and drive the boat down to the desired depth. A large conning tower is on top of the hull, of the same structural strength as the latter, and through this projects the omniscope or periscope. All the mechanism for operating the boat is centered in the conning tower. A water-tight hatch is provided to seal the conning tower off from the hull of the craft. One of the principal features of the Lake boat, devised to insure greater safety of the crew during submergence, is that of a drop lead keel of 5 tons weight, which can be readily freed from the bottom of the boat in case of danger by pulling a lever, thus giving the craft sufficient buoyancy to return to the surface. It is claimed that the knowledge of the letting go of this keel, which will instantly give 5 tons of positive buoyancy, inspires a feeling of safety and tends to banish nervousness from the crew while the boat is submerged at great depths. Forward is also a diving compartment for leaving the vessel when submerged, working on the same principle as a diving bell. This compartment is not so much a safety compartment as it is for a diving bell for carrying on work at the bottom of harbor entrances, through which a diver may proceed to the water-bed and submarine mines can be destroyed and laid. The vessel has buffers or wheels, which keep the hull from injury when running on the bottom. The "Lake" has twin screws, which are driven by gasoline engines when traveling on the surface and by electric engines alone when submerged.

One of the up-to-date features recently installed on the "Plunger" is a copper signal buoy, 15 inches in diameter, which is arranged to be readily released from the inside in case of danger while the boat is submerged. This rises immediately to the surface, indicating the exact position of the craft, and serving as a distress signal in case of an accident. The ball buoy and a reel of 200 feet of 3/16-inch bronze wire are incased on the bridge, just in front of the conning tower in a box-like compartment. A telephone can be installed inside to afford direct communication to the submerged boat. Large ring holes also have been attached to the "Plunger" and the other submarines, so that they can be lifted and brought to the surface immediately in case of a disaster.

Of unusual and timely interest are the photos here reproduced, giving a realistic glimpse of one of these wonderful little engines of destruction of the diving type now in service. Both sides and every foot of the round steel tube are lined from stem to stern with intricate and delicate machinery, levers, valves, etc., each having a particular function in manipulating and operating the fish-like craft in the depths of the sea. The center view, looking aft, shows the commanding officer's platform above the conning tower and steering wheel. To the right is the large inside tiller wheel, and below, the wheel to operate the diving and horizontal rudders, while in the background is the compartment for the engines. On the left is shown the large indicator, registering the submarine's depth below the surface, and its deflection from the horizontal. Below this is one of the 2,000-pound air flasks, underneath which is one of the ballast tanks. The bow view shows the main fighting feature of the craft, viz., the torpedo tube, and the pipe above connected with the air flask for expelling the torpedo from the tube. On the right and left sides are seen the air flasks and ballast tanks. The important forward trimming tanks are shown on either side of the torpedo tube. The vessel is made to dive bow down by aid of each particular tank. Above the torpedo tube are a special steering wheel for pointing the submarine at the time of firing, depth registers, speed indicators, etc. For getting the range while submerged, a periscope is employed, the end of which protrudes a foot or more above the surface, which reflects below the location of surface objects. On firing a torpedo, the boat has to be pointed, put nearly level, and at the same time kept beneath the surface at the requisite depth, so as to have the periscope lens just clear of the water—all of which requires great care and intelligence on the part of the officers and crew.

The Current Supplement.

The new Connecticut Avenue Bridge at Washington, D. C., the largest of its kind in the world, is about to be opened. This is one of the most noteworthy concrete bridges in the world, for which reason engineers will doubtless read with interest Mr. F. N. Bauskett's article on the structure in the current SUPPLEMENT, No. 1637. Simon Lake writes on safe submarine vessels and the future of the art. Coming as they do from a well-known authority, his criticisms and his advice are valuable. A new method of treating sewage, invented by W. D. Scott-Moncrieff, is described and illustrated. M. Klar's splendid dissertation on the manufacture, denaturing, and the technical and chemical utilization of alcohol is concluded. In this particular installment he describes the malting process, the gelatinization of the raw material, the saccharification of the raw material, production of the yeast, fermenting the sweet mash, and the production of alcohol from the mash. Joel A. Allen continues his treatise on the influence of physical conditions in the origin of species. Our Berlin correspondent discusses electrically-operated equatorial mountings for telescopes, elucidating his remarks with many helpful photographs. "A Method of Photometry of High Candle Power Units" is a title of an iconoclastic article by F. B. Lambert. The two hundredth anniversary of the birth of Linnæus falls upon May 23, 1907, and for that reason the splendid biography prepared by Dr. H. Kramer should be read with interest. Dr. Alfred Gradenwitz describes a new direct-reading wind gage.

