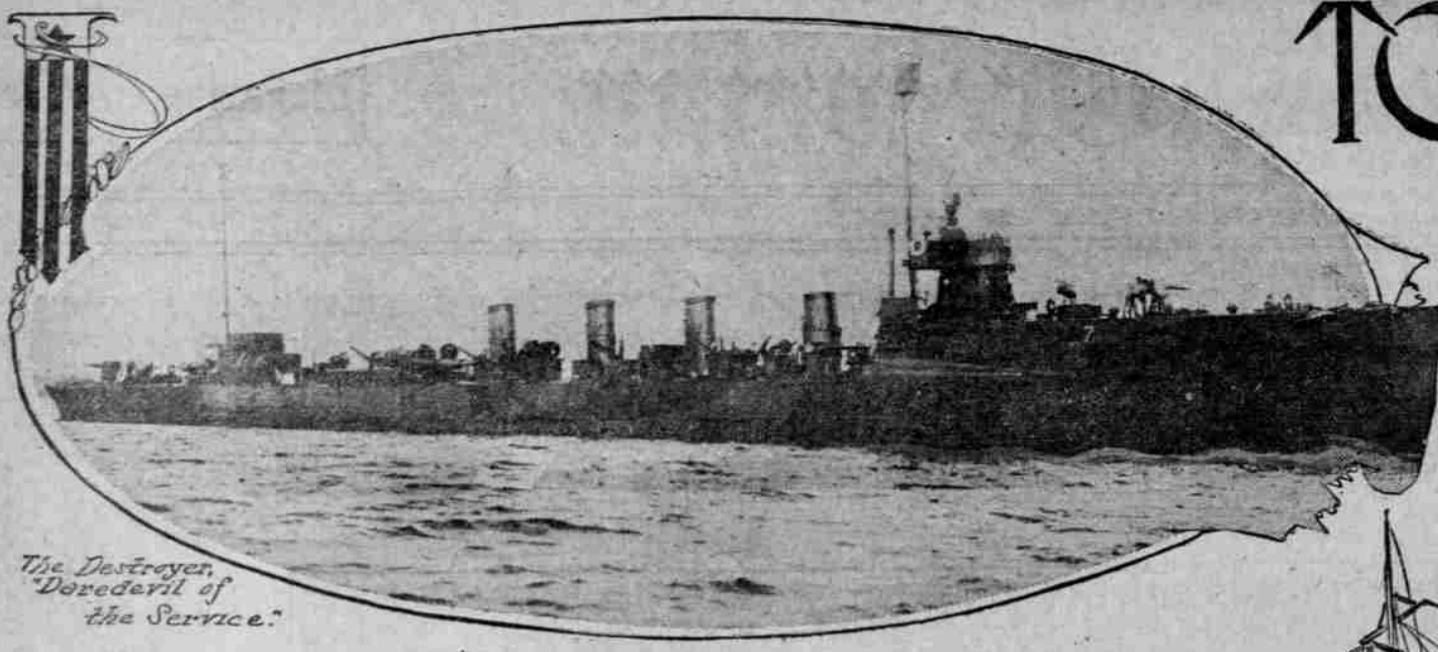


TORPEDOES and MINES

FEARFUL MEDIA - OF DESTRUCTION IN NAVALWARFARE. Ingenuous Machines for Blowing Up an Enemy.

