

of unknown land. For this great enterprise, Commander Peary needs \$200,000. If the expedition were accomplished in one year without the loss of the ship, the cost would be only \$100,000, but a larger guarantee is necessary, because two years' time or more might be consumed and the ship might not be brought back. This great geographical prize therefore can be obtained for much less than the sum expended in defense of a single challenge for the America's cup.

Other speakers of the evening were Capt. T. C. McLean, U. S. N., commander of the cruiser "Cincinnati," who rendered great services to the stricken island of Martinique directly after the eruptions of 1902, and who was in command at Colon at the time of the last revolution at the Isthmus of Panama; Major W. R. Abercrombie, U. S. A., who had charge of the surveys along the Copper and Tanana rivers, Alaska, in the search for an all-American route from the coast to the Yukon; Dr. A. Donaldson Smith, who has carried on important investigations in Abyssinia; Capt. Amos Bonsall; Dr. E. O. Hovey, who studied the eruptions of Mont Pelé and the Soufrière for the American Museum of Natural History; Mr. George C. Mercer, who is one of the very few men who have stood upon the summit of the South Dome in Yosemite Valley; Mr. Gilbert H. Grosvenor, editor of the National Geographic Magazine; Miss Dora Keen, who has traveled extensively in Asia and has been almost the only white person to witness (in Teheran) the religious ceremony of the Mohammedans which corresponds to the Passion Play of Oberammergau; and Mr. Henry G. Bryant, who has recently returned from the wilder portions of Mexico, and who is the president-elect of the Geographical Society of Philadelphia.

GROWTH OF OUR NAVY.

In response to several requests from correspondents that we would publish another general view of the new ships that have been authorized, or are under construction, for our navy, thereby supplementing the double-page engraving published in our last Naval Supplement of December 14, 1901, we present the accompanying double-page inset. The engraving in the special number referred to represented all the ships that were authorized or under construction at the close of the year 1901. The double-page inset in the present number includes every warship contracted for and under construction since that date. In looking through the official records, we were much interested to note that the whole of this very formidable fleet was authorized by Congress in the brief period of eight months, from July, 1902, to March, 1903. It includes five of the largest and most formidable battleships ever designed, vessels only slightly smaller than the British "King Edward" class, and more powerfully armed than they; two smaller battleships of about the size of the Russian "Czarevitch" or the new "Borodino" of the Russian Baltic fleet; two armored cruisers which will be the largest vessels of that type ever built, and two gunboats. This is a most remarkable addition to be made in so short a space of time, and if it were not that the contractors for our warships are so slow in completing their contracts, the vessels being at times from one to three years behind their contract date of completion, it would indicate we were rapidly moving forward to the second position in strength among the great naval powers of the world.

BATTLESHIPS.—The most important vessels of the fleet are five large battleships of the "Connecticut" class, the first two of which, the "Connecticut" and "Louisiana," authorized by Congress July 1, 1902, are sister ships. The other three ships, "Kansas," "Minnesota," and "Vermont," were authorized on March 3 of the following year. They are practically identical with the "Connecticut" and "Louisiana," the chief points of difference being that the thickness of the waterline belt has been somewhat decreased, and that of the upper main belt somewhat increased over that on the earlier ships. The "Louisiana" is being built by a private firm, the Newport News Shipbuilding Company, and the "Connecticut" is being constructed at the New York navy yard, Brooklyn, where a rate of progress has been maintained that has already gone far to prove the truth of the naval constructors' assertion, that work can be done as expeditiously and satisfactorily at the government yards as it can at private establishments.

The detailed description which we now give of the "Connecticut" and "Louisiana," both of which, by the way, will probably be launched toward the close of the present year, will also serve for the three later vessels of this class in all particulars except that the main belt amidships will be 9 inches instead of 11 inches thick, and that the upper main belt will be 7 inches thick instead of 6 inches as in the "Connecticut." The particulars of these five battleships then are as follows: Length, 450 feet; extreme breadth, 76 feet, 10 inches; depth, 24 feet, 6 inches; and the displacement at this draft, when the ship is fully equipped ready for sea, with all her stores on board and a normal coal supply of 900 tons, is 16,000 tons. The ships will be driven at a speed of 18 knots by twin-screw, triple-ex-

