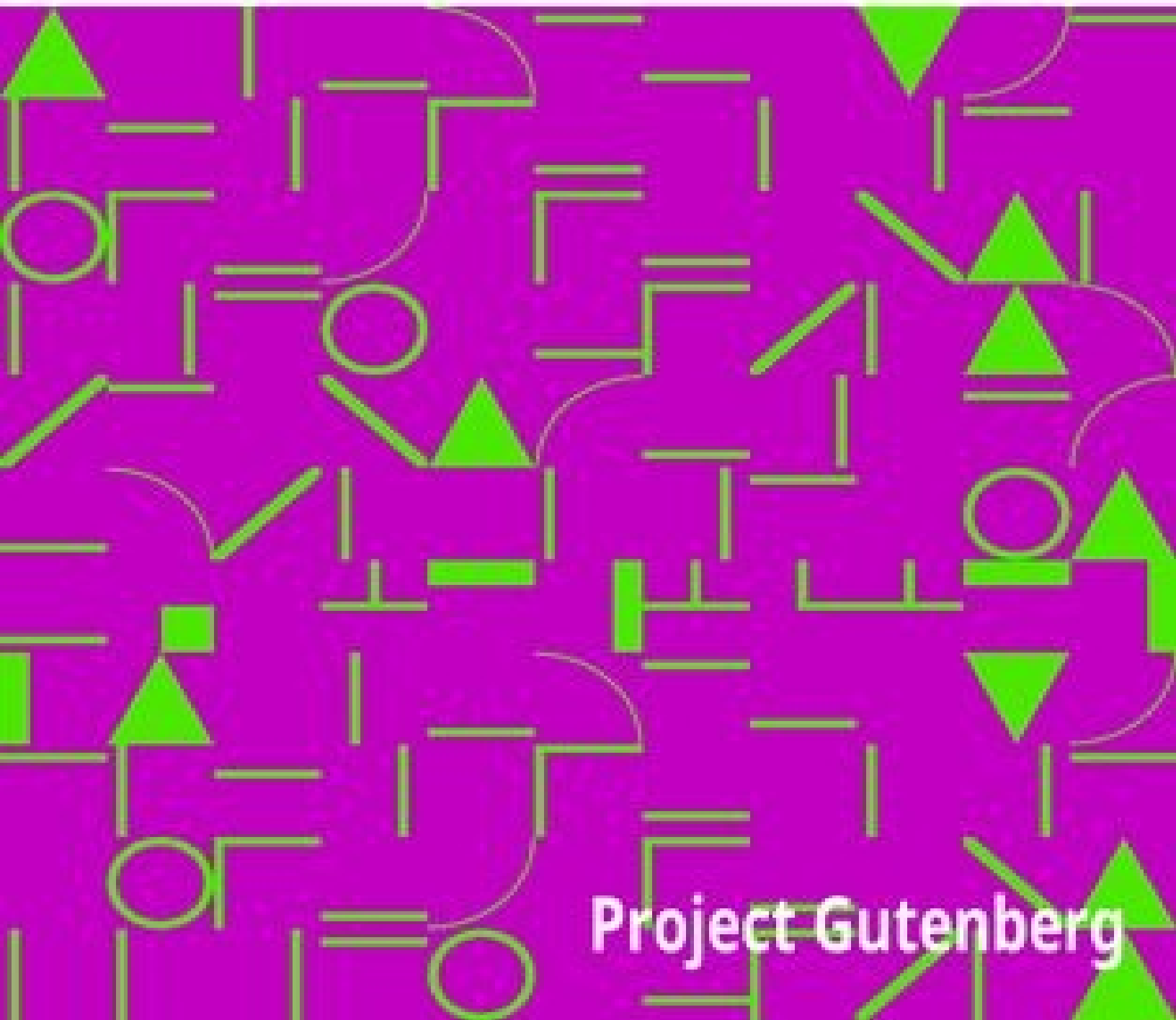


A brief sketch of the work of Matthew Fontaine Maury during the war, 1861-1865

Richard L. Maury

An abstract geometric pattern consisting of various shapes like triangles, circles, squares, and lines in shades of blue and green, scattered across a light gray background.

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**A Brief Sketch of the Work
of
MATTHEW FONTAINE MAURY
During the War 1861-1865
BY HIS SON
RICHARD L. MAURY**

RICHMOND

Richmond
WHITTET & SHEPPERSON
1915

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KATHERINE C. STILES

INTRODUCTION

When I took charge of the Georgia Room, in the Confederate Museum, in Richmond, Virginia in 1897, I found among the De Renne collection an engraving of the pleasant, intellectual face of Commodore Matthew Fontaine Maury, so I went to his son, Colonel Richard L. Maury, who had been with his father in all his work here, and urged him to write the history of it, while memory, papers and books could be referred to; this carefully written, accurate paper was the result.

At one time, when Commodore Maury was very sick, he asked one of his daughters to get the Bible and read to him. She chose Psalm 8, the eighth verse of which speaks of "whatsoever walketh through the paths of the sea," he repeated "the paths of the sea, the paths of the sea, if God says the paths of the sea, they are there, and if I ever get out of this bed I will find them."

He did begin his deep sea soundings as soon as he was strong enough, and found that two ridges extended from the New York coast to England, so he made charts for ships to sail over one path to England and return over the other.

The proceeds from the sale of this little pamphlet will be used as the beginning of a fund for the erection of a monument to Commodore Maury in Richmond.

KATHERINE C. STILES.

TORPEDOES

Torpedoes as effective weapons in actual war were first utilized by the Confederate navy, and Captain Matthew F. Maury introduced them into that service, and continually improved and perfected their use until they had become the mighty engine of modern warfare and revolutionized the art of coast and harbour defense. He, it was, who in 1861 mined James River, who, in person commanded the first attack with torpedoes upon the Federal fleet in Hampton Roads, and it was the development and improvement of this plan of defense which held the enemy's ships throughout the South at bay, and caused the loss of fifty-eight of the ships, and the Secretary of the United States Navy to report to Congress in 1865 that the Confederates had destroyed with their torpedoes more vessels than were lost from all other causes combined. Their use was soon extended from James River to the other Southern waters by eleven young naval officers, active and alert, who planted, directed and exploded torpedoes wherever there occurred favorable opportunity, and with a daring and coolness never surpassed; officers whose ability was abundantly shown by the remarkable inertness of the United States Navy after they had left that service in response to the call of their States to come and help protect their invasion.

