Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

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NEW YORK, SATURDAY, JANUARY 31, 1891.

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(Illustrated articles are marked with an asterisk.)

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No. 787.

For the Week Ending January 31, 1891.

Price 10 cents. For sale by all newsdealers

THE NEW YORK WATER SUPPLY—A GREAT DAM DECIDED UPON.

Ever since the water supply of New York City actually commenced to flow through the splendid new aqueduct completed last July, the public interest in the projected great dam, which formed a part of the whole water supply enterprise, has manifested itself in many ways. At the time the aqueduct was decided upon, the plans and specifications were submitted for the immense complementary work since known as the Quaker Bridge dam,* which was to be about four miles below the present Croton dam, and give a total storage capacity of 34,000,000,000 gallons. The great dam, however, has not been commenced, and the water supply coming through the new aqueduct is still obtained from the old Croton reservoir, to which has been added, as sources of supply, some supplementary minor reservoirs which the topographical features of the Croton basin favored being made available at small cost.

The projected Quaker Bridge dam had many opponents, on account of its great cost, and the fear that a dam so high, holding such a vast body of water, might not be entirely safe. Its estimated cost was $4,087,000, and it was to be 180 feet in height above the river bed, below which the foundations would go down 91 feet. On account principally of these considerations the New York Aqueduct commissioners, in whom the necessary authority is vested, have decided upon the construction of a dam designed to be somewhat less expensive and at a location presenting fewer engineering difficulties, at Cornell.

The new dam, for which Chief Engineer Fteley has been instructed to prepare plans without delay, will rise 159 feet above the bed of the Croton River, the foundations going down 70 feet. Its length between flow lines will be 1,736 feet, and its cost is estimated at $3,650,000. Another dam, styled the Fteley, or Croton No. 2, had been projected, to be located about a mile below the present Croton dam, but this plan, although it would have been much less expensive, was laid aside, because it would have added but slightly to the present reservoir storage capacity. The estimated cost of the Fteley dam was put at $2,450,000 if built of masonry, and $1,750,000 if of earth, while its total capacity would have been 16,000,000,000 gallons.

The site selected for the Cornell dam is about one and a quarter miles above that which had been adopted for the Quaker Bridge dam, and two and three-quarters miles below the present Croton dam, and will give an additional drainage area of twenty-one square miles, and a storage capacity of 30,000,000,000 gallons. The engineer estimates that it will require five years to build the new dam.

MR. CRAMP THE SHIPBUILDER, REPLIES TO HIS CRITICS.

The charge is often made that the ships of our new navy, though making fast time under the special and the abnormally favorable conditions of their trial trips, are unable to approach contract speed with such conditions as obtain in ordinary Atlantic weather. The work these ships have done lends color, if it does not actually sustain, the charge. Whether or no these ships, if pressed, can really repeat their initial performances is an interesting one, and, with a view of getting at the facts, the SCIENTIFIC AMERICAN recently sent to Mr. Charles H. Cramp, who is one of the best known and most skillful of American iron shipbuilders, for his opinion on the subject.

Mr. Cramp said:

"The statement has been made that the cruisers recently built for the United States government, while making good time on their trial trips, have been deficient in speed ever since. This statement, so far as the cruisers constructed by us are concerned, is absolutely false, as will be readily seen by referring to the recorded figures showing the speed our vessels made on the measured mile in their trial trips and in their later runs.

"The cases of the Yorktown and the Vesuvius will afford an illustration of the truth of my assertion. The Vesuvius, when submitted to the trial test by the government officials, registered a speed of 20·5 knots; and this after having had her displacement increased from nine hundred to one thousand tons. With her former displacement we made her register a speed of 21·65 knots. It is a well known fact that in most cases abroad, instead of an increase in the normal speed over the trial speed, there is a marked decrease.

"This falling off from the speed attained on the trial trip usually amounts to from 20 per cent to 25 per cent. This is a rule to which there are few exceptions; and yet, in spite of all this, our critics, many of whom are actuated by feelings of personal spite, will try to have it believed that the ships turned out of our yards are found wanting in speed after a short term of service. Look at the foreign-built vessels of the Vesuvius class, known as the Sharpshooter class. These vessels have been trying to reach a speed of 21 knots, forced draught, for nearly two years, without success. As yet they have not succeeded in making over 17 or 18 knots, natural draught. This falling off in speed of the foreign-built vessel is not due to any inefficiency of the officers, but to the fact that the engines of these vessels have not the quality of endurance, a defect which may be ascribed to the absence of good workmanship.

