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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are sharp, the articles short, and the facts authentic, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

## LACK OF PROGRESS ON THE MANHATTAN BRIDGE.

The people of the city of New York, and particularly those who live in the Borough of Brooklyn, are again growing anxious on account of the apparent further delay in the construction of the Manhattan Bridge. It is now nearly three months since the contract was let for the construction of the steelwork, yet, as far as any outward evidence goes, there is no sign of the erection of this part of the work. The piers upon which the towers are to be erected are to-day as barren of any ironwork as they were four years ago when they were first completed; and instead of the public being greeted with the sight of the steel towers growing steadily day by day on the base which has so long awaited them, all that they have been greeted with is a series of disquieting rumors in the daily press, to the effect that the contractors to whom the steel work was awarded have had difficulty in making arrangements with any big steel concern for the supply of material. Of this phase of the question, we know nothing, and it does not, indeed, properly concern this journal. But we do feel called upon to ask on behalf of the traveling public whether something cannot be done by the Mayor, or his deputy, to break up the deadlock, and get this greatly-needed public work once more moving toward its long-delayed completion.

The construction of the bridge was originally authorized as far back as December 30, 1899. The piers were commenced and completed within reasonable time during the administration of Mayor Van Wyck. When the new administration under Mayor Low took hold of the matter, it was considered that the plans for a cable suspension bridge were inadequate, and a suspension bridge of the eye-bar type was substituted. Then, the Board of Aldermen refused to make the necessary appropriations for construction, and the matter was entirely tied up during the administration of Mayor Low. Upon the accession of the present administration under Mayor McClellan, the former engineers who had charge of the work under Mayor Van Wyck were reappointed. They promptly threw out the eye-bar design and consumed two years' time in preparing plans for a bridge with wire cables. On this design bids were received in August, 1906. Immediately there followed a taxpayers' action, on the ground that the specifications were not legally drawn. The proposals were all rejected by the city, new specifications drawn, and proposals again asked for in April of the present year. But two taxpayers enjoined the opening and awarding of the contract, and this caused a further delay. When the court finally ordered the award of the contract, there was a further objection, this time made by the Bridge Department; for after an exhaustive investigation as to the ability of the various bidders, they advised in their report to the Board of Estimate and Apportionment that the contract should not be let to the lowest bidder, but to the lowest bidder but one, the Bridge Commissioner objecting to the irregularity shown by the lowest bidder in estimating the cost of items in the contract, and to serious informalities in the matter of the sureties on the proposal bond. The Board of Estimate, however, awarded the bid to the lowest bidder on the 14th of June last.

A serious feature in the present delay is the fact that the Brooklyn anchorage has been completed for several months to the point where the steelwork included in the contract is necessary, before the work can be carried up any higher. The steel not being forthcoming, the work on this anchorage has been stopped, with a possible liability on the part of the city to the contractor on account of the delay. Moreover, in the contract for the anchorages there is a clause which provides for the payment of a premium of \$500 per day, if the anchorage is completed in advance of the contract time; and as the excellent prog-

ress made on the Brooklyn anchorage would have justified the contractors for that work in anticipating a handsome premium under this agreement, it would look as though the city might now be exposed to a further unnecessary drain upon its treasury on account of these exasperating delays.

## WORLD'S RECORD FOR UNITED STATES ARMY GUN.

The series of tests which have been carried on during the past year at Sandy Hook of the Brown wire gun, which was manufactured for the United States army, have just been brought to a successful close; and the ballistic results obtained so greatly exceed anything that is officially on record in our own or any other army, that the incident calls for something more than passing notice. We have recorded during the course of the trials the unusually high velocities which were being obtained, velocities considerably in excess of those achieved with our own service guns. In the last ten rounds of the test, however, the charge of powder was increased from 73 pounds to as high as 84 pounds, with resulting powder pressures of from 48,672 pounds to the square inch to a maximum of 64,483 pounds per square inch. The velocities achieved rose steadily from 3,470 feet per second to a maximum of 3,740 feet per second, the muzzle energy corresponding to the last-named velocity being 10,295 foot-tons.

To appreciate the gain in power of this 50-caliber gun due to its great strength, which enables it to withstand the high powder pressures necessary to secure such high velocity, we have only to compare it with some other 50-caliber gun, such, for instance as the present service naval 6-inch gun, as mounted on our latest battleships and cruisers. This piece fires a 100-pound shell with a velocity of 2,900 feet per second and a resulting energy of 5,838 foot-tons at the muzzle. The weight of the wire-wound gun and of its shell are about the same as the service naval piece, and yet the energy is nearly 100 per cent greater. Although the powder pressures were so exceedingly high, the amount of erosion was not excessive, and the gun at the end of its severe test is said to be in good condition. There was some erosion near the powder chamber, but it was not sufficiently serious to appreciably affect the flight of the projectiles, none of them having been observed to "tumble." At such an enormous velocity as 3,740 feet per second, the trajectory is, of course, exceedingly flat, and evidence of this was shown in following the flight of the projectile, which, with 1½ degrees elevation only, did not strike the water until it was about 5,000 yards distant, and after the first ricochet the shell had traveled out of sight before it again struck the water, the officers in charge of the test not being able to observe the splash of the second ricochet, even when looking with glasses from the raised walk at the firing ground. The result is a great triumph for the wire-wound system of construction coupled with the peculiar inner tube of laminated plates, which constitutes the special feature of the Brown gun. The advantage of a system of ordnance capable of producing these high velocities, is that it enables the weight of the gun to be greatly reduced without the loss of penetrating power at given ranges.

