will be closed on Sept. 22. It will be equipped as fully as the means permit. Microscopes will not be provided, but it is believed that investigators will find most of their indispensable wants satisfied. The fee for an investigator's table will be fifty dollars for the present season.

Rooms accommodating two persons may be obtained near the laboratory at prices varying from three to four dollars a week, and board from four and a half to seven dollars. Applications for places in the laboratory should be made immediately to the secretary of the Marine Biological Laboratory, Nahant, Mass.

Wood's Holl, owing to the richness of the marine life in the neighboring waters, offers exceptional advantages. It is situated on the north shore of Vineyard Sound, at the entrance to Buzzard's Bay, and may be reached by the Old Colony Railroad (two hours and a half from Boston), or by rail and boat from Fall River and New Bedford.

The new laboratory is intended to continue and extend the work of the laboratory at Annisquam, carried on for six years by the Woman's Education Association, with the co-operation of the Boston Society of Natural History.

SCIENTIFIC NEWS IN WASHINGTON.

A New Building in the National Museum; more than Twelve Thousand Accessions made to the Museum since 1882, and nearly Seven and One-Half Million New Entries made in its Catalogues; Hundreds of Thousands of Interesting Specimens yet unpacked; Exhibits for which there is not even Storage-Room. — How the Cholera was spread in Japan in 1886. — The Proper Treatment of Inebriety as a Disease. — More about the Proposed Vacuum Air-Ship.

The Proposed New Building for the National Museum.

THE Senate Committee on the Library has reported favorably a bill to provide for the erection of an additional fire-proof building for the use of the National Museum. The appropriation made for this purpose is $500,000, and the new building is to cover an area of 300 feet square, and to consist of two stories and basement. The site of the building is to be to the west of the Smithsonian Institution, flanking it on that side as the present building does upon the east. The present building contains about 80,000 square feet of floor-space available for exhibition and storage. The building proposed will contain about 220,000 square feet. The amount of room for offices and laboratories will be about the same in each. The net area in the new building available for exhibitions, storage, and office-rooms, as estimated, will be between five and six acres.

The cost of the present National Museum building was $315,400, and that cost was less than that of any similar building in existence in this country. The proposed structure can now be erected at proportionately smaller cost, responsible builders having offered to build it for $473,000. Plans of the interior and elevations of the proposed new building were submitted with the report of the committee.

To show the necessity of providing at once more extensive accommodations for the National Museum, the following interesting extracts from a letter written to the committee by Prof. S. P. Langley, secretary of the Smithsonian Institution, June 7, are given: —

"Since the erection of the present museum building there have been more than 12,000 accessions to the collections, chiefly by gifts. From the year 1859 to 1880 the accessions numbered 8,475. It is thus evident that within the last eight years the number of accessions has been half as large again as during the previous twenty-one.

"Many of the more recent accessions are of very great extent, as, for instance, the bequest of the late Isaac Lea of Philadelphia, which contains 20,000 specimens of shells, besides minerals and other objects; the Jeffries collection of fossil and recent shells of Europe, including 40,000 specimens; the Stearns collection of mollusks, numbering 100,000 specimens; the Riley collection of insects, containing 150,000 specimens; the Catlin collection of Indian paintings, about 500 in number; the collection of the American Institute of Mining Engineers, for the transportation of which to Washington several freight-cars were required.

"There are also the extensive collections obtained at the Fisheries Exhibitions at Berlin and London and at the close of the New Orleans Cotton Centennial; the Shepard collection of meteorites; the Wilson collection of archæological objects (more than 12,000 specimens); the Lorillard collection of Central American antiquities; and very many others nearly as extensive. In addition to these are the annual accretions from the work of the United States Fish Commission, the United States Geological Survey, and the Bureau of Ethnology, as well as the contributions from several expeditions of the government, from army and navy officers, and from other government officials. These are very extensive, and are yearly increasing in bulk and value.

"In the Armory Building are stored many hundreds of boxes of valuable material which we have not room to unpack, and the great vaults under the Smithsonian building and many of the attic and tower rooms are similarly occupied.

"For several important departments of the museum no exhibition space whatever is available, and no portion of the collection can be publicly displayed. Indeed, the growth of many of the departments is in large measure prevented by the fact that we have no room for additional exhibition-cases, or even for storage. Many valuable collections elsewhere than in Washington are at the service of the museum, but we have no space for their reception.

"At the close of the last fiscal year (June 30, 1887) a very careful estimate showed that the collections were sixteen times as great in number of specimens as in the year 1882.

