SUBMARINE TORPEDO BOAT HOLLAND.

Now Belongs to Government—Acceptance of the Craft Indicates a Change of Policy With Reference to the Submarine Boat Theory in Our Navy Department—Difference of Opinion Regarding Purchase.

After many delays the government has signed a contract with the Holland Submarine Torpedo Boat company to purchase its experimental craft, the Holland, for $150,000. It also agrees to pay $175,000 each for any other boats of the type it may conclude to purchase, provided that these shall be similar in dimensions to the improved and larger Holland boat now designed.

This is certainly a long step in advance for the advocates of the submarine boat theory, because it ranges this country alongside of France as an official advocate of the system, says the New York Herald. The wisdom of the decision can be decided only after more extended and satisfactory experiments have been conducted. At the present stage of development the performances have fallen short of the promises, and the principle still seems open to such doubts that experts radically disagree upon the question of its practical usefulness.

The naval committee reported these facts and added that during the run the air inside the vessel was quite fresh and that during the run there was no disturbance at the surface of the water except such as was caused by the flagstaff, which would not be used in time of war.

In making his report to the secretary of the navy, Captain Lowe said: "I believe that the Holland is a successful and veritable submarine torpedo boat, capable of making a veritable attach upon an enemy unseen and undetected, and that therefore she is an engine of warfare of terrible potency, which the government must necessarily adopt into its service."

Notwithstanding this favorable report, the naval construction board refused to recommend her purchase. They were of the opinion that the government should wait until the Plunger was completed and tested before purchasing any boat. Secretary Long coincided with this view at the time, and a member of the naval board of construction, in discussing the matter, gave certain reasons why the board did not approve of the Holland. He said that owing to her low rate of speed while under water she would be unable to make head against a strong current; that the men inside can never tell exactly where she will come to the surface, and that in case of any accident to her rudder she would immediately rise and expose herself to the enemy. Moreover, he said, there was no space on board for provisions or for the crew to sleep, and therefore she could not go on extended cruises and would be of little use even for coast defense.

It will be remembered that during the blockade of Santiago Holland was begging for a chance to run into Santiago harbor with his boat and break up the Spanish fleet. A great many people wondered why he was not given the chance, and now these statements may explain the attitude of the navy department in the matter.

After the latest rejection of his boat, Holland sent her down to Washington, where she was viewed by many senators, congressmen and naval officers. On closer acquaintance Secretary Long seems to have changed his views and the purchase of the boat followed.

The Holland submarine torpedo boat is a steel shell, 54 feet long and 10½ feet wide, with cigar shaped ends. Within this small space are 40,000 pounds of machinery and fittings, including a fifty horse power gasoline engine, which propels the boat while on the surface and generates the electricity used in her submarine expeditions. In the bow is a horizontal torpedo tube, from which the crew may direct torpedoes at the enemy while underneath the water. Another tube is set at an angle of twenty degrees, and from this, while on the surface, the Holland may hurl torpedoes through the air either at war ships or shore defenses.

The act of diving is accomplished by opening the air chambers in the lower part of the hull and filling them with water, and at the same time setting a horizontal rudder so that the bow of the boat is projected downward, carrying the entire hull under the waves. With a load of nine tons of water in her chambers the boat will run along at a depth of five feet. She sinks lower with every pound of water taken in, and the maximum depth at which she can travel is 140 feet. When necessary to rise this water is forced quickly out by powerful pumps, and then the boat bobs quietly up to the surface. She can run along very comfortably with only her tiny conning tower above the water, and is then visible only a mile away, and even then only by the aid of marine glasses.

Contrary to general belief, this is not the first encouragement, direct or indirect, given by the government to submarine navigation. Robert Fulton borrowed an idea conceived by Bushnell, of Connecticut, and made numerous tests of various novel craft both at home and abroad. During the civil war, the Confederates experimented successfully with submarine boats, and in one notable instance sank the United States steamship Housatonic. Our navy department has, despite the croakings of partisans of the idea, always been keen in watching the tentative efforts made by American and French inventors, and has stood ready to carry forward the work when its practicability was assured. It may be added that France is the only foreign sea power interested in the development, and that there it has become a mania. England ridicules the idea, and within a fortnight the first lord of the admiralty has declared his disbelief in its value, and even if called upon to meet an attack by such a type, the British admiralty would seek its weapon in other directions.