## THE NEXT CHALLENGER FOR "AMERICA'S" CUP.

The impression is gaining ground among yachtsmen that the next challenge for the "America's" cup will come from Germany, and should it be so, it cannot be denied that the interest in these contests will receive a decided stimulus and a greatly-needed flavor of novelty. The many contests which have been sailed during the past two decades by challenging yachts that flew the colors of one or other of the British clubs have served to demonstrate, particularly in the case of the last three or four races, that under the rules which at present govern these contests, it is a practical impossibility to design and build in Great Britain a yacht of sufficiently exaggerated form and sail area to compete against the best American production with any reasonable chance of success. So firmly is this idea settled in the minds of British yachtsmen, that it may be taken for granted that, if any challenge is sent under the present rule of measurement, the motive therefor must be found somewhere else than in any reasonable expectation of lifting the cup.

However, the Germans have made wonderful strides in the art of naval architecture as applied to vessels of the navy and the merchant marine; and we may feel certain that if they should challenge and send a yacht over, she would render a very creditable account of herself, and would be sufficiently formidable to render a series of races of the greatest interest. It is realized, of course, that German naval architects would labor under the great disadvantage of never having built a yacht of the type that would be required, and therefore, would not have at command that mass of constructional data derived from a long line of previous racing craft, which renders the position of such an able yacht designer as Mr. Herreshoff apparently unassailable. It is true that the Germans have done some good work in the design of smaller craft, and in

the forthcoming races for the Roosevelt cup they have sent over some very able and exceedingly well-built 21-foot yachts as competitors. It is a far cry, however, from these "little fellows" to a modern racing 90-foot "single-sticker." Therefore, if the Germans should challenge, they would have to strike out into a practically new field, and they would be thrown upon their theoretical knowledge in the matters of design, selection of materials, and construction.

The case would be entirely changed, however, or very greatly modified, if the New York Yacht Club should do what the majority of yachtsmen, both here and abroad, very much hope that they will do, namely, permit the future contests for the "America's" cup to be sailed under their new rule of measurement—the rule under which the recent very successful race for the King's cup was sailed during the New York Yacht Club cruise. The advantages of such a step are twofold—first, that the yachts built under this rule would be at once less costly and more reasonable in construction and proportions, and second, that after the contest they would be serviceable for many years to come for racing and cruising purposes. Furthermore, if the new rule were adopted for the "America's" cup contests, it would unquestionably neutralize, to a large extent, the advantages of locality and weather conditions which constitute, under the present rule, with its encouragement of exaggerated and delicate racing machines, a decided advantage to the holder of the cup.

A challenging nation would no longer be under the necessity of building a racing machine with such a small margin of safety as to necessitate its being towed across the Atlantic if it is to be got over to this side at all, and because of the smaller cost and the better boat that was produced, there would undoubtedly be a larger number of yachts built both for the challenge and for the defense.

## THE GREATEST GEM MINE IN THE WORLD.

The sapphire workings at Yogo Gulch, Montana, are being gradually developed into a great and permanent mining industry, says Mr. George F. Kunz in a forthcoming report on precious stones, published by the United States Geological Survey. Taken as a whole, the Yogo dike is perhaps the greatest gem mine in the world. It is about four miles long on the surface, and being a true igneous dike, descends to an indefinite depth. It is estimated that the entire content of workable sapphire-bearing rock would approximate 10,000,000 cubic yards. A mining plant is now being erected here which will quadruple the previous output and make Montana sapphire mining a very important factor in American gem production.

The stones obtained are not of large size. They range from "culls," used for watch jewels and other mechanical purposes, to gems averaging, when cut, from half a carat to 2 or 3 carats and rarely up to 5 or 6. As gems they are brilliant, free from flaws and of good color, ranging from light shades to the rich, deep blue of oriental sapphires. The Yogo crystals have an advantage for mechanical uses over East Indian stones in their form, which is largely short prismatic or rhombohedral with flat basal terminations, and hence they need much less cutting for such purposes as watch jewels. The gems are sent to Amsterdam for cutting.

## ADULTERATION OF CEREAL BREAKFAST FOODS.

The cereal breakfast foods as a class, according to Dr. Charles D. Woods and Prof. Harry B. Snyder in a bulletin issued by the Department of Agriculture, are ordinarily free from adulteration. Various experiment station chemists and public analysts in States having pure-food laws have examined the brands on the market, as indeed they examine all classes of food at frequent intervals, and found that as a general rule they were made from good, sound grain without admixture of harmful substances. Some may be made from coarse milling products, such as wheat middlings, and some doubtless contain molasses, glucose, or other similar materials which do not appear in the manufacturer's description, but which are not injurious.

Occasionally the percentage of ash or mineral matter in breakfast foods is abnormally high, but this is apparently due to common salt added to give flavor and not as an adulterant. In general, it may be said that there is every reason to suppose that the manufacturers endeavor to use wholesome materials, and that if an impurity is occasionally found in their goods it is accidental rather than intentional. Furthermore, cereal breakfast foods, as previously noted, are generally made from well-cleaned grain and are marketed in a cleanly way. In the case of the package goods the form of marketing affords special protection while the goods are in the dealer's hands and also in the household, where they are very commonly kept in the original cardboard box or package.

The tensile strength of catgut musical-instrument strings is 60,000 pounds per square inch, the elongation at rupture 15 to 19 per cent.