Hardly had Captain Maury arrived in Richmond than his active mind was directed to the problem of protecting the Southern coasts. The South had not a single vessel of war, and but scanty means of making, equipping or manning one; the North had all the old navy fully armed and equipped, with unlimited means for making more.

Penetrated as the country is by innumerable navigable waters, and save at the entrance of a few of her largest rivers, altogether unfortified, he urged that the only available defense was to mine the channel ways with torpedoes, floating and fixed, which should be exploded by contact or by electricity, when the enemy attempted to pass. At that time there was nothing save a few shore batteries to prevent any ship whose captain was bold enough to run past their fires from ascending James River to Richmond, or from reaching any other maritime town in the South. Fortunately there were but few bold enough for the attempt.

In the beginning there was much prejudice against this mode of warfare, which, notwithstanding, has since, under Captain Maury's instruction, become

the chief reliance of most maritime nations. It was considered uncivilized warfare thus to attack and destroy an unsuspecting enemy, and the United States, and many of her naval officers were specially loud in their denunciations of those who resorted to it. There was official apathy too, and opposition of friends, but regardless of such, he proceeded to experiment and demonstrate, and with such success that in time the nations of Europe became his pupils, and there were hosts of followers and fellow-workers at home, and the Confederate Congress appropriated six millions of dollars for torpedoes.

His initial experiments to explode minute charges of powder under water, were made with an ordinary tub in his chamber at the house of his cousin, Robert H. Maury, a few doors from the Museum in Richmond, Va. The tanks for actual use were made at the Tredegar Works, and at the works of Talbott and Son on Cary Street; the batteries were loaned by the Richmond Medical College, which also freely tendered the use of its laboratory. In the early summer of 1861 the Secretary of the Navy, the Governor of Virginia, the chairman of the Committee of Naval Affairs, and other prominent officials were asked by him to witness a trial and an explosion of torpedoes in James River at Rocketts.

The torpedoes were composed of two small kegs of rifle powder, weighted to sink a few feet below the surface. They were fitted with hair triggers and friction primers, and thirty feet of lanyard attached to the triggers connected the keys. When in use they were to be set afloat in the channel way as near as possible to a vessel and to drift down with the current until the connecting lanyard fouled the anchor chain, or the bow of the vessel and the kegs swung around against her side when the tightened lanyard would fire the trigger and cause the torpedo to explode. So the Patrick Henry's gig was borrowed, with a couple of sailors to pull, and the torpedo having been embarked, with the trigger at half-cock, Captain Maury and the writer got on board and were rowed out to the buoy just opposite where the James River Steamboat Company's wharf now is, where the invited spectators stood to witness the explosion. The triggers were then set, the kegs carefully lowered into the water, taking great care not to strain the lanyard, all was cast off, the boat pulled clear, and we waited to see the torpedo float down until the buoy was reached, the lanyard foul strain and explode the torpedo. But there was delay, the lanyard fouled the buoy all right, the kegs floated past and strained the lanyard, but there was no explosion. Impatient we backed water to the buoy and the writer leaned over the stern and caught the lanyard to give the necessary pull, but in the very act the explosion took place, a column of water went up twenty feet or more, and descending, gave us a good wetting and filled the surrounding water with stunned and dead fish. The

officials on the wharf applauded and were convinced, and that the experiments might continue Governor Letcher loaned power, and shortly after the Naval Bureau of Coast, Harbour, and River Defense was organized with ample funds for the work, and the very best of intelligent and devoted young officers as assistants and an office was opened in Richmond at the corner of Ninth and Bank Streets, where Rueger's now is.

In a few months he had mined James River with fixed torpedoes to be exploded by electricity should the enemy attempt to pass, and a means thus indicated to protect the city. During the summer and fall attacks were made upon the Federal squadron at Fortress Monroe, under the personal command of Captain Maury from Norfolk. The first of these was early in July, 1861, from Seawell's Point, at the mouth of the James River, and was directed against two of the fleet there—the "Minnesota" and the "Roanoke." Friday and Saturday night he sent an officer in a boat to reconnoitre, but there was a steam picket on watch, Sunday as he was spying them through a glass, noting their relative positions, he saw the church flag on two of them, a white flag bearing a cross displayed, flying just a little above the ship ensign. When he thought that those men were worshipping God in sincerity and truth, and, no doubt, thinking themselves in the line of their duty, he could but feel for them when he remembered how soon he might be the means of sending many of them into eternity. That night the attacking party in five boats set off about ten o'clock. Captain Maury was in the first boat with the pilot and four oars. Each of the others manned by an officer and four men carried a magazine with thirty fathoms of rope attached. These magazines were oak casks of powder with a fuse in each. Two joined by the rope were stretching across the ebbtide and when directly ahead of the ships were let go, and floating down the rope caught across the cable, the torpedo would drift and the ship strain the trigger, ignite the fuse and explode. "The night was still, calm, clear, lovely." Thatcher's comet was flaming in the sky. We steered by it, pulling in the plane of its splendid train. All the noise and turmoil of the enemy's camp and fleet was hushed. They had no guard boats of any kind, and as with muffled oars we neared them we heard seven bells strike. After putting the torpedoes under one ship the boats that carried them went back, and Captain Maury with the other two, planted the other torpedoes. They then rowed away and waited, but the explosion did not come and the enemy never knew of the attempt. Lieut. R. D. Minor, one of his skilful and daring assistants, commanded the second expedition which he thus describes:

C. S. S. Patrick Henry,

Mulberry Point, October 11th, 1861.