At this moment another vessel of the Holland type, nominally belonging to the government, is awaiting completion at Baltimore. This craft, now known as the Plunger, was authorized by Congress in March, 1893, and in 1895 the contract for the construction of her hull and machinery, at a cost of $150,000, was signed. Over a year later the keel was laid, and since then her vicissitudes have been many. The work was so much interrupted, owing principally to the difficulties encountered with her electrical apparatus, that the navy department was led to withhold further decisions upon the Plunger until more certain prospects of its success were made manifest. Indeed, within a few months the secretary, in reply to invidious criticisms upon his failure to encourage the invention, explained that no hostility existed to it among the naval officers; that all charges of professional jealousy were puerile, and that the refusal to give official recognition to the idea was based solely upon certain questions that had arisen with the contractors and builders of the Plunger.

The acceptance, therefore, of the Holland, and the agreement reached as to future boats of the type, indicate a change of policy in the department. Inspired by this long delayed recognition, the contracting company will doubtless produce superior vessels, and should their sanguine prophecies be realized, produce a type that will have a definite war value.

George Holland, inventor of the Holland boat, has been experimenting with submarine craft for more than a quarter of a century. His original boat was given many trials, but never gave satisfaction, and at last the navy department joined him in the building of the experimental submarine boat Plunger, which is still unfinished, at Baltimore. The naval experts and Mr. Holland were unable to agree, however, and Mr. Holland finally withdrew, declaring that the Plunger would never be a success, and that he would build a new boat to demonstrate the feasibility of his own ideas.

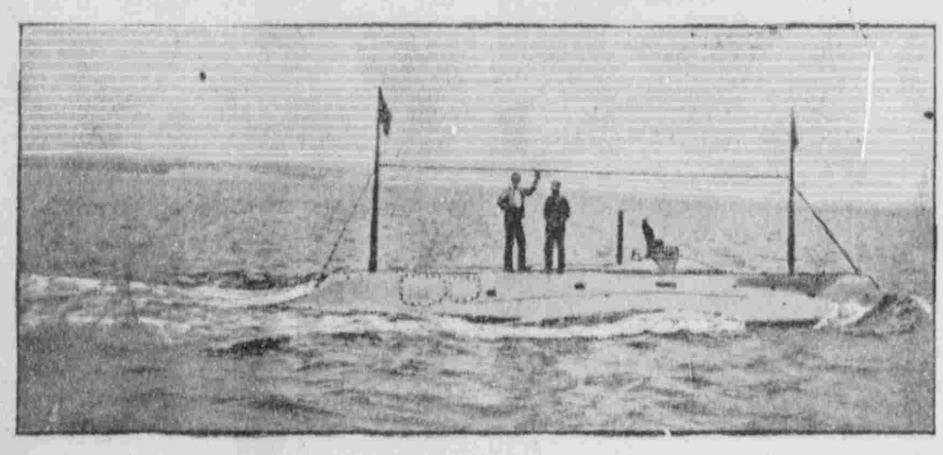
This he did, and the final trials were on November 6 at Peconic bay, at the eastern end of Long Island. Six naval officers were present, and the requirements of the government were that the boat should sink and proceed a mile under water, rise to the surface, make an observation from the conning tower, discharge a torpedo at a target while at full speed and return to the starting point under water.

At two o'clock on the afternoon of the trial the Holland was reported in readiness, and Captain John Lowe and Commander John Emory went on board of her, making with the crew a total number of eight persons. Rear Admiral Rogers and three other officers remained in the tender to watch the proceedings.