"The museum is growing, as it is fitting that the national museum of a great country should grow; and it is not only necessary to care for what is already here, but to provide for the reception and display of what is certain to be placed in our hands within the next few years.

"The present museum building is not more than large enough for the ethnological and technological material already available. The proposed new building will afford accommodation for the natural-history collections, which are at present very inadequately housed. For instance, the amount of space assigned to the collection of mammals is about 6,500 feet. At least double that amount of space will be needed to accommodate the material now on hand as soon as the taxidermists of the museum shall have been able to prepare it for exhibition, it being our desire to have mounted groups, similar to the buffalo family recently finished, in order to preserve for future generations representations of the large quadrupeds native to this continent, which are on the verge of extinction.

"The collection of birds, which, so far as North America is concerned, is the finest in the world, is very inadequately shown, and requires double the case-room now available.

"The collection of mollusks, which is one of the most complete in the world, and contains more than 450,000 specimens, is at present almost entirely unprovided for.

"The collection of insects, which, though smaller, is, so far as North America is concerned, equally perfect, is also practically without any exhibition space. And so I might continue.

"It should be borne in mind that under the roofs of the Smithsonian and new museum buildings are grouped together collections which in London, Paris, or any other of the European capitals, are provided for in a group of museums, for the accommodation of which a much larger number of equally commodious buildings is found needful."

Causes of the Cholera Epidemic in Japan in 1886.

The *Marine Hospital Abstract of Sanitary Reports* for last Saturday contains extracts from a Japanese official publication on the cholera in that country in 1886. It spread over the whole empire, there being 155,574 cases, among which 110,086 were fatal. There were only seventeen days in the whole year in which no cases were reported. The following paragraphs from this report are interesting, because they show, what has been so often shown before, the effect of bad sanitary conditions upon the spread of an epidemic: —

"As to the cause of its outbreak and propagation, accurate evidence is wanting; it is an undeniable fact, however, that it sprang and was propagated from the widely spread germs of the disease

which had lain dormant in Osaka the preceding year, there being no trace of a fresh introduction. Osaka, in the autumn of the preceding year, had been invaded by the disease from Nagasaki; but after some thirty days of prevalence the epidemic gradually declined with the approach of the colder season, though it did not then entirely disappear. One or two cases kept occurring continually over into the next year, until, on the 2d of January, there were five cases reported in the western and southern districts of the city and in the ku of Sakai. On the 3d, five more cases were reported in the three ku of the west, south, and north, and the ku of Sakai. From this time forward, the number of cases gradually increased until the approach of the warmer season, toward the end of April, when it had spread all over the city, where it raged up to the end of October. During the epidemic, there were ninety-nine days in which the daily number of cases reported was over one hundred, and four days when there were two hundred. Indeed, it was the most severe epidemic ever known in Osaka.

"The situation of Osaka is such that it undoubtedly favors the propagation of an epidemic; for the water of the Yodo River, being conducted through the city by canals in various directions, besides furnishing a convenient roadway for transportation and water traffic, also receives the contents of the drains of the city, while at the same time it supplies the city with drinking-water.

"The wells, keeping the same level with the canals, freely communicate with each other, and thus the drinking-water of the city is more or less mingled with the water of the drains. Such, then, being the situation of Osaka, when an epidemic appears, the same convenience for the transportation of goods furnishes an easy medium for the propagation of disease. It is not strange, then, that since the tenth year of Meiji (1877), whenever an epidemic prevails, the city has been a centre of the epidemic. Moreover, in the preceding year there was much rain after the spring, until finally, in June, the Yodo River overflowed its banks, inundating the streets and houses. Hence the city was rendered very filthy, in consequence of which the concealed germs found a favorable nidus, from which the disease appeared with the return of the warm weather, and finally ravaged the whole city. It is also to be borne in mind, that, as Osaka is the commercial centre of Japan, and has free communication in every direction, it is likely to become the cradle of epidemics, and therefore whatever has made its appearance in various other localities has had its origin directly or indirectly in Osaka."

Drunkenness as a Disease.

