

been established, and artistic taste has been developed in a way to make the work done of greater value and more attractive, with a corresponding increase in the value of labor. From Nurnberg alone there are now sent out some 23,000 tons of toys, the price lists of which number 16,000 different designs. Since the introduction of steam machinery into the toy industry of this place the annual product has increased twenty-fold. At Sonneberg, in Thuringia, not long ago a small hamlet, but now quite a city, the annual production of toys amounts to some \$10,000,000.

THE NEW WOODRUFF SCIENTIFIC EXPEDITION.

Bacon's ideal college was surrounded by a park, which should contain the "raw materials" of all knowledge. The tendency of education in recent years has been to make Bacon's ideal real. Witness the splendid grounds, museums, libraries, and in many cases elaborate workshops, attached to our representative institutions of learning. But the world cannot be brought within the compass of a park. The raw materials of knowledge are not all transportable. Consequently, he who would study man and nature at their best, in the fullness of life and activity, must pursue the quest of knowledge the world over. Accordingly Mr. Woodruff would outdo Bacon, make the whole world his park of learning, and carry his college around the globe.

That an enterprise so novel and radical in character should meet with many obstacles, is not to be wondered at, nor that it should have taken nearly three years for its managers to reach a point at which they could say "we are ready." It is to be hoped that no lack of candidates will prevent the sailing of the expedition so liberally planned and fitted out. The accompanying engraving shows the steamer General Werder, selected for the voyage, and certified by the United States Navy Department as suitable in all respects for the purposes of the expedition.

The Director wishes it to be distinctly understood that the expedition is neither a money making speculation, nor yet a visionary philanthropic scheme; but an educational enterprise of great magnitude and importance, conducted on sound and legitimate business principles. The managers have no other pecuniary interest in the expedition than to make it self-sustaining. It is expressly provided by Act of Congress that no mercantile or commercial venture shall enter into the plan of the voyage. The financial basis of the enterprise is perfectly sound. Every possible assurance of the fulfillment of their contract is given by the managers, who are bound, by every provision that could be reasonably required, to the exact terms of the agreement between themselves and the patrons and trustees of the expedition.

The collegiate department is to be under the control of President W. S. Clark, LL.D., of Amherst, Mass. The ship will be commanded by Commander A. P. Cooke, United

States Navy; while the financial affairs of the expedition are intrusted to Drexel, Morgan & Co., bankers of this city. The whole plan and purpose of the expedition is educational. It involves a voyage around the world, to be performed in sixteen months, devoted to the education of youth and the recreation of tourists. For the students the expedition will constitute a floating college, in which the usual course of instruction will be complemented by object teaching on a grander scale than has ever before been attempted, while to the tourist it offers many advantages for sight seeing.

The route selected has been decided upon, after mature

deliberation, as one most likely to bring the party to the different ports at the most favorable seasons of the year. In planning the course of the vessel, all that careful foresight can provide for has been taken into account, yet it is scarcely to be expected that every step of the projected route can be followed. It is not possible to participate and provide against chance of detention with such certainty as to foresee the precise time of reaching and leaving a given port. It may become necessary to modify the proposed route in some of its details; but the managers give the strongest and most positive assurance that no expense will be spared and that no effort will be wanting to conduct the voyage in good faith according to the letter and the spirit of the programme announced. As already said, the voyage will take about sixteen months, which length of time is deemed

