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NEW YORK, SATURDAY, MARCH 31, 1900.

## THE ISTHMIAN CANAL SURVEY.

We recently had occasion to protest against the Hepburn bill for the immediate construction of the Nicaragua Canal on the ground that it was stupid and unfair to the President and to the Commission to bring in such a measure before the President's Isthmian Canal Commission, which has been appointed for the purpose of determining which was the best possible route across the Isthmus, had had time to complete its labors and present its report. On more than one occasion we have drawn attention to the fact that the obviously proper thing to do before undertaking any active construction, is to make certain that the location selected is, all things considered, the best that can be chosen. In the first place, it is by no means clear that Nicaragua offers a better route than Panama; indeed the balance of evidence thus far adduced would seem to prove the contrary. Moreover, it is quite possible, as we have frequently pointed out, that careful investigation would show that there is a third alternative route superior to either Panama or Nicaragua.

General P. C. Hains and W. A. Noble, members of the Isthmian Canal Commission, have recently returned to this country, and in the course of a press interview, have made certain unofficial statements which would seem fully to justify even to particulars, the attitude taken by the SCIENTIFIC AMERICAN with reference to the Hepburn bill. The investigations of the commission, we are told, have shown that the underlying strata of the site of the big Ochoa Dam, on the Nicaragua Canal, are not so satisfactory as was at first reported, and though it is still considered practicable to build a reliable dam at that place, it is evident that the cost would be greater than estimated by previous commissions. While the route of the Walker Commission is pronounced feasible, the expectation that serious difficulties would be encountered in the construction of a satisfactory harbor at Greytown is confirmed. Mr. Noble stating that a big jetty would have to be constructed through the shifting sands, and that continual dredging would be necessary to keep the channel clear. Mr. Noble seems to have fully endorsed the statements made by the Panama Canal delegation in the preliminary hearing last year at Washington. The general tenor of Mr. Noble's remarks is to the effect that the American Commission found that this canal company was doing, and apparently is capable of accomplishing everything that it has promised. Particularly significant is the fact that our commission found that the Panama Company had a feasible scheme for controlling the Chagres River, a feat which all the world has considered impossible of execution.

The most significant statement of all, however, is that which refers to the possibility of finding a third alternative route across the Isthmus. Mr. Noble is reported as saying that what is known as the Atrato location presents a "good route, perhaps the best route, feasible and short" and in his opinion, "less expensive to build."

Although the remarks of the returned members of the Commission were entirely unofficial, and were accompanied with the statement that no report of any kind had yet been made, they furnish much food for thought; and we respectfully commend them to the consideration of those members of Congress, who would rush the country into the immediate construction of a particular canal before they know whether it is the cheapest and best that could be built.

## THE DESIGNS OF LAST YEAR'S BATTLESHIPS AND CRUISERS.

The hoped for removal of the deadlock occasioned by the refusal of the last Congress to authorize the armor for the new battleships and cruisers authorized at the last session, has encouraged the Construction Department to proceed with the details of the designs. It is stated by a member of the Construction Board that the battleships will be about 13,500 displacement and 18 knots speed. The main battery will consist of four 12-inch guns in two turrets, one forward and one aft,

and four 8-inch guns in two turrets located upon either beam and sufficiently to the rear of the forward 12-inch turrets to escape interference. There will also be fourteen 6-inch rapid-firers carried in broadside. This is an extremely formidable battery, far more powerful than is carried by any existing ship in the world today. The decision with regard to the location of the 8-inch gun is not absolutely final, however, for should the forthcoming gunnery trials of the "Kearsarge" prove to be satisfactory, it is possible that the 8-inch guns will be placed above the 12-inch on the double-turret system.

The armored cruisers are to be magnificent vessels of 14,500 tons displacement and 22 knots speed, the battery consisting of four 8-inch guns in two turrets and an unusually large number of 6-inch rapid-firers carried in broadside.

## BREAKING GROUND FOR THE RAPID TRANSIT TUNNEL.

Among the red letter days in the history of New York City, Saturday, March 24, 1900, must ever hold an honorable position as having witnessed the ceremonies inaugurating the actual construction of the great underground Rapid Transit Railroad.

Never has any great city, ancient or modern, undertaken a work of improvement which in its present scope and future possibilities could compare with the vast underground transportation system which is thus begun. Great, in the aggregate, as are the various tunnel roads of London, they have been built as separate and unrelated units, and they have taken many decades to reach their present importance; whereas, the system now commenced in this city has been designed as a single system to meet the carefully considered needs of the city. Having exhausted the possibilities of above-ground transportation, New York, which, by reasons of its peculiar topographical situation, has the most complex and difficult transportation problem to deal with of any in the world, has been driven to the underground system as presenting the only practical and adequate relief from its difficulties.

The spot chosen for turning the first spadeful of earth was immediately in front of the steps of the historic City Hall and above the terminal loop which will encircle the City Hall Park and form the present southern terminus of the road. The ceremony of turning the first spadeful of earth was performed by the Mayor. Addresses were delivered by the Mayor and by A. E. Orr, President of the Rapid Transit Commission, a gentleman to whose indefatigable efforts the present successful issue of the labors of the Commission is largely due. The spot will be indicated to future generations by a plain, bronze tablet, set in position not far from the spot where in July, 1776, the Declaration of Independence was read to the American troops in the presence of General Washington. The tablet will contain the names of the Mayor, the Rapid Transit Commissioners, the Chief Engineer, William Barclay Parsons, the contractor, John B. McDonald, and August P. Belmont, the President of the Rapid Transit Subway Construction Company.