pansion engines of 16,500 indicated horse-power, to which steam will be supplied by Babcock & Wilcox water-tube boilers. The protection will consist of a complete belt of Krupp steel armor at the waterline, extending from stem to stern, which will vary in thickness from 11 inches amidships to 4 inches at the ends. Associated with this armored belt is a complete protective deck 2½ inches on the flat and 4 inches on the slopes. Above the main deck, throughout that portion of the ship amidships between the main barbettes, is a wall of 6-inch Krupp armor extending from the main belt to the upper deck, and protecting the central battery. The turrets for the main battery 12-inch guns will be protected with a maximum thickness of 12 inches of Krupp steel, and the barbettes upon which they turn will be protected with 10 inches of Krupp steel. The 8-inch turrets will have 6 inches of armor in the case of the "Connecticut" and "Louisiana," and 6½ inches of armor in the "Minnesota," "Kansas," and "Vermont."

The armament of these ships will be the most powerful of any vessels at present designed. It will consist of four 12-inch rifles, calculated for a muzzle energy of over 46,000 foot-tons, eight 8-inch guns with a designed muzzle energy of 13,600 foot-tons, and a battery of twelve 7-inch guns with a designed muzzle energy of 9,646 foot-tons. There will also be twenty of the invaluable 3-inch rapid-fire guns, which have a designed velocity of 3,000 feet a second, and an energy of 874 foot-tons. Four of the latter are mounted on the gun deck, firing through casemates, two of them forward and two aft; six are mounted on the upper deck in broadside between the 8-inch gun turrets; and ten are mounted in the open upon the superstructure deck, three on each broadside, and one at each corner of this deck. There will be also twelve 3-pounder semi-automatic guns and eight 1-pounder automatic guns, and eight machine guns scattered throughout the bridges and fighting tops. They will carry also two 3-inch field guns. Although no provision was made for submarine torpedo tubes in the original design of these vessels, the plans have been changed since the construction commenced, and the ships will be fitted with two forward submerged torpedo tubes. On such large dimensions the vessels will be able to give ample accommodation for the complement of 42 officers and 761 men.

Speaking of the ships as a whole, we think that they represent about the best combination of speed, armor, and armament to be found in any of the latest battleship designs of the various navies; although there can be no question that the increase of the armor protection above the main belt from 6 to 7 inches in the three later ships, at the expense of a reduction of the main belt amidships, is a decided improvement of the defensive qualities of these ships.

At the same time that the three later ships of the "Louisiana" class were authorized, Congress made provision for the construction of two battleships of 13,000 tons displacement, which were to have the maximum speed and offensive and defensive qualities practicable on these dimensions. Working under this restriction as to size, our naval constructors have turned out two admirable ships, the "Mississippi" and "Idaho," which may be termed smaller editions of the "Connecticut." The dimensions are as follows: Length, 375 feet; beam, 77 feet; mean draft, on a displacement of 13,000 tons, 24 feet, 8 inches. The ships will be driven at 17 knots by twin-screw, triple-expansion engines of 10,000 horse-power, steam being supplied by Babcock & Wilcox boilers. The main battery will consist of four 12-inch guns carried in turrets protected by 12 inches of Krupp steel, and barbettes of 10 inches of steel. The intermediate battery will consist of eight 8-inch guns mounted in four turrets protected by 6½ inches of steel, the barbettes being protected by 6 inches. There will be a central battery on the main deck of eight 7-inch rapid-fire guns, protected by 7 inches of Krupp armor, and there will also be twenty 3-inch rapid-fire guns, twelve 3-pounder, semi-automatic guns, eight 1-pounder automatics, and two 3-inch field guns. They will also carry two submerged torpedo tubes. The waterline belt will be 9 inches amidships, tapering to 4 inches at the ends. The conning tower will have 9 inches of armor, and the conning-tower tube 6 inches, while the ammunition tubes will be protected by 3 inches of armor. The vessels will have a full coal capacity of 750 tons, and at 10 knots cruising speed they will have a radius of 5,750 nautical miles.