Sir,—Owing to an unexpected delay in the completion of the magazine I was unable to leave Richmond before the morning of the 9th, and did not reach this ship until yesterday about 8 A.M. when I laid your plan of the intended attack on the United States ships at anchor off Newport News before Commander Tucker, who with Lieutenant Powell, the executive officer, placed every facility at my disposal for carrying it into execution. Acting Master Thomas L. Dornin and Midshipman Alexander M. Mason, having volunteered to accompany me, the evening was passed in preparing the magazine and in explaining in detail to the officers the manner of handling and working them. In filling the tanks I found that I would have 392 pounds to operate with, instead of 400, which I had calculated upon; and to insure them from sinking I had some cork attached to the buoys, which subsequently proved of great advantage. The day was a stormy one, with a fresh breeze from the northward with rain and mist well suited for our operations against the enemy. About sunset Commander Tucker got underway from his anchorage off this place, and with lights shaded steamed slowly down the river on a strong ebbtide till the ships were seen ahead of us, when we came to within a mile and a half of the point, dropping the anchor with a hawser bent on to it to prevent noise from the rattling of the chains. The boats were then lowered, the magazines carefully slung, buoys bent on at intervals of seven feet, and when all was ready the crews armed with cutlasses took their places, and were cautioned in a few words by me to keep silent and obey implicitly the officers. Acting Master Dornin with Midshipman Mason took the left side of the channel, while I took the right with Mr. Edward Moore as boatswain of the ship to pilot me. Pulling down the river some 600 or 700 yards the boats were then allowed to drift with the rapid ebbtide, while the end of the cork line was passed over to Mr. Dornin, and the line tightened by the boats pulling in opposite directions. The buoys were then thrown overboard, the guard lines on the triggers cut, the levers fitted and pinned, the trip line made fast to the bight at the end of the lever, the safety screws removed, the magazine carefully lowered in the water, where they were well supported by the buoys, the slack line (three fathoms of which was kept in hand for safety) thrown overboard, and all set adrift within 800 yards of the ship, and 400 yards of the battery on the bluff above the point. So near were we that voices were heard on the shore and Mr. Moore reported a boat about 100 yards off, which, however, I did not see, being too much engaged in preparing the magazine for its service. Pulling back a short distance and hearing no explosion we returned to the ship which we found cleared for action and ready to cover us in event of being attacked, and the boats had just been hoisted up when signal lights were observed flashing in the vicinity of the point with considerable rapidity, indicating a suspicion on the part

of the enemy that an attack of some kind was intended. Leaving our anchorage, we steamed rapidly up the river and took up our former position off this place about 12:30 at night. On going to the crosstrees this morning two ships were seen at anchor off the point, and later in the day when seen from Warwick River, where Commander Tucker and I went to get a better view of them, they were apparently unharmed, and I concluded that the magazine could not have fouled them, though planted fairly and in good drifting distances and with an interval between of some 200 feet, perhaps somewhat less as the line became entangled slightly while playing out.

I have thus minutely described to you, sir, the whole operation, believing, as its originator, it would be interesting to you, and, perhaps, serve as a guide in the further prosecution of this mode of warfare.

I beg leave to return my sincere thanks to Commander Tucker, Lieutenant Powell and other officers and men of the "Patrick Henry," for their hearty co-operation, and I particularly desire to call your attention to the coolness and bravery of acting Master Dornin and Midshipman Mason, and the boat crews associated on duty with me.

I am, sir respectfully your obedient servant,

R. D. MINOR,
Lieutenant C. S. Navy.
Commander M. F. Maury, C. S. Navy,
Fredericksburg, Va.

The torpedoes used by Captain Maury in his attack upon the "Minnesota," at Fortress Monroe, and by Lieutenant Minor upon the "Congress," off Newport News, were as follows: They were in pairs connected by a span 500 feet long. The span was floated on the surface by corks, and the torpedo, containing 200 pounds of powder, also floated at a depth of twenty feet. Empty barregas, painted lead color, so as not readily to be seen, serving for the purpose.

The span was connected with a trigger in the head of each barrel, so set and arranged that when the torpedo being let go in a tideway under the bows and athwart the hawser had fouled, they would be drifted alongside, and so drifted would tauten the span and set off the fuse, which was driven precisely as a ten second shot fuse, only it was calculated to burn fifty-four seconds, because it could not be known exactly in which part of the sweep alongside the strain would be sufficient to set off the trigger. That they did not explode was attributed to the fact that the fuse would not burn under a pressure of twenty feet of water, which conjecture was confirmed by after experiments, when it was found that

the fuse would very surely at a depth of fifteen feet but never at twenty. Sometime after these torpedoes were found down the bay by the enemy. Spans, barrels, barregas and carried to Washington—thus the enemy forewarned, forestalled further attempts of this character by dropping the end of his lower studding sail boom in the water every night, and anchoring boats, or beams ahead.

To obtain insulated wire, of which the South had none, an agent was sent secretly to New York, but without success, and as there was neither factory nor material for its manufacture in the Confederacy, the difficulties of preparing electrical torpedoes, to which Captain Maury attached the most importance and greatly preferred, seemed insuperable, until by a remarkable piece of good fortune, in the following spring, it happened that the enemy, attempting to lay across Chesapeake Bay were forced to abandon the attempt and left their wire to the mercy of the waves, which cast it upon the beach near Norfolk, where, by the kindness of a friend, it was secured for Captain Maury's use. With part of this he connected his mines in James River, below the obstructions, with the shore stations, which afterward destroyed the "Commodore Barney," and later the "Commodore Jones," and with part enabled other Southern ports to be similarly protected.

Of his James River torpedoes, Captain Maury thus reported to the Secretary of the Navy:

Richmond, June 19th, 1862.

Sir,—The James River is mined with fifteen tanks below the Iron Battery at Chaffin's Bluff. They are to be exploded by means of Electricity. Four of the tanks contain 160 pounds of powder, the eleven other hold 70 pounds. All are made of boiler plate.

They are arranged in rows, as per diagram, those of each row being thirty feet apart. Each tank is contained in a water-tight wooden cask, capable of floating it, but anchored, and held below the surface from three to eight feet, according to the state of the tide. The anchor to each is an eighteen inch shell and a piece of kentledge so placed as to prevent the barrels from fouling the buoy ropes at the change of the tide. Each shell of a row is connected with the next one to it by a stout rope thirty feet long, and capable of lifting it in case the cask be carried away. The casks are water-tight, as are also the tanks, the electric cord entering and returning through the same head. The wire for the return current from the battery is passed from shell to shell and along the connecting rope, which lies at the bottom.

