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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.

COSTLY IMPROVEMENTS IN NEW YORK CITY.

We have heard much talk of late about the magnitude of the Panama canal undertaking in respect of the number of men employed, the time it will take to construct, and its total cost to the country. Certainly, \$180,000,000, more or less, is a huge sum of money to be spent on a single work, even by a nation as wealthy as our own. Nevertheless, it is a fact that, at the present time, there are being carried out in New York new engineering works of magnitude, public and private, whose total cost has been estimated at not less than \$600,000,000; and much of this work has been planned, begun, and carried well on to completion, with not one-tenth of the discussion and worldwide advertisement, which has marked the operations on the Panama canal. Without entering into full particulars, it is sufficient to instance a few of the leading engineering works and their probable cost. In addition to the Catskill water supply, referred to on another page, which is to cost \$162,000,000, two leading railroads of the country are rebuilding their terminal stations, and electrifying their terminal and suburban service, at a total cost for the two, which, judging from the way things are going, will not fall far short of \$200,000,000. We refer to the electrification of the New York Central system and the construction of its new yard and station and offices, and to the carrying out by the Pennsylvania Railroad Company of similar works, which involve the construction of no less than six separate tunnels under the Hudson and East rivers and below Manhattan Island. Then there is the extensive work being done by the Hudson Companies, which are completing four tunnels below the Hudson River, and building an extensive system of subways below Jersey City and beneath the streets of Manhattan. The total cost of this work, by the time the terminal stations, yards, etc., are completed, will not be far short of \$50,000,000. The Rapid Transit Commission, moreover, have laid out extensions of the Rapid Transit Subway, of which the first installment, which will soon be begun, will call for an expenditure of not less than \$100,000,000. Add to this the two bridges which the city is building across the East River, costing together about \$40,000,000; the connecting railway illustrated in our June 8 issue with its 1,000-foot four-track steel-arch bridge over the East River, to cost from \$12,000,000 to \$15,000,000, to say nothing of a large number of minor but costly improvements, and it can be seen that the total easily amounts to the \$600,000,000 mentioned above.

AMERICAN YACHTING SEASON OF 1907.

The claim of the yachtsman that in spite of the great public interest aroused in yachting by the occurrence of the "America's" cup contests, such races are prejudicial to the interests of yachting in general, seems to be borne out by the experience of the past few seasons, in which the "America's" cup has been allowed to remain undisturbed in its resting place in the Tiffany vaults. These international races, moreover, have not only had the bad effect of monopolizing interest, but they have been the chief instruments in promoting the development of an exaggerated and unwholesome type of yacht, which is enormously costly to build and is useful for absolutely no other purpose than that of being towed out to the Sandy Hook lightship to sail a series of races in which the last conditions which the owners of either boat desire to meet are those of a reefing breeze and a heavy sea. When each race was over, the boats were worth merely as much as they would fetch when broken up for old junk.

American yachting was never in such a healthy condition as it is at the present time. The rules have been changed with a view to preventing extravagances

of construction and producing seaworthy racing craft which, although but slightly inferior in speed to the older type, are stanch and strong and capable of being utilized by their owners for cruising under whatever kind of weather may be encountered.

The improvement in yachting is to be attributed largely to the growing popularity of long-distance, deep-sea racing, a movement which was first started by some of the minor clubs and among the smaller classes of yachts. Notable among these races is that for the Bermuda cup, the first of which was held last year, and was so successful that in the second race completed two or three weeks ago, no less than a dozen competitors were entered, and made the 650-mile run successfully; while the great ocean race of two years ago promoted by the Emperor of Germany will long be remembered for the number and size of the yachts that were entered, and the remarkably fast time made by the winners.

In addition to the promotion of deep-sea races, there has been a marked revival of interest in short-distance races held over the local courses. Among the large yachts there will be a series of closely-contested struggles between that fine schooner "Ingomar," which a few years ago swept everything before her in Europe, and the two crack schooners of last year, the "Elmina" and the "Queen."

In the 65-foot class the sloop "Effort," winner of the King's cup last year, a bronze boat, will be seen in contests with that veteran and always successful sloop the "Neola," the latter having been built under the old rule, and subsequently modified to meet the conditions of the new rule. In the 57-foot class three boats, which have already shown such great speed that they have beaten the larger "Effort" and "Neola" on time allowance, have been built by Herreshoff for three enthusiastic owners, who will race them for all they are worth during the coming season.

International racing, moreover, although there will be no "America's" cup contest, will be promoted by three events, each of extreme interest. The most important of these will be the race for what are known as the Sonderklasse boats. Out of about a score of American-built yachts, three will be selected to represent this country at Kiel, where they will defend the cup won by "Vim" last year in a series of races against three German competitors, and after these races the trio will compete in a series of contests to be held in Spanish waters. Then on Lake Ontario there will be an international race for the Canada cup; while another international contest will be the dory race, to be held between boats representing the Massachusetts Dory Racing Association and the Shelburne Yacht Club of Nova Scotia.