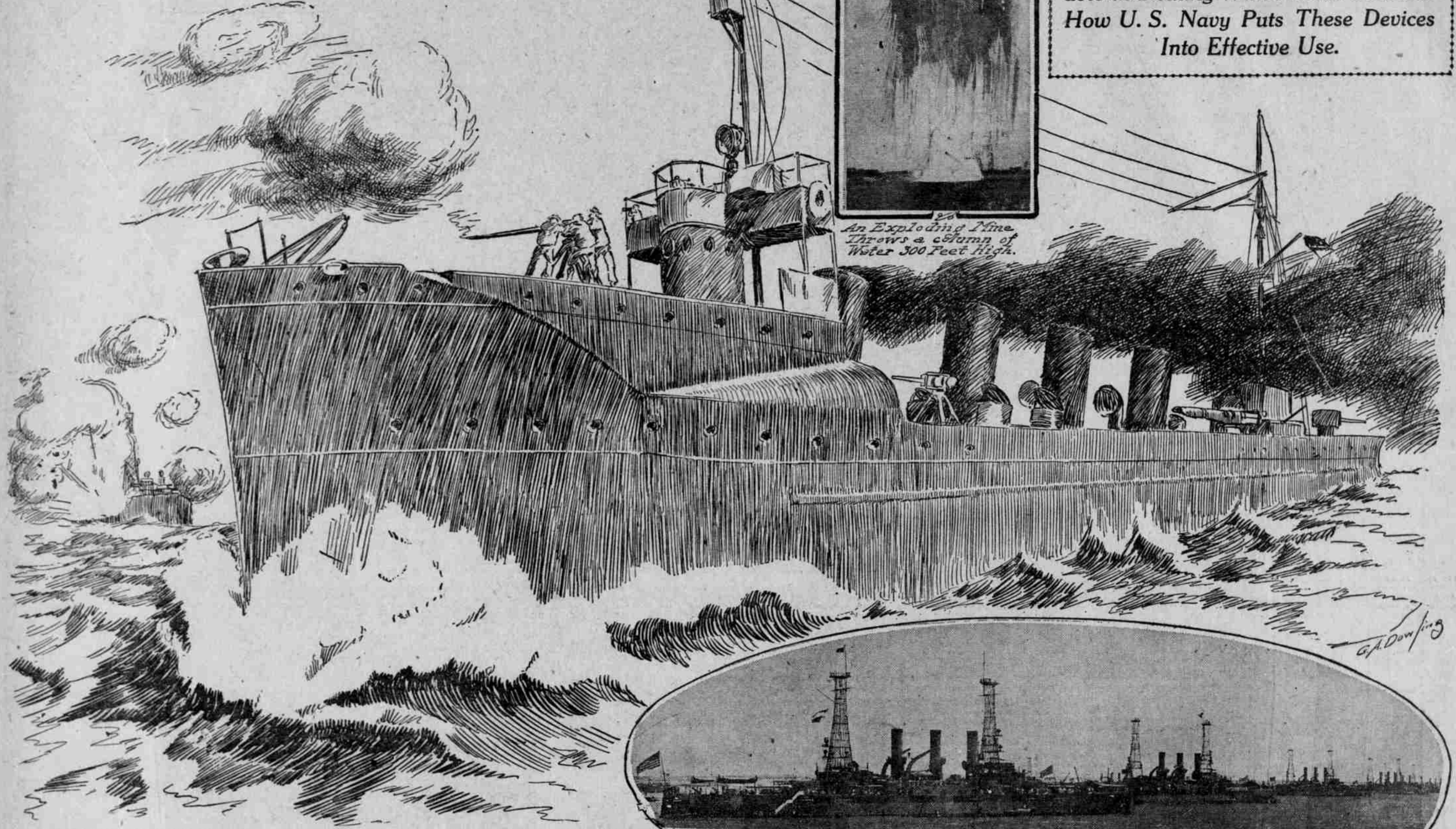


The Destroyer, "Dove" of the Service.



An Exploding Mine Throws a Column of Water 300 Feet High.

Devices for Dealing Death Seem to Have an Almost Human Intelligence —Stealthy Mines Are Most Formidable in Dealing With Hostile Flotillas. How U. S. Navy Puts These Devices Into Effective Use.



Battleships Ready for Torpedoes Firing.

BY WILLIAM ATHERTON DU PUY.
IT SEEMS incredible that a piece of mechanism could be placed in the water, pointed in one direction, foundering at an uncertain depth, and that this mechanism would right itself, choose the depth for which it is set, turn about in its course and place a charge of gun cotton in the bullseye of a target two miles away—and under water. Yet such is the thing accomplished by the torpedoes that are every day in use in the United States Navy.

It seems incredible that one of those defensive bombs known as mines might be thrown overboard from a whaleboat and that, regardless of the depth of water, its anchor would automatically adjust itself and the mine would lie stealthily at the chosen depth beneath the surface against the time that the ship of an enemy would explode it and rend heaven and earth thereabouts.

But this also is one of the bromide stunts of the men of the Navy. The manner in which each of these messengers of destruction operates is among the mysteries of the sea, whose existence was revealed to the writer in the course of a recent cruise with the battleship fleet off of New England. These portions of these operations that are not held secret alone may be told to the general public.

Torpedo's Growing Importance.

The most ingenious of them all is the torpedo. Incidentally the torpedo is the creature of destruction that is gaining importance in naval warfare at such strides that it may be at present striding that it of them all promises to be the center of the activity of the future. But a while ago considered usable only for close-in work, it is now hitting the mark at a distance of two miles with almost the regularity of the big guns, and it is expected that the torpedo range will be increased. The stealthy torpedo, commonly called the destroyer, is the dread of the battleship by night and in the fog. Its guns are unimportant and its work is done almost exclusively with the torpedo. The submarine, that strongest of coast defenses, the star-at-home boat, that makes the entry of the waters of a warlike nation so dangerous, likewise uses the torpedo exclusively. The developing use of this implement of destruction is, however, in its adaptation to the battleship itself.