The wire that passes from cask to cask is stopped aslack to the buoy rope from the shell up to the cask to which it is securely seized, to prevent any strain upon that part which enters the cask. The return wire is stopped in like manner down the buoy ropes to the shell, and then along the span to the next shell. At 4 the two cords are rapped together, loaded with trace chains a fathom apart and carried ashore to the galvanic battery. For batteries we have 21 Wollastons, each trough containing 18 pairs of plates, zinc and wire, 10 x 12 inches. The first range is called 1: the second 2: the third 3, and the wires are so labelled. Thus all of each range are exploded at once.

Besides these there are two ranges of two tanks each, planted opposite the battery at Chaffin's Bluff. When they were planted it was not known that a battery was to be erected below. These four tanks contain about 6,000 pounds of powder. The great freshets of last month carried away the wires that were to operate the first pair. Lieut. Davidson, who, with the "Teaser" and her crew, has assisted me with the most hearty good will, has dragged for the tanks, but without success, they rest on the bottom. Could they be found it was my intention to raise the four, examine them and if in good condition, place them lower down.

Lieut. Wm. L. Maury, assisted by Acting Master W. F. Carter, and R. Rollins, was charged with the duty of proving the tanks and packing them in casks. There are eleven others, each containing 70 pounds of powder. When tested in the barrels and found ready for use, they will be held in reserve in case of accident to those already down. A larger number was not prepared for want of powder. There are a quantity of admirably insulated wires, a number of shells for anchor or torpedoes and a sufficient quantity of chains for the wires remaining. They will be put in the navy store for safe keeping.

The galvanic batteries, viz.: 21 Wollaston and one Cruickshank (the latter loaned by Dr. Maupin of the University of Virginia), with spare acids are at Chaffin's Bluff in charge of Acting Master Cheeney. He has also in pigs a sufficient quantity mixed to work the batteries, and ready to be poured in for use.

It is proper that I should mention to the department, in terms of commendation the ready and valuable assistance afforded by Dr. Morris, president of the Telegraph Company, and his assistants, especially Mr. Goldwell.

My duties in connection with those batteries being thus closed, I have the honor to await your further orders.

Respectfully, etc.,

M. F. MAURY,

Commander C. S. Navy.
Hon. S. R. Mallory,
Secretary of the Navy, Present.

Shortly after, Captain Maury was ordered to London on secret service for the Navy Department, and that he might avail himself of laboratories and workshops for experiment and improvement of his new science, in which he was now regarded as supreme authority. He was to report progress and improvement in this new means of making successful war from time to time to the Navy Department, which was constantly done during the next two years, and thus the result of his labours and inventions communicated to the officers in charge of the torpedo stations now established along our Atlantic Coast. His devices and inventions, which have not since been surpassed and some of which are still in use, had reference chiefly to exploding the torpedo; to determining with certainty from a distance the moment when a ship should enter within explosive range, and at all times to test its condition and to verify its location.

Lieut. Hunter Davidson, his valued assistant, succeeded him in charge of the James River batteries, and in time extended the mines some distance below. During the two years when he was in charge he planted many electrical torpedoes in the channel of the river, to be fired from concealed stations on shore. Some of these contained 1,800 pounds of powder.

In August, 1862, the Federal steamer "Commodore Barney" was badly disabled by one of these, and in 1864 the "Comm. Jones" was totally destroyed, with nearly all on board, the first fruits of Maury's electrical torpedo defense. The first vessel destroyed by a submarine torpedo was the gunboat—ironclad—"Cairo," in the Yazoo River. The torpedo was a demijohn of powder enclosed in a box sunk in the river and fired by a string from the shore. Lieut. Beverley Kennon claimed the credit for this but Masters McDaniel and Ewing did the actual work.

Early in 1864 Davidson, in a steam launch, specially constructed for him, called "The Torpedo," having made 120 mile run down James River, all within the enemies' lines, exploded a torpedo against the flagship "Minnesota," at anchor off Newport News. The river swarmed with the enemy's vessels, and the guard boat was lying by the "Minnesota," but her captain had allowed his steam to go down. Davidson hit the great ship full and fair, causing great consternation on board, but the torpedo charge was only fifty-three pounds of powder and it failed to break in her sides, although considerable damage was done. Davidson suffered no injury and returned to Richmond without incident.

On August 9, 1864, there was a great explosion in Grant's lines at City Point, on the James, caused by a torpedo with a clock attached which caused it to explode at a given hour. With daring unexcelled John Maxwell and R. K. Dillard, of the torpedo corps, made their way into the lines, carrying the machine neatly boxed with them, which Maxwell handed aboard one of the boats lying at the wharf, saying that the captain had directed him to do so. In half an hour there was a terrible explosion, killing and wounding fifty men and destroying much property and many stores besides, injuring many nearby vessels, which brave John Maxwell quietly witnessed seated upon a log upon a hillside close by.

Lieut. Beverly Kennon was also most active in this system of defense and personally planted many torpedoes in the Potomac, Rappahannock and the James. He and Lieut. J. Pembroke Jones succeeded Lieutenant Davidson in charge of the torpedo defense of the James. A defense in itself equivalent to a well appointed fleet or army, since, as is well known, it served to keep the enemy out of Richmond till the close of the war, and converted them into earnest advocates of its use.

General Raines, chief of the Army Torpedo Bureau, had early adopted as the best form of torpedo, the beer barrel filled with powder and fitted with a percussion primer at each end. They were set adrift in pairs down the river by the hundred to be carried by current and tide against the enemy's ships below. Though many necessarily failed and drifted out to sea, if but a single one in a great number succeeded the Confederacy was well repaid. At times as many as a hundred a day were caught by the enemy's netting set out for that purpose in the James River alone.

Captain Francis D. Lee, of General Beauregard's staff, recommended the spar torpedo, which was very successfully used, especially in the waters around Charleston. It was a case to contain seventy pounds of powder set on the end of a twenty foot spar and rigged on the bow of a boat. It was exploded by contact on the side of the vessel attacked.

