weight of the wreck is estimated at 7000 tons, so that it will be necessary for no less than seventy of these monster magnets to be used in connecting the lifting machines on the pontoons with the wrecked battleship.

The wonderful methods of science were never more strikingly exhibited than they will be in this experiment. Science will give eyes that will penetrate to the bed of the sea. The men on the pontoons will be able, by means of delicate instruments connectd with the groping magnets, to tell exactly where these are in relation to the wreck, and when they touch the armored sides with sufficient sticking power to make the test a success. A delicate electrical dial on the pontoon will record the depth to which the magnet has sunk and the power with which it has attached itself to the battleship will be shown in the same way.

If it is shown that the force of the magnetic influence is not sufficiently great to stand the strain that will be put upon it when the work of raising the ship begins, then the magnet will be broken away from the insufficient embrace and a new spot on the ship's sides played for until a firm hold is obtained.

When all the magnets have been thus fixed the work of raising the wreck will be begun. On the pontoons are to be powerful hydraulic rams and dynamo machines, and these will get to work on the lifting process. Each lifting cable will be attached to the lifting pontoon by means of a sheave on the head of a hydraulic lifting ram having a stroke of twelve feet, which will give an effective lift of twenty-four feet. Each hydraulic cylinder on the pontoon will be connected with all the others, and a balancing accumulator will prevent any rope from getting more than a normal strain of one hundred tons.

When the rams have all made their full stroke the lifting cables will be simultaneously held in position by means of special hydraulic lifting blocks. The rams will then be lowered and another lift of twenty-four feet given to the wreck, and this operation will be repeated uptil by patient work the great battleship is raised so near the surface as to allow of her being towed to shallower water and then beached.

All this will be the work of a great deal of time, but the consensus of scientific opinion is that it can be performed. When it is considered that the Victoria cost to build no less a sum than $8,000,000, it is worth the attempt at an immense cost, as no part of her armament is injured, and the comparitively small-sized hole that sunk her can readily be repaired.

A careful estimate of the cost of raising the battleship by means of electro-magnets shows that it can be done for less than $500,000, so that the government will be an immense gainer if the work is successfully completed.

In a small way the test of this novel method of raising a sunken battleship has already been made by the government authorities, and were it not for the slowness with which the admiralty officials take up any new suggestion, however feasible it may seem, the Victoria might have been raised long ago.

When the idea was first suggested by an electrical expert, the government officials were sufficiently impressed with it to allow a demonstration to be made with a model ship, the depth of water, the lifting capacity of the magnets and all things, being, relatively, the same as those of the forthcoming undertaking.

Into a depth of water that represented, in comparison with the size of the immersed model, the depth of the Mediterranean where the Victoria is sunk, there were lowered a number of magnets that bore to the model the same size, comparatively, as those that will be used in the work described. The magnets readily attached themselves to the sides of the sunken model, and the little boat was easily raised to the surface of the tank in which it had been sunk.

The demonstration of the success of the experiment was met by the objection that the sides of the model were clean steel and the water was pure, so that the magnets were easily attached. It was argued that a vessel that had been in salt water as long as the Victoria would be covered with barnacles and encrusted with salt to such an extent that it would not be possible to find a clean spot where the magnets could attach themselves with sufficient power to make the lifting possible. The wreck being too deep for divers, it would not be possible to send men down to clean spots where the magnets could find a lodging space, and so the very difficulty which had prevented the raising of the Victoria by means of the usual process would prevent her being raised by the proposed magnetic method—the depth of water would not permit divers to assist in the work that the magnets could not do for themselves.

The electrical experts contended that the uncleanliness of the sides of the vessel was probably much exaggerated. The water in which she had sunk was not so foul as was suggested, and in all probability it would be found that the magnets would attach readilyto the sides, in spite of the presence of foreign matter, and the rest, of course, would be easy.

DOUGALD C. JACKSON, VICE-PRESIDENT AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, WRITES THE FEAT SURPASSES JULES VERNE'S MARVELS

The proposed raising of the great British ironclad Victoria by means of electro-magnets worked from pontoons challenges the utmost marvels of Jules Verne, and includes a germ of possiblity of which they are destitute. To plan and execute such an undertaking would be stupendous and unmatched in the annals of electricity and engineering; but to apply the word impossible would doubtless indicate more courage than seasoned knowledge and experience.

DOUGALD C. JACKSON.

RALPH W. POPE, SECRETARY AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, STATES THE FEAT WOULD BE ON A LARGE SCALE

If the hulk of the Victoria is successfully raised by the process referred to, it will be a simple application on a large scale of well-known electro-magnetic principles in practical use for the last fifty years. When the feat is performed it will be time enough, in my opinion, to describe it. Yours truly,

RALPH W. POPE.