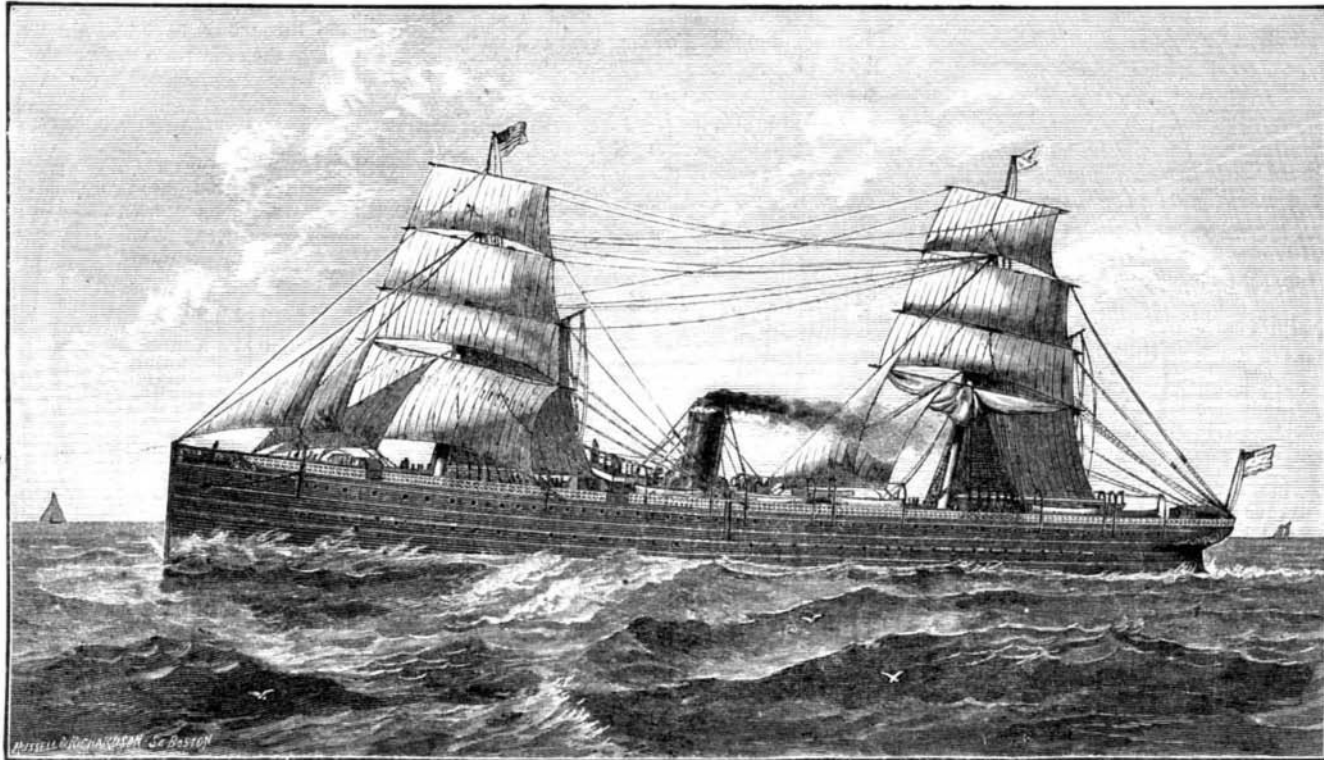
rigged, with compound engines of the latest type, and duplicates of all machinery, screw, etc., liable to accidents. It is provided with spacious accommodations, the best ventilation, a full complement of boats, and every modern appliance for health, safety, and comfort.

Recuperating the Brain.

An intelligent writer on this subject thinks the use of stimulants to fortify the exhausted brain an unwise measure. The best possible thing, he says, for a man to do when he feels too weak to carry anything through is to go to bed and sleep as long as he can. This is the only recuperation of the brain power, the only actual recuperation of brain force; because during sleep the brain is in a state of rest, in a condition to receive appropriate particles of nutriment from the blood, which take the place of those which have

been consumed by previous labor, since the very act of thinking burns up solid particles, as every turn of the wheel or screw of the steamer is the result of consumption by fire of the fuel in the furnace. The supply of consumed brain substance can only be had from nutritive particles in the blood, which were obtained from the food eaten previously, and the brain is so constituted that it can best receive and appropriate to itself those nutritive particles during the state of rest, of quiet and stillness of sleep.

Large Magnet.
MM. Ducretet et Cie. exhibited at the Paris Exhibition



THE STEAMER GENERAL WERDER OF THE NEW WOODRUFF SCIENTIFIC EXPEDITION.

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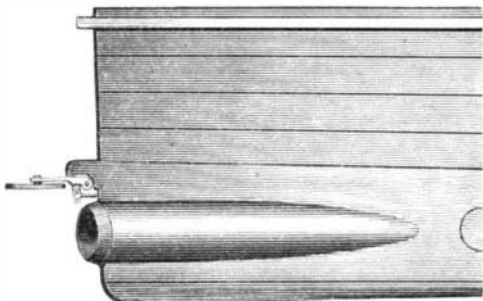
tion a Faraday electro-magnet, alleged to be the most powerful ever made. The coils have a diameter of 50 centimeters (19.7 inches), and a height of 60 centimeters (23.6 inches). The total weight is 950 kilogrammes (2,193.6 pounds). The helixes are made up of numerous parallel and separately insulated wires in order to facilitate different combinations, both in tension and in quantity.