In 1862 Dr. St. Julien Ravenal, Mr. Theodore Stoney and other gentlemen of Charleston, after consultation with Captain Maury, designed and had constructed a semi-submarine torpedo boat, the first of its type. It was called the "David," for it was intended to attack the Goliath of the federal blockading fleet. After its remarkable experience and success, its name was used as the name for its type and the Confederacy had many "Davids" on the stock when the war ended. It was cigar shaped, twenty feet long, five in diameter at the center. The boiler was forward, the miniature engine aft, and between them a cuddy hole for captain and crew. The torpedo was carried on a spar protruding fifteen feet from the

bow, and could be raised or lowered by a line passing back into the cuddy hole. It was of copper containing 100 pounds of rifle powder and provided with four sensitive tubes of lead, containing explosive mixture. A two bladed propellor drove the craft at a six or seven knot rate. When ready for action the boat was so well submerged that nothing was visible save the stunt smoke-stack, the hatch combings and the stanchion, upon which the torpedo line was brought aft. The torpedo was submerged about six feet. Lieutenant W. T. Glassel, of the Confederate Navy of Virginia, one of the bravest of the brave, volunteered to take charge of her. He says Assistant Engineer J. H. Toombs volunteered his services, Major Frank Lee gave me his zealous service in fitting a torpedo. James Stuart, or Sullivan, volunteered to go as fireman, and the services of J. W. Cannon as pilot were secured. I had an armament on deck of four double-barrel shotguns, and as many navy revolvers; also four cork life preservers had been thrown on board to make us feel safe. On the fifth of October, 1863, they left Charleston a little after dark, bound for the federal fleet outside, and especially for the "New Ironsides," the most powerful ship afloat. He thus graphically describes what occurred: "We passed Fort Sumter and beyond the line of picket boats without being discovered. Silently steaming along just inside the bar, I had a good opportunity to reconnoiter the whole fleet at anchor between me and the camp fires on Morris Island.

"The admiral's ship, 'New Ironsides,' lay in the midst of the fleet, her starboard side presented to my view, I determined to pay her the highest compliment. I had been informed through prisoners lately captured from the fleet, that they were expecting an attack from torpedo boats and were prepared for it. I could hardly, therefore, expect to accomplish my object without encountering some danger from riflemen, and, perhaps, a discharge of grape or canister from the howitzers. My guns were loaded with buckshots. I knew that if the officer of the deck could be disabled to begin with, it would cause them some confusion, and increase our chance of escape, so I determined that if the occasion offered I would commence by firing the first shot. Accordingly, having on a full head of steam, I took charge of the helm, it being so arranged that I could sit on the deck, and work the wheel with my feet. Then directing the engineer and fireman to keep below, and give me all the speed possible, I gave a double-barrel gun to the pilot, with instructions not to fire until I should do so, and steered directly for the monitor. I intended to strike her just under the gangway, but the tide still running out carried us to a point nearer the quarter. Thus we rapidly approached the enemy. When within 300 yards of her a sentinel hailed us. Boat ahoy! repeating the hail several times very rapidly. We were coming toward them with all speed and I

made no answer but cocked both barrels of my gun. The officer of the deck next made his appearance and loudly demanded, 'What boat is that.' Being now within forty yards of the ship and with plenty of head way to carry me on, I thought it about time the fight should commence and fired my gun. The officer of the deck fell back mortally wounded (poor fellow), and I ordered the engine stopped. The next moment the torpedo struck the vessel and exploded. What amount of direct damage the enemy received I will not attempt to say. My little boat plunged violently and a large body of water, which had been thrown up, descended upon her deck, and down the smoke-stack and hatchway.

"I immediately gave orders to reverse the engine and back off. Mr. Toombs informed me then that the fires were put out, and something had been jammed in the machinery, so that it would not move. What could be done in this situation? In the meantime the enemy, recovering from the shock, beat to quarters and general alarm spread through the fleet. I told my men I thought our only chance of escape was by swimming and I think I told Mr. Toombs to cut the water pipes and let the boat sink. Then taking one of the cork floats I got into the water and swam off as fast as I could.

"The enemy in no amiable mood poured down upon the bubbling water a hailstorm of rifle and pistol shots from the deck of the 'Ironsides,' and from the nearest monitor. Sometimes they struck very close to my head, but swimming for life I soon disappeared from sight and found myself alone in the water. I hoped that with the assistance of the flood tide I might be able to reach Fort Sumter, but a north wind was against me, and after I had been in the water more than an hour I became numb with cold and was nearly exhausted. Just then the boat of a transport schooner picked me up and found to their surprise that they had captured a 'rebel.' I was handed over next morning to the mercy of Admiral Dahlgren, who ordered me to be put in irons, and if obstreperous, in double irons. When on the flagship I learned that my fireman had clung to her rudder chains and been taken on board.

"Engineer Toombs started to swim towards the 'Monitor,' with the intention of catching her chains, but changed his mind when he saw that the 'David' was afloat, and had drifted away from the frigate. Swimming to her he found Pilot Cannon, who not being able to swim, when the fires were extinguished jumped overboard and clung to the unexposed side of the 'David.' After drifting about a quarter of a mile he got back on board and seeing something in the water he hailed and heard, to his surprise, a reply from Toombs, who soon got on board. Finding the boat uninjured, though a bull's eye canteen afforded a mark to the Federal cannoneer, they fixed the engine, started up the fires, got up steam and

started back to Charleston, reaching the Atlantic dock about midnight."

As the result of this most daring feat it was found that the torpedo had exploded under three feet of water and against four and one-half inches of armour, and twenty-seven inches of wood backing. The ponderous ship was shaken from stem to stern, and was docked for repairs until the attack on Fort Fisher, while the "David" and her crew were uninjured. Captain Rowan reported that the ship was very seriously injured and ought to be sent home for repairs, and Admiral Dahlgren informed the Secretary of the Navy that, "Among the many inventions with which I have been familiar, I have seen none that acted so perfectly at first trial. The secrecy, rapidity of movement, control of direction and precise explosion, indicate, I think, the introduction of the torpedo element as a means of certain warfare. It can be ignored no longer. If sixty pounds of powder why not 600," and the Secretary of the Confederate Navy reported: "On the evening of the 5th of October Lieutenant W. T. Glassell, in charge of the torpedo boat, "David," with Assistant Engineer Tomb, Pilot Walker Cannon, and Seaman James Sullivan, left Charleston to attempt the destruction of the enemy's ship, 'New Ironsides.' Passing undiscovered through the enemy's fleet, he was hailed by the watch as he approached the ship and answering the hail with a shot, he dashed his boat against her and exploded the torpedo under her bilge. The fires were extinguished, and the boat was nearly swamped by the concussion and the descending water, and Lieutenant Glassell and Sullivan, supposing her to be lost swam off and were picked up by the enemy. Engineer Tomb and Pilot Cannon succeeded in reaching Charleston with the boat.