GENERAL MANAGER WALKER OF THE ILLINOIS STEEL COMPANY, WHICH USES ELECTRO-MAGNETS TO LIFT RED HOT TONS OF STEEL, IS NOT SANGUINE

I have submitted the facts to our electrical experts and following on their reports will advise as follows:

Theoretically this scheme is feasible, but from a practical standpoint it would appear, to say the least, that the difficulties would be very serious. The magnets would have to be designed and constructed with a view of keeping them watertight, a difficulty which it would be comparatively easy to overcome; but a magnet designed to lift 100 tons would be very unwieldy, if not too much so, for use on such work.

The maximum pulling power of iron under practical conditions is about 200 pounds per square inch, which would mean that a magnet capable of lifting 100 tons would have a pulling face (even when highly magnetized) of about seven square feet, and its full power could not be applied unless the attracted surface were in close physical contact with the magnet face at all points. This condition would be very hard to obtain in connection with the case in point. It would seem that smaller magnets would be better, but even they would be open to objection on the same score.

Much would depend upon how the vessel was lying, but even with the most favorable conditions of position it would seem almost impossible to place magnets upon her of sufficient capacity to raise her, unless divers could go down to place them, in which case magnets would be unnecessary. The weight of the magnets would also be very considerable, for the ratio of weight to lifting power of magnets increases with their capacity, and is very large with large magnets.

We should certainly consider this feat—should it be accomplished—as a most remarkable one, and that the engineers should receive great credit for surmounting difficulties so serious, and we may further say that we do not believe the feat can be accomplished, under the conditions set forth, and in the manner suggested. WM. R. WALKER.

NIKOLA TESLA, THE FAMOUS ELECTRICIAN, SAYS THAT THE PLAN IS BOTH FEASIBLE AND INTERESTING

The idea is certainly interesting. It would be the first attempt of its kind in the history of electrical engineering on such a large scale. It would challenge the attention of electricians the world over.

To raise a great battleship which lies 450 feet under water, by electro-magnets at the ends of cables with the proper wrecking machinery on pontoon above, seems to me not outside the realm of possibility.

I am not familiar with all the details, and therefore do not care to be understood as having weighed all the objections and merits of the proposed attempt. In answer, however, to the simple question whether, in my personal opinion, the Victoria could be brought to the surface, held in the grasp of electro-magnets of sufficient power, I see no reason to reply otherwise than in the affirmative. There would be many difficulties presented, which could no doubt be met. The insulation of the connecting wires, for one thing, would necessarily have to be heavy in order to stop leakage. The magnets would have to be of great weight. It would be necessary for a perfect contact to be established, which would be far from easy.

I will watch the attempt, if made, with considerable interest.

NIKOLA TESLA.

CHIEF O'NEIL OF THE BUREAU OF ORDNANCE OF THE UNITED STATES NAVY, MENTIONS GREAT RISKS AND DANGERS

I beg to state that I should consider it most interesting, but I question if the British government seriously contemplates making use of such means to raise the sunken Victoria off the coast of Syria. Aside from the costly pharaphernalia pertaining to the cables, magnets, dynamos, etc., immense pontoons and lifting machinery would be necessary, and the work would have to be carried on in an exposed place, subject to great risks and dangers from the elements. There would also be great difficulties in placing the electro-magnets in position on the hull of the vessel.

I have seen electro-magnets used in the Carnegie and other works for lifting steel and iron plates, beaams, etc., but the weights are comparatively insignificant, and the attendant circumstances presented no unusual difficulties. CHARLES O'NEIL.

Commodore F. M. Bunce of the United States navy and commandant of the Brooklyn navy yard says: The proposed attempt is, undoubtedly, most remarkable, and I shall be greatly interested in its results.

A. E. KENNELLY, VICE-PRESIDENT OF AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, POINTS OUT THE DIFFICULTIES

Regarding the feasibility of the proposal to raise the sunken battleship H. M. S. Victoria from a depth of four hundred feet to the ocean surface, I beg to say that I should consider the scheme by no means impossible, theoretically, but very hazardous and doubtful of success. There would be no difficulty whatever in making a number of electro-magnets which, when applied skillfully and collectively, would lift any reasonable weight, say 10,000 tons, provided that the magnets could be lowered on to clean, flat surfaces of iron and all properly adjusted before comencing to lift. Such a feat executed on land, say on a canyon or over a declivity, would be a mere matter of dollars and cents, which could be estimated in advance to a nicety. When, however, as in the case considered, the iron surface is probably slimy, or ensilted, or curved, or slippery, the object invisible, etc., the practical difficulties become so great that even if the attempt proved successful it might cost more than the vessel is worth. I should say, requiescat in pace.