As for the prospect of any future races for the "America's" cup, the conditions are very problematical. There will, of course, be no race this year, and thus far no challenge has been received for a race in 1908. Last year Sir Thomas Lipton made some tentative overtures to the New York Yacht Club, by endeavoring to secure from that body a statement as to whether, if he should challenge with a boat built under the new rule of the New York Yacht Club, he would be met by a yacht designed under the same rule; but for reasons known only to themselves, the committee declined to make any promises, stating that after a definite challenge had been received they would be prepared to determine what type of boat would be forthcoming. The dilemma under which the challenger would be placed under existing conditions is, that if he built under the new rule, he might be confronted by such a boat as "Reliance," or an improved "Reliance," built under the old rule, a type against which a new-rule boat would have very little chance of success in the light drifting matches which have generally prevailed in international races held over the Sandy Hook course. It is the consensus of opinion among American yachtsmen in general, that the interests of the sport would be promoted, and the building of a more healthy type of boat insured, if the New York Yacht Club would consent to a series of races by boats built under their own present rule.

FORTY-FOUR-MILE ELECTRIFICATION ON THE WEST SHORE RAILROAD.

The electrification of the 44-mile stretch of the tracks of the West Shore Railroad which has just been completed has been carried through so quietly, that little has been heard of it outside of the particular stretch of country served and the railroad and electrical companies that have been making the important change.

The new equipment extends from Utica to Syracuse, and it has been undertaken with a view to meeting certain special transportation conditions in the district to be served. Until about two years ago, the various electric lines between Albany and Buffalo were owned independently of the New York Central Railroad, in whose hands were the only steam lines offering direct service; and this company being also the owners of the West Shore Railroad, have at their disposal six separate steam railroad tracks across the State. The

New York Central took care of the passenger traffic and the fast freight, while the West Shore Railroad was devoted almost exclusively to freight service, only two or three through trains being run daily between New York and Buffalo. About ten years ago, with the completion of the interurban electric railroad from Buffalo to Niagara Falls, the steam railroad began to be confronted with an active competitor for the passenger service. The success of that line led to the construction of others, and gradually the scheme for a continuous interurban electric line from Buffalo to Albany began to appear feasible. At this time the New York Central began to gather in the various electrical lines that were in close competition with its steam lines, and having acquired these properties began to make a study of the problem of distributing the service to the best advantage between the electric and steam systems. On the stretch of country lying between Utica and Syracuse, the West Shore and the New York Central lines draw farther apart than at any other point in their route across the State, the distance by the West Shore line being about seven miles shorter than by the New York Central. The electrification of the West Shore line resulted from an agreement between the Oneida Railway Company and the New York Central Railroad Company, under which the former leased the tracks of the West Shore Railroad between Utica and Syracuse, equipped them for electrical operation, and is to conduct the passenger business. The New York Central, on the other hand, abandoned the West Shore local trains, but reserves the right to run its through steam trains and haul its steam freight trains as before.

The recent improvements have consisted of the addition to the two steam tracks already existing of fourteen additional miles of third and fourth tracks, and the relaying of the road throughout with 80-pound rail. Over this road there will be three classes of service, namely, fast electric trains, for single cars, making two stops only; local trains; and the steam service.

As between the single-phase high-voltage system with catenary overhead construction and the low-pressure direct-current system with third-rail distribution, it was decided that the latter would be more suitable to the conditions. In making the comparison, it was found that the cost of the overhead system and motor equipment for the single-phase system would be about as great as that of the direct system with sub-stations. With the overhead catenary construction, 1,250,000 pounds of copper would have been necessary for the feeders and trolley wire; but with the third-rail system the distribution would be through steel rails, which might more readily be used elsewhere in case a future change should be made. The fast electric cars or trains will make the run between Syracuse and Utica in one hour and twenty-eight minutes, and of this total time, twenty-eight minutes will be consumed on the local service in the suburbs of each city, the run between the cities themselves being made in one hour. The local trains will run at a speed of twenty-four miles an hour, and complete the 44-mile run in one hour and fifty-eight minutes.

An enterprise of considerable importance is now being carried out under the direction of the Swedish government. This consists in the use of the Tröllhattan Falls in order to operate a turbine plant. Current is to be generated in the station, and a power distribution line will be run for a distance of 45 miles to the city of Gothenburg. The work is undertaken in such a way as not to detract from the appearance of the falls or the surrounding country, nor on the other hand to cause any bad effect to the operation of the canal which connects Lake Wener with the Göta Elff and the Kattogat. As to the quantity of water which can be obtained by the present hydraulic construction, it is calculated to be 320 cubic meters (11,200 cubic feet) at low-water periods. Upon this total, 62 cubic meters (2,170 cubic feet) are to be reserved for the supply of the canal and 8 cubic meters (283 cubic feet) for a small hydraulic plant which is already erected at this point. A head of water of 70 meters (231 feet) is counted upon, and the total amount of power which can be obtained by the present plant is 75,000 horse-power. According to the present designs, the turbine house is to contain a certain number of 10,000-horse-power turbine and dynamo groups, using the Francis type of turbines. As a result of the current supply which will be secured in this case, it is probable that ore from the north of Sweden will be transported to Gothenburg and will be treated by an electric process in large works which are to be erected for the purpose. An electric railroad will be built specially for the hauling of the ore.

Consul Frank Hannah of Magdeburg sends information of a new German composition to take the place of cedar in lead pencils. The principal ingredient of the substitute is potatoes. The pencils are now being manufactured and soon will be on the market. It is estimated that to manufacture these pencils will take about half of the time required to make cedar pencils.