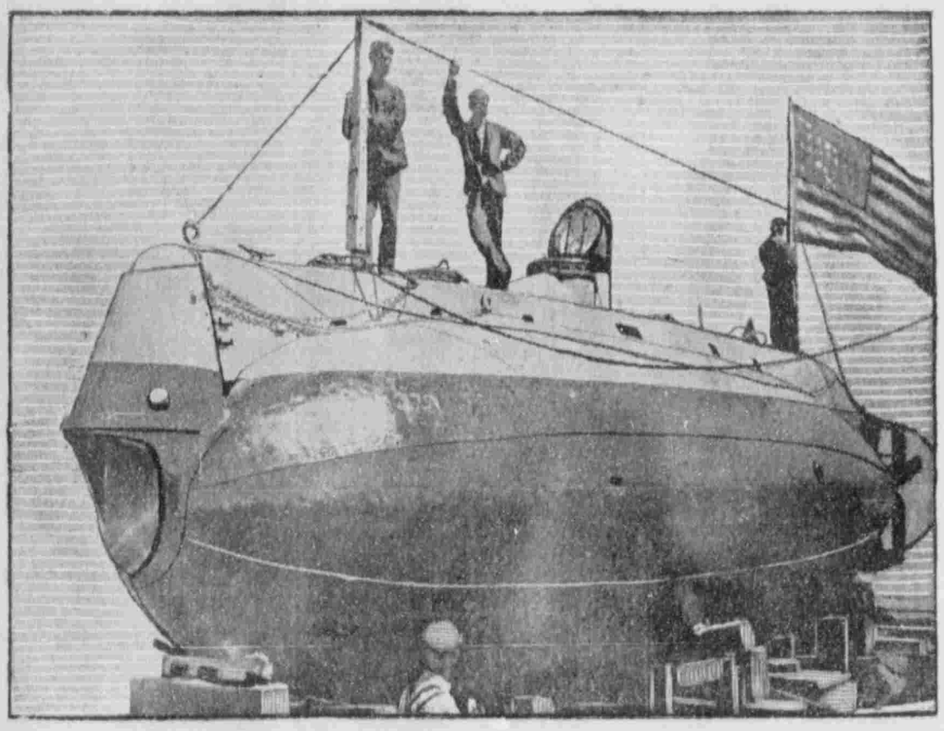
At 2:28 p.m. the Holland signalled with her whistle that she was about to sink and then disappeared entirely beneath the water. At 2:30:55 she passed the starting buoy.

Forty seconds later she rose to the surface, remained visible eight seconds, and then sank to a depth of five feet below the surface. She remained invisible for nine minutes and twenty-five seconds, and then again rose to the surface within three hundred feet of the finish. A minute later she completed the mile, and the torpedo was discharged, missing the target by only seventy feet. The record for the mile was, therefore, 11 minutes and 5 seconds. On the return trip the boat was submerged at 2:42; she passed the half mile at 2:43:45, and at 2:56:38 completed the mile. Time, 13:26. The time occupied in making the entire trip was 25 minutes, 43 seconds.

UNCLE SAM'S NEW TORPEDO BOAT A WONDERFUL CREATION.



A new snapshot of Uncle Sam's latest addition to the navy, showing the Holland almost awash. It is being urged upon the government by those who favor vessels of the submarine type that others of this class, only larger, be added to our floating force at once.



At last the naval authorities have purchased the Holland torpedo boat, the most successful submarine craft ever launched. This picture of the formidable creation was taken at Peconic, Long Island, while the boat was being overhauled previous to inspection by the naval board. It is the best photograph yet obtained of a type of boat that is destined to revolutionize naval warfare.

SCIENTIFIC MISCELLANY.

An asphalted pasteboard from Norway and a wood and paper board from Sweden are new building materials of great probable usefulness. The first is made by compressing together several layers of heavy paper and asphaltum, the product being a smooth, solid plate, which is as strong as wood and cheaper, which will not crack or rot, and which is adapted for walls and ceilings, for panels, and for many other purposes. The second material is a board having a central layer of closely-fitter bits of wood, with a layer of cement and an outer layer of paper on each side. The paper has been compressed and made waterproof. The boards are made four feet wide and eigth to eighteen feet long, and are adapted not only for the interior lining of houses, but for making trunks, boxes, tables and other light articles. The boards can be polished or painted.

Calcium carbide by a cheapened process is claimed by H. Aschermann. On treating pyrites with lime and coke in an ordinary electric furnace, metallic iron and calcium carbide are produced, the latter furnishing as pure acetylene as the carbide by the usual process, while at least 40 per cent less current is required by the new method. Another advantage is that the furnace can be run continuously.

A mortar used in German schools has a flanged edge, over which a sheet of rubber is fitted, the pestle passing through a hole in the rubber. This cover protects the experimenter from injurious vapors and dust, and facilitates the pounding of hard, brittle materials, such as caustic alkalies.