Dr. Godding, superintendent of the Government Insane-Asylum in Washington, has written a letter to one of the committees of Congress, in which, while showing that it would be unwise to confine inebriates with insane persons, he makes the following interesting remarks: —

"Inebriety as a disease is distinct from insanity. Inebriates resent being placed with the insane; nor are the insane, as a rule, proud of them as associates. Insane from the poison of drink, as they undoubtedly are while the liquor is in them, they now and then get committed to hospitals for the insane, and in their detention during convalescence they afford interesting though unprofitable psychological studies. Dissolute in habit, and idle in life, they are uncomfortable from the start. They are usually fault-finding and impatient at their detention, denouncing every body and every thing about them. When quiet and seemingly at ease in their lot, they are studying how to smuggle in whiskey, or effect an escape. In them moral honesty and generous impulses are sadly wanting, and a condition of settled discontent characterizes the enforced abstinence of their hospital life. What they need is occupation and prolonged treatment in an industrial home, where they can be kept at work at enforced labor under the supervision of a judicious physician. As a rule, confinement in idleness does them little or no good."

The Vacuum Air-Ship again.

The House Committee on Ventilation and Acoustics recommends the passage of the bill, referred to in *Science* recently, making an appropriation to build a vacuum air-ship. The conditions of the grant of seventy-five thousand dollars are, that a like sum shall already have been spent upon the construction of the air-ship, and that the secretary of the navy, after an investigation, with the aid of a board of engineers, into the plan of the construction of the proposed air-ship, and into the principle upon which it is proposed practically to operate it, shall be satisfied that there is reason to believe the air-ship will prove a success in attaining the ends for which it was designed. The last payment is to be made after a successful trial trip has been made. Dr. A. de Bausset, the inventor of this vacuum air-ship, proposes to make it in the form of a tube, air-tight, and cone-shaped at the ends, of steel of sufficient strength to withstand the pressure of the circumambient air when a vacuum has been produced by pumping all the inside air out of the ship. He says of his plan, "Steel $\frac{1}{44}$ of an inch in thickness has been tested, and has been proven capable of sustaining a pressure double that of the atmosphere. A cylinder 46 yards in diameter, with a total length of 218 yards, if made of this steel, will weigh 260,680 pounds: the volume of air contained in it weighs 719,709 pounds, giving an ascensional force of 459,029 pounds if the vacuum were complete." He relies upon an electric motor and a compound exhaust-screw to propel and guide the vessel when afloat.

Mr. George W. Melville, chief of the Bureau of Steam-Engineering, of the Navy Department, has written to Dr. de Bausset as follows: "I have the honor to inform you that I have looked over many of your computations, and find them correct, and also that the principle and theory of your aeroplane are in the main correct; but I have not sufficient time to properly study the details of construction of the vessel, which would be necessary in order to pass judgment upon it."

ELECTRICAL SCIENCE.

Tests of the Tudor Accumulator.

PROFESSOR KOHLRAUSCH has carried out some experiments on the Tudor accumulator which are not uninteresting. The following is part of the data obtained: —

Weight of plates	29.3 lbs.
Surface of four positive plates	1.29 sq. ft.
Volume of acid	6 pts.
Specific gravity, charged	1.147
Normal charge rate	5 ampères
Normal discharge rate	6.5 "
Internal resistance, charged	.015 ohms
" " discharged	.02 "
Capacity per pound	1.6 ampère-hours

The two cells that were tested had been in continuous use from November, 1881, to December, 1887. During the tests they were charged and discharged thirty-four times, and between charge and discharge a period of fifteen hours was allowed to elapse. Six experiments showed a total capacity of 47 ampère-hours, an efficiency of 82.4 per cent for energy, with a drop of 12.6 per cent in electro-motive force. After this several tests of an abnormal character were made. The cells were charged, and then left alone for various periods of time. There was a loss of about 7 ampère-hours at first, but after this there was no further loss in a week. When charged with a current of 8 ampères, and discharged at 10 ampères, the total efficiency was 64.7 per cent. When discharged through a constant resistance, with a current beginning at 50 ampères, they gave 23.5 ampère-hours and 40.5 watt-hours; the current falling from 50 ampères at the start to 40 ampères at the close, and the electro-motive force from 1.8 volts to 1.3 volts. They were then recharged, and discharged with 90 ampères at the commencement and 62 ampères at the end. After this enormous strain, the cells, when recharged, gave their normal discharge just as at first.

Lastly, they were run down for four days, starting at 1 ampère, until the electro-motive force had fallen to 0.2 volts, and the specific gravity of the acid to 1.1. The cells were then recharged, and on discharge gave 46.8 ampère-hours, with a total efficiency of 80 per cent. The tests show a length of life of the cell, and a power of resisting abnormal discharge and discharge rates, that is in advance of any thing yet recorded. The storage capacity is, however, low as compared with more recent cells. As, however, it is in length of life and the allowing of heavy discharge rate that the ordinary battery is mainly deficient, these experiments encourage us to believe that in a few more years storage-batteries will have reached the point where their application to traction in cities will be almost