"The cruiser Yorktown, built by us for the United States, is absolutely without a parallel so far as continued excellence of speed is concerned. The officers in charge of this vessel can make her register the speed she reached on her trial trip whenever they desire to do so.

"Compare this with the performance of the corresponding type of foreign-built vessels, known as the Archer class. These vessels are, without a single exception, 25 per cent slower in normal speed than the Yorktown. The Baltimore is the fastest cruiser in the world of her class, and the excellence of the performance of her engines is still maintained even up to their maximum efficiency. And it is the unanimous opinion of naval experts that the Philadelphia will maintain, if not exceed, the speed attained on her trial trip. The Newark, for the weight of her engines, is the best performing vessel of all the large vessels built by us for the government; the speed attained by her on her preliminary trips being greater than any yet attained abroad with a similar weight of engines and displacement. It is the opinion of experienced naval men that she, too, will continue to maintain the speed developed on her trial trips. An important element going to make up the superiority of American over foreign built ships is the excellence of the engines. The engines in the cruisers recently turned over by us to the government are more expensively constructed and fitted out than any engines ever built for a naval vessel abroad. This is true particularly of the boilers. Of the vessels built by us for the United States, there has not been a single instance of defective boiler. On the other hand, the reverse has been the case at all the official trials of foreign-built ships during the last eighteen months.

"In like manner, I could cite each one of our ships as an example, and comparing their normal speeds and sea-going qualities with those of foreign-built vessels of the same respective classes, we would find to be true of all what I have said of a few.

"These astute critics also harp on the statement that the first-class passenger ships built abroad can maintain, and do maintain, a rate of speed almost equal to that developed on the trial trips. They cite figures which they allege go to prove this statement, and then, for a climax, they ask what vessel the United States now possesses that could compete with these foreign-built passenger ships as commerce destroyers in the event of a war.

"Well, there never was a more misleading statement than that. It is one of those statements that are so hard to handle, because they take for granted something which does not exist. How absurd it is to compare an elephant with a greyhound, or a naval cruiser with a passenger ship! So in this instance they are comparing things which are essentially different in their nature. And, moreover, these foreign-built passenger ships have no trial record from which to fall short of, and no 'contract standard' from which to deteriorate. They are accepted without any such tests as is customary in this country; and there is no standard of performance on which depends the acceptance or rejection of the vessel.

"It is true, perhaps, that the government possessing the swift-sailing passenger vessels, like the City of Paris and the City of New York, would have an enormous advantage over us by employing these vessels as commerce destroyers. But this advantage would not be so great as might at first be supposed. For the United States having comparatively very little commerce to be destroyed, there would be correspondingly little work for commerce destroyers of the foreign powers; whereas with a good fleet of cruisers, such as the Yorktown, Baltimore and Philadelphia, the war would be largely one of defense by the foreign power, and offense by the United States. In short, I may say that the American navy is lacking, not in the quality of its vessels, but in the quantity.

"It has been also said that our ships have an insufficient coal capacity. That is another one of those slippery statements. I never saw a war vessel that could carry coal enough. This is, perhaps, a radical statement, but nevertheless a true one. And it is here that the armed merchant vessel will have such a great advantage over the war vessel, in its greater coal-carrying capacity, and hence its swift-sailing and enduring capacity. I say no war vessel has a sufficient coal-carrying capacity, because a war vessel is, above all things, 'a bundle of compromises.' The qualities which are called for in a first-class war vessel are so diverse, and of a nature so antagonistic, that each of these qualities must be modified by all the others. For instance, in a war vessel we need great speed, heavy engines, heavy guns and enduring power, that is ability to maintain the maximum rate of speed. But to secure great speed, the models must be fine and en-

*For illustration of proposed Quaker Bridge dam, building of new aqueduct, and map and profile of route, see SCIENTIFIC AMERICAN SUPPLEMENT, No. 558.