"Although Lieutenant Glassell failed to accomplish his chief object, it is believed that he inflicted serious injury upon the 'Ironsides,' while his unsurpassed daring must be productive of an important moral influence, as well upon the enemy as upon our own naval force."

The annals of naval warfare record few enterprises which exhibit more strikingly than this of Lieutenant Glassell the highest qualities of a sea officer.

At this time there were sixty officers and men on torpedo duty at Charleston alone.

The most remarkable career in all torpedo history was that of a little boat built in Mobile Bay, and operated upon the fleet off Charleston. She was the pioneer of all submarine torpedo boats, as she was the first to achieve success.

She was built in 1863-4 at Mobile by Mr. Horace L. Hundley, at his own expense. She was made of boiler plate, was shaped like a fish twenty-four feet long, five feet deep, three feet wide; she had fins on each side, raised or

depressed from the interior; her motive power was a small propeller worked by manual power of her crew seated on each side of the shaft; she was provided with tanks which could be filled or emptied of water to increase or diminish her displacement; but had no provision for air storage. The captain stood in a circular hatchway well forward and steered the boat, and regulated the depth at which she should proceed. When she dived all was made tight until she rose again. She had no ventilation. She was designed to tow a torpedo astern, dive under the vessel attacked, dragging the torpedo after; she would then rise to the surface on the other side, when the torpedo would explode by contact with the bottom of the vessel, and the torpedo boat make off in the darkness and confusion. General Maury states that on her trial trip, which he saw, she towed a floating torpedo, dived under a ship, dragging the torpedo, which fairly exploded under the ship's bottom, and blew the fragments one hundred feet into the air; and that not being able to use her in Mobile, he sent her, and her crew to Charleston. It is said that during another trial in Mobile she sank and all on board perished before she was raised.

Lieutenant Payne, of the Navy, volunteers to take her out, and secured a volunteer crew of sailors. She was named the "H. L. Hundley." While tied to the wharf at Fort Johnston, whence it was to start at night to make the attack, a steamer passing close by, filled and sank it, drowning all hands save Payne, who was at the time standing in one of the manholes. She was promptly raised, but was again sunk, this time at Fort Sumter wharf, when six men were drowned, Payne and two others escaping. When she was brought to the surface again. McKinley and a trained crew came from Mobile, bringing with him Lieutenant Dixon, of the Twenty-first Alabama Infantry, to fight the boat. He made repeated descents in the harbour, diving under the receiving ship again and again successfully. But one day, when Dixon was absent from the city, Mr. Hundley, wishing to handle the boat himself, unfortunately made the attempt; it was readily submerged but did not rise again and all on board perished, from asphyxiation. When the boat was discovered, raised and opened the spectacle was indescribably ghastly, the unfortunate men were contorted into all kinds of attitudes horrible to see; some clutching candles, evidently endeavouring to force open the manholes; others lying on the bottom tightly grappled together; and the blackened faces of all presented the expression of their agony and despair.

The "Hundley" had thus cost the lives of thirty-three brave men, but nevertheless, there were still found volunteers to risk theirs for their country—and Lieutenant Dixon found no difficulty in enlisting eight more heroes to attack the Federal steam sloop of war, "Housatonic," a powerful new vessel of eleven

guns, lying on the north channel, opposite Beach Inlet, off Charleston. General Beauregard had refused to let it be used again, but Lieutenant Dixon, having undertaken to use the boat with a spar torpedo in the same manner as the "David," consent was given and preparations for the attack were again made.

Dixon was a Kentuckian and was moved by the highest principle and patriotism in making this venture. He had taken an active part in the construction of the vessel, and had caused other men to perish in her by dangers he had not shared, now bravely demanded this opportunity. His crew were Arnold Becker, C. Simpkins, James A. Wick, T. Collins and ——— Ridgeway, of the Navy, and Corporal J. F. Carlson, of the artillery. All knew the fearful risk they ran—and all were willing to sacrifice their lives for their country, counting the cost as nothing if thereby they could procure the destruction of the "Housatonic."

Everything being ready at twilight on the 17th of February, 1864, these devoted heroes took their places in the boat at Sullivan's Island, and set off upon their perilous adventure. This time she got away successfully, but that is the last that we hear of her save the official report from the enemy, that about 9 o'clock an object like a plank was seen approaching, which in a moment more struck the ship with a great explosion, blowing up the after part of the ship, causing her to sink immediately to the bottom, drowning five men and injuring many more.

The "Hundley" was never heard of again till several years after the war, divers sent down to wreck the "Housatonic," found her little antagonist lying on the bottom near by.

Admiral Dahlgren reported to the Secretary of the U. S. Navy, as follows:

Sir, I much regret to inform the Department that the U. S. S. "Housatonic," on the blockade off Charleston, S. C., was torpedoed by a rebel "David" and sunk on the night of February 17th, about 9 o'clock.

From the time the "David" was seen until the vessel was on the bottom, a very brief period must have elapsed, as far as the executive officer can judge, it did not exceed five or seven minutes.

The officer of the deck perceived a moving object on the water quite near and ordered the chain to be slipped: the captain and the executive officer went on deck, saw the object, and each fired at it with a small arm. In an instant the ship was struck on the starboard side between the main and mizzen masts. Those on deck near were stunned, the vessel began to sink, and went down almost immediately.

The Department will readily perceive the consequences likely to result from

this event: the whole line of blockade will be infested with these cheap, convenient and formidable defenses, and we must guard every point. The measures of prevention are not so obvious. I am inclined to the belief that in addition the various devices for keeping the torpedoes from the vessels, an effectual prevention may be found in the use of similar contrivances. * * *

I have attached more importance to the use of torpedoes than others have done, and believe them to constitute the most formidable of the difficulties in the way to Charleston. Their effect on the "Ironsides" in October, and now on the "Housatonic," sustains me in the idea. And thereupon he makes application to be furnished a number of torpedo boats made upon the model of the "David," a sketch of which is submitted, and also a quantity of floating torpedoes, and suggests that as he has information that the Confederates have a number of "Davids" completed and in an advanced state of construction, the Department would do well to offer a large reward of prize money for the capture or destruction of any of them, say \$20,000 or \$30,000 for each, adding, "they are worth more than that to us."