ARMORED CRUISERS.—The two armored cruisers "Tennessee" and "Washington" are, like the battleships above mentioned, among the very latest and most powerful of their class in any navy. Moreover, they are extremely handsome vessels, with a clean-cut outboard profile, and an excellence of proportioning and placing of masts and smokestacks, that renders them comparable in appearance to the modern Atlantic passenger steamship. These cruisers are nearly a thousand tons larger in displacement than the six armored cruisers of the "California" class, and although the length, 502 feet, is the same, they have

about 3½ feet more beam, or 72 feet, 10 inches, and about a foot more draft, the draft on a mean displacement of 14,500 tons being 25 feet. They will be driven by twin-screw triple-expansion engines, with an indicated horse-power of 23,000, at an estimated speed of 22 knots an hour. The normal coal supply will be 900 tons and they will have a bunker capacity of 2,000 tons. They will be protected by a continuous waterline belt, which will be 5 inches in thickness amidships and 3 inches at the ends. This is an inch less than is carried by the "California" class; but what is lost at the waterline is gained in the protection of the main battery, which consists of 9 inches on the turrets, as against 6½ inches in the "California," and 7 inches on the barbettes, as against 6 inches in the earlier ship. Associated with the belt will be a protective deck, 1½ inches in thickness on the flat, and 4 inches on the slopes, with the armored citadel amidships, and 3 inches on the slopes toward the ends outside the citadel. The sides of the vessel from the main belt to the upper deck, and extending for the length of the ship between the main barbettes, will be protected by 5 inches of Krupp steel. The armament of these vessels is particularly powerful, consisting of four 10-inch breech-loading rifles in two turrets forward and aft, and sixteen 6-inch guns mounted in broadside. Twelve of these are on the main deck, and four on the upper deck. There is also a battery of twenty-two 3-inch rapid-fire guns, of which six are mounted on the gun deck within the central battery, six on the gun deck in sponsons outside of the battery, two forward and four aft, and ten on the upper deck in broadside between the 6-inch gun casemates. Twelve 3-pounder rapid-fire guns, four 1-pounders, two machine guns, and six Colt automatic guns are distributed throughout the superstructure, the bridges, and the fighting tops. There are also two 3-inch field guns to be used for landing purposes. This, it will be observed, is for a cruiser a tremendous battery, its most distinguishing feature being the four 10-inch breech-loading guns, which will be capable of piercing the heaviest armor of battleships at the nearer fighting range. There are altogether no less than sixty-eight guns. It must be confessed that the armament of these ships appears to be relatively heavier than their defensive qualities, and we wish that the side armor of the central redoubt had been 6 inches instead of 5 inches in thickness. The vessels will be provided with two broadside submerged torpedo tubes forward and probably another pair aft. Splinter bulkheads of nickel-steel, from 1½ to 2 inches in thickness, will be worked in between the 6-inch guns of the central battery, and the 3-inch battery on the main gun deck will be given also 3 inches of nickel-steel protection. The 6-inch guns in the broadside battery will be mounted in recessed ports, which will allow the guns to be swung around until their muzzles are flush with the side of the ship, thus obviating the inconvenience which arises from the great length of modern broadside guns. Altogether, we must confess to the conviction that these are about the most effective large armored cruisers to be found afloat or under construction to-day, the only vessels which compare with them, being the latest armored cruisers of the British navy, which carry a much lighter armament, and have no better system of protection.

GUNBOATS.—The two gunboats "Dubuque" and "Paucah" are vessels of the unarmored composite class, to which such vessels as the "Marietta" and "Vicksburg," the latter now at Chemulpo, Korea, belong. Both vessels are being built at Morris Heights, N. Y. They are constructed with steel framing and wood planking, and have an over-all length of 174 feet, an extreme breadth of 35 feet, and 1,085 tons displacement on a mean draft of 12 feet, 3 inches. They will be driven by twin-screw, triple-expansion engines, and steam will be furnished by Babcock & Wilcox boilers. On an indicated horse-power of 1,000 they are to have a speed of 12 knots per hour. They will carry an armament of six 4-inch rapid-fire guns, four 6-pounders, two 1-pounders, and two Colts. They are schooner-rigged and have a stump bowsprit, and a modified clipper bow, a combination which, it must be admitted, does not add anything to the beauty of the vessels. However, as the bow is full and lofty, no doubt they will prove to be excellent sea boats, well suited to their particular duties.

In a recent address before the Michigan Municipal League, Dr. Victor C. Vaughn estimated the annual loss in this country due to typhoid fever at \$50,000,000. He said the total number of cases of this disease in the course of the year was about 500,000, of which 50,000 terminated fatally. Placing a valuation of one thousand dollars on each life, he arrived at the total given above. The doctor said that this terrible death list should have no existence; for by the exercise of proper care and precautions, all of these lives might be saved.

The construction of a harbor to the north of the city of Kiel is being planned.