A. E. KENNELLY.

The Kearsarge and Kentucky Soon to Take Their Maiden Plunge

Within the next few weeks two of the most powerful warships ever constructed will take their maiden plunge. The vessels are the battleships Kearsarge and Kentucky, now being finished at Newport News by the Newport News Shipbuilding and Drydock company.

While the plans on which the vessels were constructed were a combination of the battleships Iowa and Massachusetts type, they will be considerably larger, and by the arrangement of the gun mounts in the forward and aft turrets, the concentrated fire from their rifles will pierce the armor of any ship that floats at some miles distant.

The ships are equipped with many improvements which are not to be found in any other vessels. The torpedo outfits in these ships have not, as in many others, been placed in the bow and stern. These outfits were tried in the other vessels, and not only proved unsuccessful, but dangerous, and the government spent more than $150,000 removing them. Both vessels will mount more and larger guns than any ship now in commission, and will be so arranged as to give the ships a broadside fire of wide extent, the strains and pressures being equally distributed.

The main batteries of the ships will contain four thirteen and four eight-inch guns of the most modern pattern. These guns will be mounted in two-story turrets of hardened steel, one placed forward on the forecastle deck, the other aft. The guns will have a radius of fire of nearly 270 degrees.

The eigh-inch guns will be mounted in the upper or smaller turrets, while the thirteen-inch guns will be placed in the lower turrets. They will revolve simultaneously.

The secondary batteries will consist of fourteen five-inch rapid-fire guns of the latest type, with an auxiliary battery of twenty six-pounders, six one-pounder rapid-fire rifles, four gatlings and one field piece. The five-inch guns are mounted seven on each side, behind a solid steel wall six inches thick on the spar deck. They are separated from each other by dividing walls of steel six inches thick, to prevent a bursting shell or damage to one gun from affecting or spreading to another.

The six-pounders are mounted on the berth deck and on the superstructure above the eight-inch rifles. Their only protection is the steel shields carried on each gun mount. The one-pounders and the Gatlings are mounted in the fighting tops of the military masts. In addition to these the vessels will be fitted with four broadside torpedo equipments, placed two on each side, abaft the turret lines.

The upper turrets, in which the eight-inch guns are mounted, are nine inches thick, increased at the openings to eleven inches. The lower turrets are fifteen inches thick, excepting at the front, where the face plates are two inches heavier. To penetrate the turrets a shot must strike squarely with a driving force of 16,000 foot-tons.

One of the important features of the vessels is the battery of five-inch guns. Each of the rifles will have a rapidity of six shots a minute. These guns are intended to destroy the lighter armor of an enemy and riddle the unprotected parts with high explosive shells.

The vessels will be heavily armored. The hulls are protected by a hardened steel armor belt placed on the water line between the two turrets. It is seven and a half feet wide. From the after end of the belt, running 174 feet forward, the armor has a thickness of sixteen and a half inches at the top and nine and a half inches at the lower edge, which is four feet below the water line. Two bulkheads athwartship, one forward and one aft, turn inboard at the ends of the heavy armor. They terminate against the heavy barbettes which rise from the protective deck, and on which the turrets are mounted. The forward bulkhead is ten inches thick, while the one aft is two inches thicker. A protective deck runs the whole length of the ships from bow to stern.

Over that portion of the ships in which the engines and boilers are placed the deck is flat and two and a half inches thick. From the lower edge of the armored bulkheads the protective deck runs slantingly to the bow and stern and is about three inches thick, except where it slopes to the sides, and there it is five inches thick.

The conning tower is ten inches thick and is placed below the pilothouse, back of the forward turret. In it will be placed an armored tube, piercing the protective deck. Through this tube the telephone wires, speaking tubes, electrical and mechanical apparatus will be led for communication with all parts of the vessels. Besides these the electrical signals from the engine rooms and pilot house will be fitted in the conning towers.

The ships will be driven by two sets of triple-expansion engines, placed in separate water-tight compartments, and operating twin screws. Steam will be generated from five large boilers, placed in water-tight compartments forward of the engine rooms. These boilers will also supply the steam to operate something like ninety auxiliary engines. They will consist of steam, hydraulic, pneumatic and electric machines, and will be used for the purposes of lighting, hoisting, draining, pumping, ventilating and supplying miscellaneous power.

Like the cruiser Brooklyn the turrets and the ammunition hoists will be operated by electricity, and the same power will be used to discharge the larger guns.

With a cruising speed of ten knots, the ships will have a considerable radius of action. Their moderate draft will enable them to enter harbors where the water is too shallow to admit the average heavy cruisers.—New York Times.

As the electro-magnets would appear attaching themselves to the great battleship Victoria, which lies 450 feet under the waves off the harbor of Tri poli. Held by electric magnetic attraction alone she would be raised, challenging the utmost marvels of Jules Verne, a n undertaking stupendous and unequaled in the annals of electricity and engin eering, say many American electricians.