The modern abundance of meat and the increasing tendency to over-eat are held by Sir William Banks to be a cause of the increase of cancer. He finds the view supported by the fact that cancer is increasing chiefly among males, who have added to their indulgence in heavy food much more than females.

The treatment of pulmonary consumption by the electrical method of D'Arsonval has been made the subject of a paper to the French Academy by M. Doumer. The high-frequency brush discharge is applied to the skin just above the diseased tissue five minutes each day, and the results have been very satisfactory in the earlier stages. The symptoms of disease vanish in succession, the last to disappear being the stethoscopic sounds, which usually persist until after six or eight months of treatment. Of the seventeen cases undertaken, two were in the initial stage, while a few showed advanced signs of softened tissues, but all were treated successfully, and no relapses have been reported.

In our utilitarian age the German plan of planting fruit trees for shade along highways is not likely to be overlooked. In Alsace-Lorraine the wayside orchards, which are farmed out by the state, now yield an annual revenue of 150,000 francs, and Switzerland, Belgium and Luxemberg are successful borrowers of the idea. In France the chief shade trees are the poplar, the ash and the elm, which on the national roads are cut for timber at the age of about sixty years. Fruit trees—such as the cherry, the pear, the apple and the plum—now appear on the roads of several departments instead of these forest trees, and the French government is likely to become one of the world's great growers of fruit.

The white clover (Trifolium repens) seems to be the plant now accepted in Ireland as the shamrock. As this is believed to be of recent introduction, however, there has been some controversy of late as to the identity of the plant traditionally used by St. Patrick to illustrate the Trinity, and the black medic (Medicago lupulina) and the wood-sorrel (Oxalis acetosella) are among those sugested. The chairman at a late meeting of the Royal Botanic society advocated the wood-sorrel as the true shamrock, its leaves being more distinct than others.

The novel dark-room light of a British photographer, Howard Farmer, consists of an electric lamp placed in a glass jar, which is contained in a jar a quarter of an inch larger, the space between the two vessels being filled with a 6 per cent solution of bichromate of potash. A board cover is fitted to the jars. The light is very bright, but appears to have no fogging effect on the plates.

Whatever be the primary or secondary cause of death, it is nearly always the heart that dies first. Prof Nothnagel, lecturing the other day before a Vienna society, pointed out that this is true whether the death is natural—due to the successive wearing out of the nerve cells, then other groups of tissues, and finally the muscles—or whether the heart is brought to a standstill by acute or chronic disease. The conjection of cells and tissues in both cases sets in from want of oxygen. In poisoning with prussic acid the whole body is dead before the heart ceases to beat, but this is the only exception to the rule, the reverse being true in all other cases. However great the fear of death, there is abundant reason to believe it painless in nearly every imaginable form. Consciousness ceases before the heart stops. In a fatal gunshot wound the action of the bullet is more rapid than the message to the brain announcing it, and there is consequently no pain. Death by burning is early made painless by suffocation, which also relieves before death the distress of many who die from disease. In accute feverish diseases, bacterial poison brings on depression, apathy and indifference, and death is free from both dread and pain.

The average dietary of individuals in different countries varies greatly. An English statistician, Mr. R. F. Crawford, finds that an inhabitant of the United kingdom consumes much more meat than a Belgian, Frenchman or German, but a smaller proportion of bread and potatoes. More bread and less meat are eaten in Belgium than in any other country considered, while a French peculiarity is the apparent small use of milk.

Quartz has important advantages over glass as a material for thermometers, and attempts have been made to work it into tubes. A French experimenter, Dufour, describes two thermometers he has made. One contains tin as the liquid, and is to be used for temperatures above 240 degrees C., while the other contains mercury, and will be submitted to comparative tests with the ordinary glass thermometer.

A laboratory furnace devised by Armand Gautier can be kept for an indefinite period at any desired fixed temperature between 150 degrees and 1,300 degrees C.

Caught a Dreadful Cold.

Marion Kooke, manager for T. M. Thompson, a large importer of fine millinery at 1638 Milwaukee avenue, Chicago, says: "During the late severe weather I caught a dreadful cold which kept me awake at night and made me unfit to attend my work during the day. One of my milliners was taking Chamberlain's Cough Remedy for a severe cold at that time, which seemed to relieve her so quickly that I bought some for myself. It acted like magic and I began to improve at once. I am now entirely well and feel very pleased to acknowledge its merits."