About the same time Admiral Farragut, who had little faith in torpedoes at first, and who like other naval officers had denounced their use by the Confederates, and ordered that no quarter should be shown those captured operating them, also applied to be furnished them, saying, "Torpedoes are not so very agreeable when used on both sides, therefore, I have reluctantly brought myself to it. I have always deemed it unworthy of a chivalrous nation, but it does not do to give your enemy such a decided superiority over." And the Government of the United States, who had savagely denounced the Confederates for using them, now invited plans from inventors and mechanics for their construction, and operation, and soon supplied them abundantly to Army and Navy—adopting generally the Confederates as the best.

In August, 1864, the Federal fleet advanced upon Fort Morgan at the entrance of Mobile Bay, the line being led by "Tecumseh," the newest and most powerful of the enemy's ironclads, which was completely destroyed by a torpedo planted under the direction of General Raines, Chief of the Confederate Army Torpedo Bureau. She sunk in a moment, carrying down with her her entire crew of one hundred and forty souls, save about fifteen or twenty who escaped by swimming to Fort Morgan.

This was the greatest achievement of a single torpedo during our war and served to stimulate the Confederate authorities to renewed vigour. Thenceforward, the Bay of Mobile and adjacent waters became the chief scenes of torpedo operation. Genl. Maury stated that he had caused to be placed 180 in

her channel and waterways, that they held the powerful fleet of Admiral Farragut for ten months at bay, and destroyed fully a dozen United States vessels, of which six were gunboats and four were monitors. Regular torpedo stations were established in Richmond, Wilmington, Charleston, Savannah and Mobile, at which sixty naval officers and men were on duty, preparing these new engines of war. The channel-ways, rivers and harbours were protected by them from Virginia to Texas. Sometimes a hundred were taken out of James River in a single day, and when the Southern seaports fell hundreds of torpedoes were found floating in their waters ready to explode upon the first contact. At first the older Confederate officers who regarded them with disfavour, as Captain Wm. H. Parker says he did, were now "torpedo mad." "Commodore Tucker and I," he said, "had torpedo on the brain," and the destruction of the enemy's vessels increased so rapidly that in the last ten months of the war forty or fifty were blown up, and in the last three weeks ten or more were destroyed. Its possibilities became better and better appreciated every day. Think of the destruction this machine affected, and bear in mind its use came to be fairly understood only during the last part of the war. During that period, when but few Federal vessels were lost and fewer still severely damaged by the most powerful guns in use, we find this long line of disasters from the Confederate use of this new and in the beginning despised comer into the arena of naval warfare. Our successes have made the torpedo a name spoken of with loathing and contempt by the self-sufficient Yankee, a recognized factor in modern naval warfare, and now we see on all sides the greatest activity and genius in improving it.

The wonderful inventive genius and energetic action of the Confederate officers, and engineers astounded the world by their achievements in the unknown and untried science in naval warfare. They not only made it most effective for sea coast and harbour defence, but terrible as an agency of attack on hostile ships of war. Not only that, but they brought the system to such a high state of perfection that little or no advance or improvement has since been made in it, and within a short period of the inception of the design a system was formed so perfect and complete as that the advance upon the water by the enemy was materially checked. They startled naval constructors and officers in the civilized world by the rapidity, audacity and novelty of their original methods, and will be known through all ages for their wonderful achievements. Maury, Buchanan, Brook, Jones and their assistants are the central figures around which revolve to the present day the changes from the old to the new in naval warfare.

Meantime Captain Maury was most diligently employed in London, under the order of the Navy Department in developing and improving his system, afforded

by the workshops and laboratories there for experiment and construction. Here he continued during 1863 and 1864, pursuing these researches, perfecting many valuable inventions, and instruments with signal success. He reported to the Secretary of the Navy at home, so far as it was safe to do so, by whom results were passed on to officers in charge for their instruction and guidance and shipping continuously to the department supplies of insulated wire, exploders, and other inventions and devices whose object was to increase the destructiveness of the torpedo and to test it continually without removing it. In the spring of 1865, he sailed for Galveston with the most powerful and perfect equipment of electric torpedo material ever assembled. Great results were confidently expected from this armament, but before he reached Havana news arrived of General Lee's surrender.

But his experience and study and his scientific renown had now made him the leading authority in this new weapon of war mainly perfected by him. He was also now relieved from the seal of secrecy hitherto imposed upon him, so that when a year afterwards he returned to Europe he felt himself at liberty to impart to the sovereign there the secret of his discoveries concerning his new made science. Most of the European powers sent representatives to his school of instruction—and all of them have built upon his beginnings, the most powerful branch of their naval armaments.

To France he first imparted his secret and the Emperor witnessed the experiment and himself closed the circuit and exploded a torpedo placed in the Seine, near St. Cloud, to the perfect satisfaction of all. Russia, Sweden, Holland, England and others soon also received his instructions and they, too, have since built up a new method of defence second to none.

My own experiments, Captain Maury says, show that the electrical torpedo, or mine has not hitherto been properly appreciated as a means of defence in war. It is as effective for the defence as ironclads and rifled guns are for the attack. Indeed, such is the progress made in what may be called this new Department of Military Engineering that I feel justified in the opinion that hereafter in all plans for coast, harbour and river defences and in all works for the protection of cities and places whether against attacks by armies on land or ships afloat, the electrical torpedo is to play an important part. It will not only modify and strengthen existing plans, but greatly reduce the expense of future systems.

These experiments have resulted in some important improvements and contrivances, not to say inventions and discoveries which as yet have been made known only to the Confederate Government. They are chiefly as follows:

First. A plan for determining by cross bearing when the enemy is in the field of destruction, and for "making connections" among the torpedo wires in a certain way and by which (the concurrence of two operators) becomes necessary for the explosion of any one or more torpedoes. This plan requires each operator to be so placed, or stationed that a line drawn straight from them to the place of the torpedoes may intersect as nearly as practicable at right angles, and it requires the connections to be such that each operator may put his station in or out of circuit at will. When the torpedoes are laid, a range from each station is established for every torpedo or group of torpedoes. When either operator observes an enemy in range with any torpedo he closes his circuit for that torpedo. If the enemy before getting out of this range should enter the range for any torpedo from the other station the operator then closes his circuit, and discharges the igniting spark.