The battleship Delaware, for instance, that great fighter that has just been awarded the efficiency prize of all Uncle Sam's ships, and upon which the writer recently cruised, is effectually using the torpedo. It is on such a ship as this that this remarkable piece of mechanism may be seen to perform its stunts.

12 feet long. Its forward end is blunt and it tapers toward the tail, where are stationed the rudders and the propellers. It appears to be in one piece, but there are really three parts to it, and they are disjointed. It is an automobile and propels itself.

The Machine That Thinks.

All this is of interest only that it leads to an understanding of the remarkable feats performed by this machine. In the body of the ship far below the water line, is the torpedo room. Here the torpedoes are kept and here is the torpedo tube which discharges them into the water outside. From this tube the torpedo is started on its way by compressed air; for it is a self-propelling machine and needs only a start in order to make its two-mile journey.

The remarkable thing is that the torpedo is merely thrust into the water from whatever position the ship occupies. It is, however, so adjusted that it will automatically find a certain level below the water, will turn in the direction it is intended to take, will operate its own propellers and go careering merrily through the water to the target for which it is intended.

The manner in which it does these things is interesting. In the first place it carries a complete turbine engine and this engine runs two little propellers at the tail. The engine is operated by compressed air, and this air had been forced into the air chamber of the torpedo until it is under tremendous pressure. This supplies the force that carries the torpedo to its destination.

When the torpedo is thrust into the water, there is a drum in a certain portion of it that is exposed to the pressure of the sea. The pressure will be greater or less in proportion to the depth at which the mechanism finds itself. The drum adjusts itself accordingly, and in doing so operates a rudder at the tail of the torpedo. This rudder brings the torpedo to the depth below water for which it has been set. So will it keep at the depth below water line at which it is destined that the target should be hit.

The most remarkable of all this mechanism is, however, the operation of the gyroscope, which is the teamster that drives this instrument of destruction toward its ultimate destination. The position of the torpedo tube at the time of its discharge has been such that the torpedo has started on its career pointed at a considerable angle away from the direction of the target. From observations taken at the time of firing, the angle of divergence between the tube and the target is accurately known. The gyroscope is so

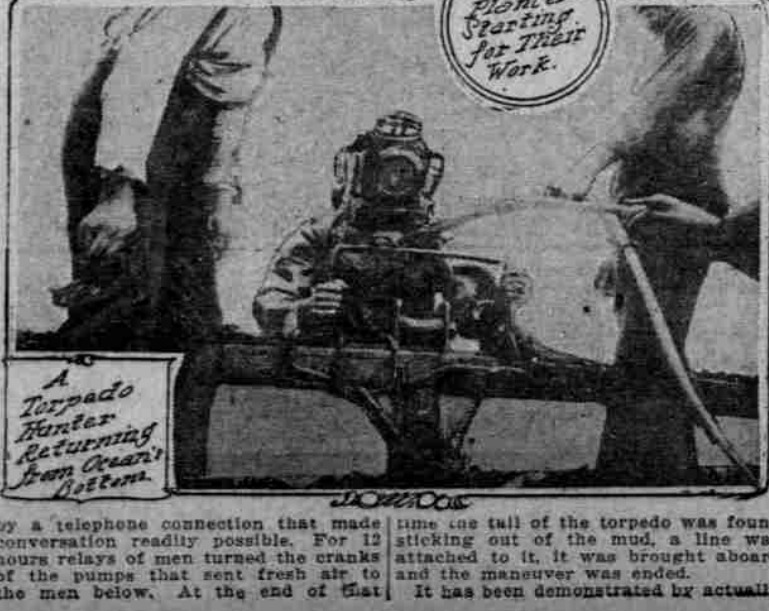
set as to correct that divergence. The little teamster pulls to right or left until its horse is going straight ahead. In fact, the gyroscope is set whirling in a position that is exactly parallel with the target. It will hold that position regardless of any angle, up or down, right or left, that may be assumed by the torpedo. It not only holds that position, but it pulls on the vertical rudders of the torpedo, holding them exactly on the target. In the course of a few hundred yards the torpedo will have righted itself in accordance with the dictates of the rudder and the gyroscope, and will be traveling in exactly the direction aimed.

Recovering the Torpedo.

When a torpedo is discharged in practice it is without the gun cotton that in battle would be in its war head. That space is filled with water instead. It is, however, worth several thousand dollars and is consequently an expensive plaything. In practice a great deal of pains is taken to recover the torpedoes, for they are not injured by being discharged.