The inaugural ceremonies have a special interest for the SCIENTIFIC AMERICAN, in view of the fact that this month exactly thirty years ago saw the opening of an underground tunnel beneath Broadway, which in some respects anticipated the great work which is now to be undertaken. It is well known to our readers that the late Alfred Ely Beach was early impressed with the advantages of underground transit, and had such faith in the possibilities of the system that he organized a company and built a preliminary length of tunnel which by a curious coincidence lies within a stone's throw of the scene of the present ceremonies.

## GERMANY'S NAVAL PROGRAMME—A LESSON FOR THE UNITED STATES.

Whatever may be said of the policy of the present Emperor of Germany in general, it must be universally admitted, that as it effects the interests of the navy and merchant marine, it is farsighted and successful. Of the many momentous problems which the young Kaiser found confronting him on his accession to the throne, there is none to which he has addressed himself with greater zeal than to that of raising Germany to a high position in the strength of its merchant marine and in the numbers and efficiency of its navy. At his accession he found a navy which was only less obsolete than was our own in the year 1883, when we commenced the construction of modern steel vessels and for the first few years of his reign new ships were added to the German fleets in the haphazard methods which were characteristic of the naval growth in that era, and, unhappily, still characterize the provisions for increasing our own navy to-day.

In the year 1898, chiefly through the exertions of the Emperor, Germany inaugurated a system of warship construction which bids fair to become general among the navies of the world. Realizing the great length of time which must intervene between the voting of funds for construction and the actual completion of a warship, and probably being desirous of placing the question of the provision of necessary new ships beyond the accidents of party politics, the Government passed,

in the year 1898, what was known as the naval septennate programme. This bill provided for the construction of what was practically a new navy, the cost of which was to be spread over a period of seven years, although a final modification limited the period to six years. In addition to new torpedo boats and gunboats, the bill provided for the raising of the strength of the navy by the year 1904, to that of seventeen battleships, eight coast defense vessels, nine large cruisers, and twenty-six small cruisers. The new construction involved called for seven new battle ships, two large, and seven small cruisers, besides new gunboats and torpedo boats to take the place of obsolete vessels of these classes that will be removed from time to time from the active list. The total expenditure thus authorized was \$103,000,000, and the whole of the ships are to be in commission by the close of 1904.

The system providing for new ships in the United States is the antiquated one of authorizing the construction of so many vessels and sometimes none at all, at each annual meeting of Congress. The growth of the navy, a matter of the highest national importance, is, therefore, dependent upon the particular mood in which each Congress may happen to find itself. The perilous uncertainty of the system is shown in the fact that at this moment we are in danger of losing our position as the third naval power in the world to Germany, whose septennate programme gives her at the present moment a long lead over this country. An interesting comparison of the relative strength in 1904, of our navy and that of Germany, has appeared from the pen of Commander J. D. Jerrold Kelley in a recent issue of The New York Herald, in which it is shown that the German and United States fleets will be approximately equal when Germany's septennate scheme is completed in the year 1904. The comparison would be more gratifying were it not for a couple of important "ifs" with which it is prefaced, for it is assumed that Congress will agree to the new construction recommended by the House Committee and commented upon in our issue of last week, and that these ships and the battleships and cruisers of the "New Jersey" and the "California" classes, authorized last year, will be completed by 1904.

As a matter of fact, however, the ships of the latter class are at present held up for want of the necessary armor, and the ships of this year's programme may yet fall a victim, like those of last year, to the political exigencies of Congress. Unless the present Congress take favorable action, the year 1904 will find the German navy preponderating over our own to the extent of six first-class battleships and three large cruisers, representing together an advantage of no less than 110,000 tons in armored ships. A comparison of the number of vessels shows that Germany would possess nineteen first-class battleships against our twelve, and twelve large cruisers against our nine. And it must be remembered that warship construction is so long-drawn-out, that no amount of subsequent energy could compensate for the loss of twelve months' time thus incurred. It is to be hoped that in view of these facts Congress will not fail to authorize the new construction recommended for this year, and the necessary armor for the ships of this and last year's programmes.

So much for the year 1904. What of the years that follow it? Germany is so well satisfied with the septennate scheme that the Emperor has had the farsightedness and courage to have prepared another and much more ambitious programme, which will provide for the growth of the German navy up to the year 1920. The number of battleships contemplated for 1904 is to be doubled by the addition of nineteen new ships, giving a total of thirty-eight, while the navy is to include at that date twenty large cruisers and forty-five protected cruisers, the new ships thus provided for having a total displacement of 400,000 tons. Not only is the continuity of the construction work ensured for two decades, but adequate provision is made for the construction of the necessary docks and harbors. The total cost of this construction will be \$465,250,000 which is to be raised by a scheme of loans and revenue taxes.

The question naturally arises if we are in danger of falling so far behind Germany by the year 1900, where shall we stand at the close of the year 1920? To leave such an important matter as the authorization of the new warships to the caprice of the naval committees of each current year, while our competitors, with commendable farsightedness, are establishing programmes that reach two full decades into the future, is to expose ourselves to the danger of being hopelessly outmatched at some future critical period in our foreign relations.

## THE STEERING OF MODERN, SCREW-PROPELLED SHIPS.

The statistics of steamship disasters for the year 1898 showed that 42 per cent were caused by strandings alone. Startling as the fact may be to landmen, shipowners and marine underwriters are well aware of the large ratio of losses due to vessels running ashore, as compared with losses due to collisions, foundering, and other accidents of the sea. After we have eliminated the strandings, known to have been due to fogs