Consequently if the range belongs to the same torpedo its explosion takes place. But if not there will be no explosion; hence, here is an artifice by which explosion becomes impossible when the enemy is not within the field of destruction, and sure when she is.

Second. The "Electrical Gauge," a contrivance of my own, by means of which one of the tests which the igniting fuse has to undergo before it is accepted, is applied. By means of it the operators can telegraph through the fuse to each other without risk to the torpedoes, and by which the torpedoes, may without detriment to their explosibility be tested daily, or as often as required. And thus the operator can at all times make sure that all is right.

Third. A plan for planting torpedoes where the water is too deep for them to lie on the bottom and explode with effect, by which they will not interfere with the navigation of the channel, and by which when the enemy makes his appearance they may, by the touch of a key be brought instantly into the required position and at the proper depth.

These contrivances are all very simple; they are readily understood from verbal instruction, they require neither models or drawings, and enable the operator chiefly to use the self same wire for testing his torpedoes daily after they are planted, and then to explode them at will.

Though these torpedoes, owing to the lack in the Confederacy of the proper materials and appliances for their construction and use, were make-shifts, yet so effective had their use become, especially during the last year of the war, that the Secretary of the American Navy, in his annual report of December, 1865, to the President of the United States, thus testifies to their efficiency: "Torpedoes

always formidable in harbours and internal waters, have been more destructive to our naval vessels than all other means combined."

Since 1862, finding myself in reach of the facilities afforded in England, I have made the study of Electrical torpedoes a specialty, and the results are such, to say the least, as to show that it is capable of doing quite as much for the defence as ironclads and rifled guns are likely to do for the attack.

These results consist in improvements and discoveries which enable the adept in that new department of military engineering to explode his torpedoes whether buried on land or submerged in the water, singly or in groups, instantaneously and at any distance to transmit through them without the risk of explosion, orders and commands, and as readily as through the ordinary line of telegraph. To determine with unerring certainty when the enemy is in the field of destruction of this or that torpedo. To render its explosion impossible, unless he be in such field, even though the igniting spark should be discharged; and so to set an electrical current to watch it, as to make the injuring of it without his knowledge impossible, and the removal of it by an enemy, if not impossible, extremely difficult and dangerous.

Electrical torpedoes are also available for the defense of mountain passes, roadways and fortified positions on land.

I am not aware that electricity was used at all in the Confederate war for springing mines on land. Shell cast for this purpose should be used but in an emergency, tin canisters, or other perfectly water-tight cases, will answer. These shells should be one-fourth of an inch thick to one inch, according to size and probable handling in transportation. They should be spherical only instead of a hole for the fuse as in a hollow shot they should have a neck like a bottle, with a cap to screw over, not in the neck. The case should be charged through the neck, and the wires let in through two holes counter sunk diametrically opposite, the counter sinking being for the purpose of receiving pitch or other resinous matter, to keep the water out. The fuse being adjusted to the wires should be held in place by a string through the neck while the wires drawn out taut and sealed within and without. Having proved the fuse, first fill and then drive in the peg. Then fill the space between it and the screw-cap with red lead and screw down so as to make water-tight. Now secure the tails of the wires so that they will not be chafed or bruised, and the mine is ready for transportation.

They are general to be used in stone fougasses, the wire being buried at convenient depths and all marks of fougasses and trenches removed as completely as possible. Any number not exceeding twenty-five or thirty may be

arranged in a single circuit for the Ebonite; but if the magnetic exploder of Wheatstone be preferred, and the ground be perfectly dry, hundreds may be planted in a latter circuit.

The operator may be at any distance from these primas when he explodes them, provided only he has established some mark or point which on being seen by the enemy should serve as a signal. The area of destruction of fougasses properly constructed with a charge of twenty or thirty pounds of powder may be assumed to be that of a circle seventy-five or eighty yards in diameter. Twenty mines would therefore serve for a mile. Several miles may be planted in a night and the assailants may be enticed, or invited out in the morning. Passes before an invading army may be mined in advance and thus if he cannot be destroyed, his progress may be so retarded by dress mines or sham mines as almost literally to dig his way.

The power to telegraph through these torpedoes is of little consequence, in as much as there need be but one station and one operator. Using the testing fuse manufactured by Abel and a weak voltaic current, the operator can at any time satisfy himself as to continuity. Thus "bridge" and "gulfs" or "breaks" are not required for the land as they are in sea-mining. Ebonite has the further advantage on land that it takes but a single wire.

Forts may be protected against assault and your own rifle pits from occupation by an enemy simply by a proper distribution of these new engines of war. They may be planted line within line and one row above another, and so arranged that volcanoes can be sprung at will under the feet of assaulting columns. And these improvements and discoveries enable the engineer at small cost, and short notice effectually to defend any roadstead, or block any river, harbour or pass against the land and naval forces of an enemy without in the least interfering with the free use of the same by friendly powers.

To this admirable state of efficiency was the new and terrible science of war perfected, chiefly by the Confederate Navy, and mainly through the instrumentality of its faithful, and devoted officer Captain Matthew F. Maury, and his brave and daring young assistants, Minor, Davidson, Kennon, Dixon, Glassel, and many others, and those crews of the "Hundley," who moved by the lofty faith that with them died, volunteered for enterprise of extremest peril in the defense of Charleston Harbour, in which they all perished, in this desperate service, of whom the names of but the following are known: Horace L. Hundley, George E. Dixon, Robert Brookland, Jos. Patterson, Thomas W. Park, Chas. McHugh, Henry Beard, John Marshall, C. L. Sprague, C. F. Carlson, Arnold Beeker, Jos. A. Wicks, C. Simpkins, F. Collins, Ridgway, Miller, whose

monument erected by the ladies of Charleston, stands upon the battery there in perpetual memory and honour.

RICHARD L. MAURY,
Army Northern Virginia.

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