The Geological Survey's New Director.

With this issue, a new name appears at the head of the weekly press bulletins published by the United States Geological Survey. It is that of the new director, Dr. George Otis Smith, who was appointed by President Roosevelt to succeed Mr. Charles D. Walcott on the retirement of Mr. Walcott from the directorship to take up his new duties as secretary of the Smithsonian Institution.

Dr. Smith is one of the younger members of the Survey in point of age, as it is only thirty-six years since he was born at Hodgdon, Aroostook County, Maine. He has, however, had fourteen years of continuous service in geologic work. After graduating from Colby College in 1893, he joined a Geological Survey party working on the Marquette iron range, Michigan. During the three following years he took a post-graduate course in geology at Johns Hopkins University, receiving in June, 1896, the degree of Ph.D. As the result of a civil service examination which he took for the position of assistant geologist, he became connected with the United States Geological Survey soon after his graduation.

As assistant geologist and as geologist, Dr. Smith has worked in Michigan, Washington, Utah, North Carolina, the New England States, New Jersey, and Pennsylvania. For seven field seasons he was engaged in reconnaissance and detailed surveys in Washington. In the course of this work he made a special study of several artesian basins, and the results were published in a water-supply paper. He made a report also on the coal fields of the Pacific coast. The results of his investigations in Washington found further expression in a report on the rocks of Mount Rainier, in the Tacoma, Ellensburg, Snoqualmie, and Mount Stuart folios, in a professional paper on the geology and physiography of central Washington, and in a paper on gold mining in central Washington. In addition Dr. Smith contributed articles to the bulletins of the Geological Society of America, and to various periodicals.

In 1900 the United States Geological Survey issued the Tintic Special folio in which Dr. Smith described the geologic structure of that famous Utah camp. He had previously co-operated with Mr. G. W. Tower, Jr., in producing a report on the geology and mining industry of that district.

Following his years of activity in the far West, Dr. Smith began areal work in Maine. Eventually, supervision of all the Survey's geologic work in New England was assigned to him, and direction also of the geologic work in the areas of crystalline rocks in New Jersey, Pennsylvania, and Maryland. In the course of these investigations he made a special study of several economic subjects. The Survey's statistical reports for 1905 on mica, graphite, and asbestos were prepared by him. Last July he was appointed geologist in charge of petrology with scientific supervision of the Survey work in that department.

Recently Dr. Smith has had special opportunities of studying the methods and organization of the Survey and of other government bureaus. He served as chairman of the committee on accounting and bookkeeping, which has been working for the past year under the direction of the committee on departmental methods appointed by the President and known as the Keep Commission.

Dr. Smith is a fellow of the Geological Society of America, a member of the American Association for the Advancement of Science, of the American Institute of Mining Engineers, of the American Forestry Association, and other scientific societies.

A gasoline tank rarely explodes. It cannot unless it contains gasoline vapor and air in explosive proportions, which latter condition is almost never present. It does not explode because it contains too little air or too much gasoline. Even if a tank of gasoline were to burst from heat applied to its exterior, the confined heavy gas would not explode if in contact with flame or fire, but would burn instead. True, a tank of gasoline with no vent could do considerable damage were it to burst and throw burning oil and flaming gas about, but one thousand gallons of gasoline in a vessel's bilges would not be so dangerous from explosion as a hundredth of that amount. The larger quantity would burn rapidly, while the smaller would be sufficient, if mixed with the proper amount of air, to utterly demolish almost any boat.