So, when a torpedo is to be discharged, the three small steamers of the battleship are in readiness to pursue and recover it. These steamers are placed in relay between the ship and the target and each follows the course of the torpedo as long as it may. The torpedo travels twice as fast as does the steamer, so one is so stationed as to pick it up when it is lost by the other. The compressed air that operates its engine makes a string of bubbles that may be followed for a mile or more from the deck of the battleship. The steamers follow this line and the last one so times its joining in the chase as to be near at hand when the mechanism is exhausted. When it runs down the torpedo floats and a line may be attached to it and it may be brought back uninjured to the ship.

A torpedo that stuck in the mud was the point of most concern to the Delaware in the recent practice. It was of such value that it must be recovered. While it was yet emitting bubbles a buoy was put down at a point which was thought to be exactly over it. In a little while one of the small steamers, towing two whaleboats loaded with searchers and divers, was lowered, proceeded to the buoy, anchored and proceeded in its attempt to find the sunken torpedo. There was 99 feet of water at this point and the only possibility of locating the torpedo was by sending down a diver. For 12 hours the divers felt about the bottom of the sea before reporting a find. For 12 hours the men in the boats directed the course of the divers



A Torpedo Hunter Returning from Ocean's Bottom.

Mine Planting for Their Work.

accomplishing the feat that one of these torpedoes will drive a hole in the strongest battleship made. This does not mean that the modern battleship will be sunk from the impact of a single torpedo, but it does mean that it will be put out of the engagement. The torpedo will have performed what an automobile by shooting a hole in its tire. When the men of the Navy decide to scatter tacks in the way of the automobile instead of shooting at its tires, they plant mines.

The United States has a ship, the cruiser San Francisco, whose business it is to plant mines. This ship can steam along and drop mines off as she goes. Battleships perform the same tasks less automatically.

Mines may be opened up and the gun cotton taken out. When the mine is to be laid the gun cotton is put inside. In the practice stunts of mine laying gun-cotton is duly put in place. The necessary connections are made and the bomb is made airtight. One thing is left out in the practice. This is the detonator. The detonator is the trigger of the trap. When the mine is struck, this detonator makes an electrical connection which sets off the gun-cotton. The ship that sets off this mine is in for a stiff jolt and a large hole in its bottom. It need not actually strike the mine to accomplish this. The disturbance of the water 100 feet away may accomplish this result. A discharge of a mine 100 feet away may still put a hole in the ship.

The mine is to be set in the path of a coming fleet of battleships. It is set desired it should be disturbed by small craft, for this is not the game that we are after. It may, therefore, be set at a depth too great for them. The United States has its own secret device for setting a mine at a given depth. When this device is adjusted the mine and anchor may be thrown overboard and the mine will sink to the required depth and the anchor will hold it there without reference to the depth of water.

Whenever a fleet is entering into hostile waters where there is danger of mines, there is precarious work ahead. It is here again that the destroyer, that leader of forlorn hopes and taker of long chances, is again

called into play. The destroyer fleet is sent ahead of the battleships. The mines are probably set so deep that a destroyer will not strike them. Of course there is the chance that it may, but it is the business of the destroyer to risk itself, that the battleship may be saved. The destroyer runs over mines. Some hundreds of feet behind the destroyer is a drag. It is the purpose of this drag to upset and explode the mines. The destroyer is a sufficient distance away that it is in comparative safety. It may sometimes happen that the distance is not great enough and a destroyer may be sunk from a mine that was deliberately exploded; but this, again, is the work that is apportioned to these vessels, and it is their business to take a chance.

Planting really ambitious mines is more the work of the Army than the navy. It is generally true that there are fortresses at the entrances of important harbors. The garrisons of these fortresses plant mines all about these harbors. These mines are laid upon the bottom at a definite spot. There are maps that show the exact location of every one of these mines. It is not intended that they shall be struck by a ship that they may be discharged. Every mine is connected with shore and may be electrically discharged. There are instruments in the fortress that will show the exact location of any vessel entering the harbor and its relation to the mines of that harbor. The man who sits in the fortress with these instruments and maps may wait until the invading vessel is directly over a given mine, may press a button, and presto! the ship is blown up.

In the Navy mine planting is important and dangerous work. The mines are of considerable value, and it is always a task that is tedious and precarious that the ship's crew has of recovering the mines after they have been experimentally planted and dragged by the destroyers. Incidentally the whaleboats and small steamers it uses in this work respond so rolickingly to the motion of the waves that the result is most disconcerting to any land lubber who may happen to be a voluntary participant in this work. To which latter fact the writer can testify from personal experience. (Copyrighted, 1912.)