Correspondence.

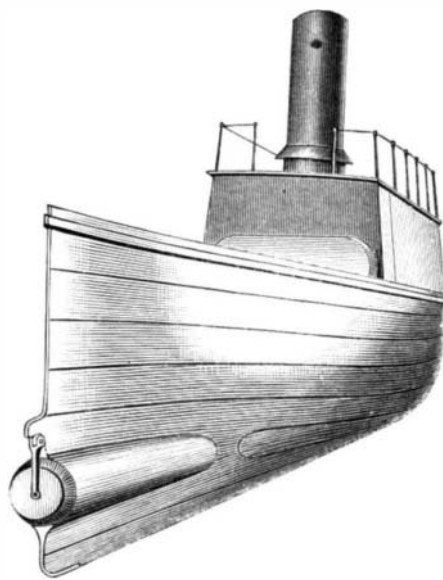
Submarine Attack.

To the Editor of the Scientific American:
The excellent engraving of a submerged spar torpedo, inserted in the last issue of the SCIENTIFIC AMERICAN, will no doubt be examined with great interest by the nautical readers of the journal who have studied the subject of national defense against iron clad ships. The similarity of Admiral Porter's device introduced in the torpedo boat Alarm, and that which Mr. Ten Eyck presented to the Navy Department, as he says, 17 years ago, will call forth discussion regarding priority of invention and the relative merits of their systems.

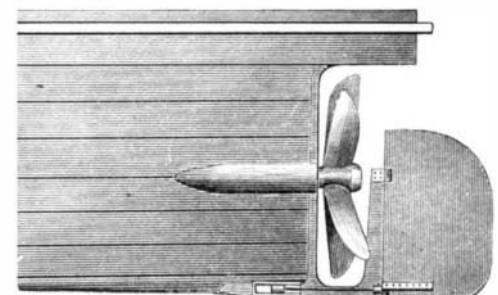
Mr. Ten Eyck, although he declines to exhibit the "manner of working the spar," has shown the detail of the essential parts of his contrivance so clearly that the professional reader can have no difficulty in comprehending the simple



BOW OF THE "DESTROYER."



EXTERIOR OF THE "DESTROYER."



STERN OF THE "DESTROYER."

States Navy; while the financial affairs of the expedition are intrusted to Drexel, Morgan & Co., bankers of this city.

The whole plan and purpose of the expedition is educational. It involves a voyage around the world, to be performed in sixteen months, devoted to the education of youth and the recreation of tourists. For the students the expedition will constitute a floating college, in which the usual course of instruction will be complemented by object teaching on a grander scale than has ever before been attempted, while to the tourist it offers many advantages for sight seeing.

The expedition will visit the principal points of interest

sufficient for the full attainment of the objects of the expedition. It is estimated that about three quarters of the time will be spent in port. Numerous land excursions for study and observation will be made at the expense of the management and under the guidance of the Faculty.

The fee to be paid by students and tourists is fixed at \$2,500. Expenses when away from the ship, washing bills, and other personal matters extra. It is proposed that the expedition shall sail May 8th next, and return in September, 1880. The chosen vessel is certified by the Navy Department to be staunch and commodious in every particular. It is 360 feet long, 40 feet beam, 3,000 tons burden, brig-

and effective character of his manner of working the spar and exploding the torpedo. At the same time the engraving shows with sufficient distinctness that the projecting "snout" which surrounds and protects the spar arrangement is solid, and hence capable of sustaining the concussion with the enemy's ship during attack, unavoidable even at low speed. The snout of Admiral Porter's torpedo boat Alarm, it should be observed, lacks solidity, an important fact pointed out by the SCIENTIFIC AMERICAN of July 19, 1873. The editor, in analyzing the properties of the Alarm, observes: "Although built with a snout, ramming is only a secondary means of attack. In fact, the bow is not a solid piece, but