Correspondence.

Cyclone Observations.

To the Editor of the SCIENTIFIC AMERICAN:

I notice in issue of March 16 article by W. T. Hall in regard to center of funnel of cyclone being white. Some years ago I saw a phenomenon similar to that on a small scale when I visited the great Karg gas well at Findlay, Ohio. The flow of gas from a pipe 5 inches in diameter, and at a pressure of (I think) 175 pounds to the inch, was ignited and allowed to issue from the pipe horizontally about three feet above the water of the river. The force of the gas projected the flame from 50 to 100 feet horizontally, and the heat and currents caused the steam rising from the water to take form of miniature cyclones, and one after another they formed and slowly moved over the water in a course parallel to the flame, and each one, shaped like a slender vase, semi-transparent, showed a whitish core or center its entire length. It was in the dusk of evening, and in the strong light these twisters showed with remarkable distinctness, and one after another they rose upward and disappeared. I thought at the time that conditions must be similar to cause the great destructive cyclones.

In the same paper, relating to the experiment in acoustics where the boy ringing a bell ran to meet others, and the effect of the sound on those meeting him: I have frequently noticed the same effect when riding on the cars and meeting another locomotive on which the bell was ringing. As our car approached the strokes of the bell would be abnormally loud, and soon as we passed the sound of the bell was scarcely heard at all. I have wondered what the reason was and never heard it explained. F. M. PRIEST.

Klamath Falls, Ore.

The Prevention of Sea-Sickness.

To the Editor of the SCIENTIFIC AMERICAN:

Through the kindness of the American consul-general here, my attention is called to No. 293 of the Export Edition of the SCIENTIFIC AMERICAN, January, 1907. On page 15 of this number you publish "A New Remedy for Sea-Sickness."

Allow me, in the interest of ocean travelers in general, to state the following:

For the last fifteen years I have studied the question of a costless prevention of sea-sickness.

A remedy for curing sea-sickness there is none, and will never be. The point therefore lies in its prevention, for "prevention is better than cure." My simple head-bandage made by folding a towel, a large handkerchief or anything similar, dipped into hot salt or sweet water, and applied round the head a few times, restores the proper circulation of the blood, relieves the abdomen from pressure, and checks the cerebral anæmia.

The question I wanted to solve was to find a costless way of preventing sea-sickness. While traveling over thirty years in all kinds of weather, at all seasons, on the seas of this globe, I always felt a great pity for the steerage passengers, especially women and children, who had to suffer so severely when the sea got rough. For this reason I had to abstract from the application of any apparatus, be it electrical appliance, thermophore, or any other construction for which a man has to pay.

The system of hot-water bandages round the head (as one can hardly call it an invention) is mine; all inventions and constructions that have come out ever since I published my simple prescription are based on my system and have passed through my hands; up to now every one of them I have had to condemn for being too heavy, cumbrous, dangerous, or too costly, etc.

If any of them were useful the large steamer companies would have accepted them at once. You can well imagine how very important it is for steamer companies to prevent people becoming sea-sick in the cabins. How pure and sweet the air would be at sea in the cabins if it were not for the repeated vomiting of bile, whose effluvia are extremely volatile and settle down at once in the curtains, floor, ceiling, paint, sofa, beds, etc., of the cabins. This in time forms one of the principal items denominated by travelers, when they enter a cabin, as "ship's smell."

Perhaps you will in the interest of humanity publish this letter (you will plainly see that I have no monetary interest in the matter), and also publish my prescription for the prevention of sea-sickness, which ought to be copied by your newspapers. In winding up allow me to say that hundreds of people whom I have never seen in my life have written to me to express their thanks for my prescription.

EUGENE WOLF, Explorer.

Munich, Bavaria.

[The prescription referred to in the above letter instructs the patient to lie down flat on the back, and fold a towel soaked in water, as hot as can be endured and as tightly as possible around the head, reheating the towel at intervals.]